



GARDENA CITY COUNCIL

Regular Meeting Notice and Agenda

Council Chamber at City Hall

1700 West 162nd Street, Gardena, California

Website: www.cityofgardena.org

Tuesday, April 26, 2022
Closed Session 7:00 p.m.
Open Session 7:30 p.m.

TASHA CERDA, *Mayor*

RODNEY G. TANAKA, *Mayor Pro Tem*

PAULETTE C. FRANCIS, *Council Member*

ART KASKANIAN, *Council Member*

MARK E. HENDERSON, *Council Member*

MINA SEMENZA, *City Clerk*

J. INGRID TSUKIYAMA, *City Treasurer*

CLINT OSORIO, *City Manager*

CARMEN VASQUEZ, *City Attorney*

LISA KRANITZ, *Assistant City Attorney*

PETER L. WALLIN, *Deputy City Attorney*

In order to minimize the spread of the COVID 19 virus Governor Newsom has signed AB 361. Please be advised that the Council Chambers are closed to the public and that some, or all, of the Gardena City Council Members may attend this meeting telephonically.

If you would like to participate in this meeting, you can participate via the following options:

1. VIEW THE MEETING live on SPECTRUM CHANNEL 22 or ONLINE at [youtube.com/CityofGardena](https://www.youtube.com/CityofGardena)
2. PARTICIPATE BEFORE THE MEETING by emailing the Deputy City Clerk at publiccomment@cityofgardena.org by 5:00p.m. on the day of the meeting and write "Public Comment" in the subject line.
3. PARTICIPATE DURING THE MEETING VIA ZOOM WEBINAR
 - <https://us02web.zoom.us/j/83329578514>
Phone number: US: +1 669 900 9128, Meeting ID: 833 2957 8514
Press *9 to Raise your Hand and *6 to unmute when prompted.
 - If you wish to speak live on a specific agenda item during the meeting you, may use the "Raise your Hand" feature during the item you wish to speak on. For Non-Agenda Items, you would be allowed to speak during Oral Communications, and during a Public Hearing you would be allowed to speak when the Mayor opens the Public Hearing. Members of the public wishing to address the City Council will be given three (3) minutes to speak.
4. The City of Gardena, in complying with the Americans with Disabilities Act (ADA), requests individuals who require special accommodations to access, attend and/or participate in the City meeting due to disability, to please contact the City Clerk's Office by phone (310) 217-9565 or email bromero@cityofgardena.org at least 24 business hours prior to the scheduled general meeting to ensure assistance is provided. Assistive listening devices are available.

The City of Gardena thanks you in advance for taking all precautions to prevent spreading the COVID 19 virus.

STANDARDS OF BEHAVIOR THAT PROMOTE CIVILITY AT ALL PUBLIC MEETINGS

- Treat everyone **courteously**;
- Listen to others **respectfully**;
- Exercise **self-control**;
- Give **open-minded** consideration to all viewpoints;
- Focus on the issues and **avoid personalizing debate**; and
- **Embrace respectful disagreement** and dissent as democratic rights, inherent components of an inclusive public process, and tools for forging sound decisions.

Thank you for your attendance and cooperation

1. ROLL CALL

PUBLIC COMMENT ON CLOSED SESSION

The City Council will hear from the public only on the items that have been described on this agenda (GC §54954.3)

2. CLOSED SESSION

2.A CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION

Gov. Code Section 54956.9(d)(1)

City of Gardena v. Marine Avenue Investments, LLC, etc.,

L.A. Sup. Ct. Case No. 22TRCP00041

2.B CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION

Gov. Code Section 54956.9(d)(1)

Edwardo Vargas vs City of Gardena

WCAB NO.: ADJ11869883; ADJ11449176

2.C CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION

Gov. Code Section 54956.9(d)(1)

Louie Schwartz vs City of Gardena

WCAB NO.: ADJ9043150, ADJ9199118

2.D CONFERENCE WITH LEGAL COUNSEL- EXISTING LITIGATION

Gov. Code Section 54956.9(d)(1)

Vanessa Reveter vs City of Gardena

WCAB NO.: ADJ7151609, ADJ7042022, ADJ9764617, ADJ7042820

3. PLEDGE OF ALLEGIANCE

Courtney Preston and Kaylee Houston

156th Street Elementary School

4. INVOCATION

Presented by Mayor Pro Tem Rodney G. Tanaka

5. PRESENTATIONS

5.A City of Gardena's June 7, 2022 Election Presentation - *to be given by City Clerk Mina Semenza*

5.B Boards & Commissions Update - Beautification Commission

6. **PROCLAMATIONS**

6.A "Older Americans Month" - *To be Proclaimed Only*
[Proclaim Only-Older Americans Month- May 2022.pdf](#)

6.B 53rd Annual Municipal Clerk's Week, May 1-7, 2022 - *to be accepted by City Clerk Mina Semenza*
[Proclamation - Municipal Clerks Week-2022.pdf](#)

6.C "Day of Remembrance of the Armenian Genocide" - April 24, 2022 - *To be Proclaimed Only*
[Proclaim Only-Armenian Genocide 2022.pdf](#)

7. **APPOINTMENTS**

8. **CONSENT CALENDAR**

NOTICE TO THE PUBLIC- Roll Call Vote Required On The Consent Calendar

All matters listed under the Consent Calendar will be enacted by one motion unless a Council Member requests Council discussion, in which case that item will be removed from the Consent Calendar and considered separately following this portion of the agenda.

8.A Waiver of Reading in Full of All Ordinances Listed on This Agenda and that they Be Read by Title Only
CONTACT: CITY CLERK

8.B Approve Minutes:
Regular Meeting of the City Council, March 22, 2022
CONTACT: CITY CLERK
[04122022 REGULAR Minutes Gardena CC Meeting - FINAL.pdf](#)

8.C Approval of Warrants/Payroll Register, April 26, 2022
CONTACT: CITY TREASURER
[Consent Calendar Memo 04-26-22.pdf](#)

8.D Personnel Report P-2022-8 4-26-22
CONTACT: HUMAN RESOURCES
[PERS_RPT_P-2022-8_4-26-22.doc](#)

8.E RESOLUTION NO. 6573, Making the legally required findings to Re-Authorize the use of Teleconferencing in accordance with Assembly Bill 361 for meetings of the Gardena City Council and other Commissions, Committees and Boards subject to State open meeting laws.
CONTACT: CITY MANAGER
[RESO NO 6573.pdf](#)

- 8.F [Approve Amendment 02 to Local Agreement CCTR-1084 with the California Department of Social Services for additional funding of the Gardena Family Child Care Program](#)
CONTACT: RECREATION & HUMAN SERVICES
[CCTR-1084-02.pdf](#)

9. **EXCLUDED CONSENT CALENDAR**

10. **PLANNING & ENVIRONMENTAL QUALITY COMMISSION ACTION SHEET**

ORAL COMMUNICATIONS (LIMITED TO A 30-MINUTE PERIOD)

Oral Communications by the public will be heard for one-half hour at or before 8:30 p.m. or at the conclusion of the last agenda item commenced prior to 8:30 p.m. Oral Communications not concluded at that time shall be resumed at the end of the meeting after Council Reports. Speakers are to limit their remarks to three minutes, unless extended by the Mayor. An amber light will appear to alert the speaker when two minutes are complete, and a red light will appear when three minutes are over. Your cooperation is appreciated.

11. **DEPARTMENTAL ITEMS - ADMINISTRATIVE SERVICES**

12. **DEPARTMENTAL ITEMS - COMMUNITY DEVELOPMENT**

- 12.A [PUBLIC HEARING: ORDINANCE NO. 1840: Adopting Chapter 18.74 to Title 18, Zoning, of the Gardena Municipal Code Relating to Reasonable Accommodations Policy and Procedures and Directing Staff to File a Notice of Exemption from California Environmental Quality Act Pursuant to the Common Sense Exemption.](#)

Staff Recommendation: Conduct a Public Hearing; Please allow three (3) minutes for each speaker; and Introduce Ordinance No. 1840
[Planning Commission Packet, Dated February 15, 2022.pdf](#)
[Ordinance No. 1840](#)

13. **DEPARTMENTAL ITEMS - ELECTED & CITY MANAGER'S OFFICES**

13.A Financial Transparency Dashboard

13.B COVID-19 Update

14. **DEPARTMENTAL ITEMS - POLICE**

- 14.A [PUBLIC HEARING: ORDINANCE NO. 1841, Adopting a Military Equipment Use Policy of the City of Gardena, California Governing the Use of Military Equipment pursuant to Assembly Bill 481](#)

Staff Recommendation: Conduct a Public Hearing, please allow three (3) minutes for each speaker, and introduce Ordinance No. 1841.
[Attachment 1 - AB 481.pdf](#)
[Attachment 2 - Gardena Ordinance No 1841 with Exhibit A \(Military Equipment Policy\).pdf](#)

15. **DEPARTMENTAL ITEMS - PUBLIC WORKS**

- 15.A [Approve Consultation Contract for HF&H Consultants, LLC to Monitor the Solid Waste Contract and Manage Senate Bill 1383 Requirements for the City of Gardena.](#)

Staff Recommendation: Approve Consultation Contract

[City of Gardena HFH Consultants Proposal to Provide Consulting Services Final.pdf](#)
[HFH Consultant City Agreement 2022.pdf](#)

- 15.B [RESOLUTION NO. 6554](#), Approving the Engineer's Report for the Gardena Artesia Boulevard Landscaping Assessment District for fiscal year 2022-2023, declaring its intention to levy and collect assessments under the Gardena Artesia Boulevard Landscaping Assessment District for fiscal year 2022-2023, and setting a time and place for hearing protests in relation thereto (Public Hearing: May 24, 2022)

Staff Recommendation: Adopt Resolution No. 6554

[Gardena Landscape Engineer's Report 2022-23.pdf](#)
[Resolution No. 6554.pdf](#)

- 15.C [RESOLUTION NO. 6555](#), Approving the Engineer's Report for the Gardena Consolidated Street Lighting Assessment District for fiscal year 2022-2023, declaring its intention to levy and collect assessments under the Gardena Consolidated Street Lighting District for fiscal year 2022-2023, and setting a time and place for hearing protests in relation thereto (Public Hearing: May 24, 2022)

Staff Recommendation: Adopt Resolution No. 6555

[Gardena SLD Engineer's Report 2022-23.pdf](#)
[Resolution No. 6555.pdf](#)

16. **DEPARTMENTAL ITEMS - RECREATION & HUMAN SERVICES**

17. **DEPARTMENTAL ITEMS - TRANSPORTATION**

- 17.A [Approve Purchase of 14, 40-foot Compressed Natural Gas \(CNG\) Buses for \\$11,763,501 and Authorize Program Total of \\$12,351,676](#)

Staff Recommendation: Approve Purchase and Program Total

[Assignment Agreement_Gardena_Executed.pdf](#)
[Gardena Option Quote - \(14\) Buses REV2.pdf](#)
[ENC Bus Breakdown.pdf](#)
[Contract OP28367_Volume I_Group A_ENC_Final_Signed.pdf](#)
[Complete Amendments to OPS28367-000 \(#1 to #20\).pdf](#)

- 17.B [Approve Fuel Contract Increases with Pinnacle Petroleum and Clean Energy for the Purchase of Gasoline and Compressed Natural Gas \(CNG\) for FY22](#)

Staff Recommendation: Approve Fuel Contract Increases

[City Council Approval of Blanket POs 8_10_2021.pdf](#)

18. **COUNCIL ITEMS**

19. **COUNCIL DIRECTIVES**

20. **CITY MANAGER REMARKS RE: DIRECTIVES / COUNCIL ITEMS**

21. **COUNCIL REMARKS**

1. COUNCIL MEMBER HENDERSON
2. COUNCIL MEMBER FRANCIS
3. MAYOR PRO TEM TANAKA
4. MAYOR CERDA
5. COUNCIL MEMBER KASKANIAN

22. **ANNOUNCEMENT(S)**

23. **REMEMBRANCES**

24. **ADJOURNMENT**

The Gardena City Council will adjourn to the Closed Session portion of the City Council Meeting at 7:00 p.m. followed by the Regular City Council Meeting at 7:30p.m. on Tuesday, May 10, 2022.

I hereby certify under penalty of perjury under the laws of the State of California that the foregoing agenda was posted in the City Hall lobby not less than 72 hours prior to the meeting. A copy of said Agenda is available on our website at www.CityofGardena.org.

Dated this 22nd day of April 2022

/s/ MINA SEMENZA
MINA SEMENZA, City Clerk

“ OLDER AMERICANS MONTH ”

~ MAY 2022 ~

Every May, the nation celebrates Older Americans Month. Gardena is fortunate to have countless older Americans who enrich and strengthen our community; and the City of Gardena is committed to engaging and supporting older adults, their families, and caregivers.

We acknowledge that communities benefit when people of all ages, abilities, and backgrounds are welcomed, included, and supported.

The theme for 2022 is **Age My Way**. Older adults continue to be a pillar of Gardena, which is why it is important that we explore the many ways that they can remain and be involved in our community. During this year's Older Americans Month, we will investigate how planning, participation, accessibility, and the power of connection all play a role in aging in place, while also understanding the individuality of each person's needs and preferences.

The City of Gardena can work to build an even better community for older residents by planning programs that encourage independence, ensuring activities are responsive to individual needs and preferences, and increasing access to services that support aging in place. By engaging and supporting all community members, we recognize that older adults play a key role in the vitality of our neighborhoods, networks, and lives. Connecting with others is one of the most important foundations of a community.

In support of this nationwide observance, I, Tasha Cerda, Mayor of the City of Gardena, California, am pleased to proclaim **May 2022**, to be

“OLDER AMERICANS MONTH”

in our City and encourage every resident to take time this month to recognize the contributions of older adults, help to build an inclusive society, and join efforts to support older Americans' choices about how they age in their communities.





PROCLAMATION

WHEREAS, the Office of the Municipal Clerk is a time-honored and vital part of local governments throughout the world, and is the oldest among public servants; and

WHEREAS, the Office of Municipal Clerk provides the professional link between citizens, local governing bodies, and agencies of government at other levels; and

WHEREAS, Municipal Clerks have pledged to be ever mindful of their neutrality and impartiality, rendering equal service to all; and

WHEREAS, the Office of the Municipal Clerk serves as the information center on the functions of local government and the community; and

WHEREAS, Municipal Clerks continually strive to improve the administration of the affairs of the Office of the Municipal Clerk through participation in education programs, seminars, workshops, and the annual meetings of their state, province, county, and international professional organizations; and

WHEREAS, it is most appropriate that we recognize the accomplishments of the Office of Municipal Clerk;

NOW, THEREFORE, I, TASHA CERDA, MAYOR OF THE CITY OF GARDENA, CALIFORNIA, hereby declare **May 1 through May 7, 2022**, to be the

FIFTY-THIRD ANNIVERSARY OF MUNICIPAL CLERKS WEEK

in the City of Gardena; and further, extend appreciation to Gardena's Municipal Clerk MINA SEMENZA, and to all Municipal Clerks, for the vital services they, their Deputies, and staff members perform, and for their exemplary dedication to the communities they represent.

Tasha Cerda

MAYOR

Dated: 26th day of April, 2022

**“ Day of Remembrance
of the Armenian Genocide ”**
— 24th Day of April 2022 —

On April 24, 1915, the Ottoman Empire began its systematic genocide of the Armenian people, a minority group that had long been treated as second-class citizens. The Armenian Genocide began with forced deportations and the murder of hundreds of Armenian intellectuals and community leaders. This ended eight years later with the deaths of more than 1.5 million men, women, and children. This marked the first genocide of the 20th century.

Since memories fade with time, it is important to remind ourselves about human tragedies that have taken place. Those who survived the Armenian genocide and their successors have had to work hard to make these tragic events known to the world; battling cover-ups, misinformation, and denial.

As we remember the victims and survivors of the Armenian Genocide, we also honor their strength and resilience. As a community, it is appropriate for us to stand together and join our Armenian brothers and sisters to memorialize their fallen ancestors.

Therefore, I, Tasha Cerda, Mayor of the City of Gardena, California, hereby proclaim the **24th Day of April 2022**, to be

“ Day of Remembrance of the Armenian Genocide ”

in the City of Gardena and encourage all citizens to recommit ourselves to making sure we never forget the Armenian Genocide, and that we always speak out against hatred and atrocities when they occur in our community and throughout our Nation.

MINUTES
Regular Meeting of the
Gardena City Council
Tuesday, April 12, 2022

In order to minimize the spread of the COVID 19 virus, Governor Newsom has signed Assembly Bill 361. Please be advised that the Council Chambers are closed to the public and that some, or all, of the Gardena City Council Members may attend this meeting telephonically.

The Regular Meeting Notice and Agenda of the Gardena City Council of the City of Gardena, California, was called to order at 7:33 PM on Tuesday, March 22, 2022, via Zoom, Mayor Tasha Cerda presiding.

1. ROLL CALL

Present: Mayor Tasha Cerda; Mayor Pro Tem Rodney G. Tanaka; Council Member Mark E. Henderson; Council Member Art Kaskanian; and Council Member Paulette C. Francis; Other City Officials and Employees present: City Manager Clint Osorio; City Attorney Carmen Vasquez; and City Clerk Mina Semenza.

PUBLIC COMMENT ON CLOSED SESSION - None

2. CLOSED SESSION - None

3. PLEDGE OF ALLEGIANCE

Crystal Contreras led the Pledge of Allegiance. Crystal Contreras is a new Recreation Leader I for the City of Gardena. She works for one of our Afterschool Programs located at Freeman Park. She's been a Gardena resident since birth and loves that she is able to LIVE, WORK & PLAY in the City which she loves.

4. INVOCATION

Presented by Mayor Pro Tem Rodney G. Tanaka.

5. PRESENTATIONS

- 5.A Certificate of Recognition to Roy Kim in Appreciation of His Service to the Community as a Member of the Human Services Commission
- Mayor Cerda expressed her gratitude and thanked Mr. Kim for serving in the Member of the Human Service Commission.

6. PROCLAMATIONS

- 6.A "DMV / DONATE LIFE MONTH," April 2022
- was proclaimed by Mayor Cerda

Gaylynn Thomas came into the meeting and thanked Council for bringing awareness to the Community. She shared her story about donor donation. Mayor Cerda thanked her for sharing her first-hand experience.

- 6.B "CHALLENGE THE NORM AND INFLUENCE OF MARIJUANA USE ON YOUTH DAY." April 20, 2022 - ***was proclaimed by Mayor Cerda***

Proclamation was accepted by Traci Sarawatari, Advisor to G-DDAP (Gardena Drug & Alcohol Prevention), she thanked Mayor and Council for the support. Valentina Martinez Garcia, one of her students, came into the meeting and expressed her concerns and explained her point of view regarding marijuana use in the youth community.

7. APPOINTMENTS

- 7.A Council Appointments to Commissions, Committees, Councils and Boards (Appointees to be Ratified and Sworn In)

Human Services Commission – Tanoh Amoa (King Nat) Jr. - ***was Appointed by Mayor Cerda***

Tanoh Amoa (King Nat) Jr. came into the meeting and thanked Mayor Cerda and Council for his appointment to the Human Services Commission.

It was moved by Mayor Cerda, seconded by Mayor Pro Tem Tanaka, and carried by the following roll call vote to Appoint Tanoh Amoa (King Nat) Jr. to the Human Services Commission:

Ayes: Mayor Cerda, Mayor Pro Tem Tanaka, and Council Members Henderson, Kaskanian, and Francis

Noes: None

Absent: None

8. CONSENT CALENDAR

- 8.A Waiver of Reading in Full of All Ordinances Listed on This Agenda and that they Be Read by Title Only

CONTACT: CITY CLERK

- 8.B Approve Minutes:

Regular Meeting of the City Council, March 22, 2022

Special Closed Session of the City Council, March 28, 2022

CONTACT: CITY CLERK

- 8.C Approval of Warrants/Payroll Register, April 12, 2022

CONTACT: CITY TREASURER

April 12, 2022: Wire Transfer: 12141-12151; Prepay: 166794- 166798; Check Nos: 166799 -167033 – for a total Warrants issued in the amount of \$4,321,802.06 Total Payroll Issued for March 25, 2022: \$2,175,989.25. Total Payroll Issued for April 8, 2022: \$1,509,085.88

- 8.D Monthly Portfolio, February 2022

CONTACT: CITY TREASURER

- 8.E Personnel Report P-2022-7 4-12-22

CONTACT: HUMAN RESOURCES

- 8.F RESOLUTION NO. 6571 Amending the List of Authorized Games and Authorizing the Play of Certain Games in Licensed Card Clubs

CONTACT: CITY MANAGER

RESOLUTION NO. 6571

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, AMENDING THE LIST OF AUTHORIZED GAMES AND AUTHORIZING THE PLAY OF CERTAIN GAMES IN LICENSED CARD CLUBS

- 8.G RESOLUTION NO. 6572, Making the legally required findings to Re-Authorize the use of Teleconferencing in accordance with Assembly Bill 361 for meetings of the Gardena City Council and other Commissions, Committees and Boards subject to State open meeting laws.

CONTACT: CITY MANAGER

RESOLUTION NO. 6572

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, MAKING THE LEGALLY REQUIRED FINDINGS TO RE-AUTHORIZE THE USE OF TELECONFERENCING IN ACCORDANCE WITH ASSEMBLY BILL 361 FOR MEETINGS OF THE GARDENA CITY COUNCIL AND OTHER COMMISSIONS, COMMITTEES AND BOARDS SUBJECT TO STATE OPEN MEETING LAWS

- 8.H Award engineering design services for the Budlong Avenue and Halldale Avenue Street Improvements Project, JN985, in the amount of \$123,865 to Kreuzer Consulting Group.

CONTACT: PUBLIC WORKS

- 8.I Approve Contract Increases with MACRO, a Division of Ross & Baruzzini for GTrans Scheduling and Operations Management Project and GTrans Real-Time Information Deployment Project (GRID)

CONTACT: TRANSPORTATION

It was moved by Council Member Francis, seconded by Council Member Henderson, and carried by the following roll call vote to Approve all Items on the Consent Calendar with the exception of Items 8.H and 8.I:

Ayes: Council Members Francis, Henderson, Mayor Pro Tem Tanaka, and Council Member Kaskanian, and Mayor Cerda

Noes: None

Absent: None

9. EXCLUDED CONSENT CALENDAR

- 8.H PUBLIC WORKS - Award engineering design services for the Budlong Avenue and Halldale Avenue Street Improvements Project, JN985, in the amount of \$123,865 to Kreuzer Consulting Group.

This Item was pulled by Council Member Francis; she asked for clarification of the project; Public Works Director Allan Rigg came into the meeting and answered her question.

- 8.I TRANSPORTATION - Approve Contract Increases with MACRO, a Division of Ross & Baruzzini for GTrans Scheduling and Operations Management Project and GTrans Real-Time Information Deployment Project (GRID).

This Item was pulled by Council Member Francis; she asked if this contract was from a previous meeting and are the funds coming out of the general fund. Director Crespo and City Manager Osorio explained the contract and funds in detail.

It was moved by Council Member Francis, seconded by Council Member Henderson, and carried by the following roll call vote to Approve Items 8.H and 8.I:

Ayes: Council Members Francis, Henderson, Mayor Pro Tem Tanaka, and Council Member Kaskanian, and Mayor Cerda

Noes: None

Absent: None

10. PLANNING & ENVIRONMENTAL QUALITY COMMISSION ACTION SHEET

- 10.A April 5, 2022 MEETING - ***Meeting Cancelled***

ORAL COMMUNICATIONS

- 1) Sherelle Diggs, resident: she wanted to let Council know about how the lights are not synchronized from RBB at Budlong, where there is always a traffic jam at Popeyes Chicken going north to Rosecrans.

11. DEPARTMENTAL ITEMS - ADMINISTRATIVE SERVICES

- 11.A Approve Contract with TCS Risk Management Services for Third Party Administrator (TPA) Selection Process for Worker's Compensation Claims Administration

City Manager Osorio presented the Staff Report.

There was a discussion which included Council regarding the Adminsure contract; if we would get penalized if we canceled it before its term date; if TCS was going to find a third-party consultant, and if so, how long does that usually take, and do they get a flat fee; and how many people is this going to affect. City Manager Osorio and City Attorney Vasquez answered all of Council's questions.

It was moved by Mayor Pro Tem Tanaka, seconded by Council Member Henderson, and carried by the following roll call vote to Approve Contract:

Ayes: Mayor Pro Tem Tanaka and Council Members Henderson, Kaskanian, Francis, and Mayor Cerda

Noes: None

Absent: None

11.B Capital Improvement Project Update

City Manager Osorio presented the Staff Report.

There was a discussion which included Mayor and Council regarding as we get better at these grants can we see what we could do to offset some of the costs at the Rosecrans Community Center; and the deferred maintenance at the Fire Station; it was then asked if we get to record half of that facility on our balance sheet. Great praise was given to City Manager Osorio and his team; it was mentioned that a lot of these projects were under budget, even the Measure G money was a godsend; we promised to use it and we are doing just that; it was also discussed that a lot of this was long overdue; it was then asked if we could explain to the public where we are going as far as our streets our concerned; and if the Council could be notified when we get to the next number. It was also asked why Vermont is so bad and then again in Torrance. City Manager Osorio and Public Works Director Rigg gave explanations and answered all of Council's questions.

Public Speakers: 1) Claudia; and 2) Sherelle Diggs voiced their concerns regarding our parks.

This Item was Received and Filed

12. DEPARTMENTAL ITEMS - COMMUNITY DEVELOPMENT

- 12.A PUBLIC HEARING: RESOLUTION 6570, Upholding the Decision of the Planning Commission Approving Site Plan Review #5-21, Conditional Use Permit #5-21, and Conditional Use Permit #6-21 to Develop A 121- Unit Single Room Occupancy Housing Development, With Seven Affordable Units, and Two, Six-Tier Automated Parking Structures on a One-Acre Property in the M-1 (Industrial) Zone with, and Directing Staff to File A Notice of Exemption for a Class 32 In-Fill Development Or Reversing the Decision and Denying the Applications
APPLICANT: West Realty Group, Inc., Lee Johnson
LOCATION: 13126 South Western Avenue

City Manager Osorio presented the Staff Report.

Senior Planner Amanda Acuna gave the PowerPoint presentation and was available for any questions. Assistant City Attorney Lisa Kranitz and Community Development Director Greg Tsujiuchi, and Environmental Consultant Rita Garcia were also available for any questions.

Applicant of West Realty Group, Inc., Lee Johnson, explained the purpose of the project in detailed and its benefits to the new reliable tenants. He was available for any questions.

Mayor Cerda opened the Public Hearing at 9:10 p.m. and asked if there were any comments from the public.

Public Speakers:

Claudia; Gardena Resident; Zahid Ahmed; Wanda Love; Cherise: All expressed their concerns and spoke in opposition of the project.

Sherelle Diggs, asked how residents can apply for the low-income units and why are current Gardena residents not the primary target audience.

There was a discussion that included our Mayor and our Council Members. Some of the items discussed were when did we adopt the Ordinance that approved the SRO; and was the minimum square footage 350; Council Member Francis wanted to make a point of clarification to Mr. Johnson when she mentioned food scarcity as a factor that identified disadvantaged communities that was the sole purpose; if we move forward if we are going to get the color blue; it was stated that we are giving our residents options. Assistant City Attorney Kranitz, Community Development Director Tsujiuchi and Senior Planner Acuna answered all of Council's questions.

There was no further comment, Mayor Cerda closed the Public Hearing at 9:40 p.m.

It was moved by Mayor Pro Tem Tanaka, seconded by Council Member Kaskanian, and carried by the following roll call vote to Approve Option 2 – Make a motion to rescind the previous action on this matter denying the project and adopt Resolution No. 6570 approving the project:

Ayes: Mayor Pro Tem Tanaka and Council Members Kaskanian, Henderson, and Mayor Cerda

Noes: Council Member Francis

Absent: None

13. DEPARTMENTAL ITEMS - ELECTED & CITY MANAGER'S OFFICES

13.A COVID-19 Update

City Manager Osorio presented the update.

14. DEPARTMENTAL ITEMS – POLICE – No Items

15. DEPARTMENTAL ITEMS - PUBLIC WORKS

15.A Approve and authorize Director of Public Works to execute an Authorization for Crossing Improvements between the City of Gardena and Union Pacific Railroad (UPRR) for the Artesia Boulevard Arterial Improvement Project JN 935.

City Manager Osorio presented the Staff Report.

Director of Public Works Allan Rigg, was available for any questions.

Public Speaker: Zahid Ahmed came into the meeting and voiced his concerns.

There was a discussion which included Mayor and Council regarding hours of construction; why they can't fix the railroad tracks near the lumberyard; if the money that is being budgeted is Measure R, Prop C, ours, or the RR; Director Rigg answered all of Council's questions.

It was moved by Council Member Henderson, seconded by Council Member Francis, and carried by the following roll call vote to Authorized the Director of Public Works to execute an Authorization for Crossing Improvement with UPRR:

Ayes: Council Members Henderson, Francis, Mayor Pro Tem Tanaka, and Council Member Kaskanian, and Mayor Cerda

Noes: None

Absent: None

- 15.B Award Construction Contract for the Pedestrian Safety Improvement FY 2021-2022 Project, JN 993, to Ruiz Concrete and Paving, Inc., in the amount of \$285,635.00, Declare California Environmental Quality Act (CEQA) Exemption, Approve the Project Plans & Specifications and Budget Contingency.

City Manager Osorio presented the Staff Report.

Public Speaker: Zahid Ahmed: came into the meeting and voiced his concerns.

Council Member Francis asked how many sites were selected and if some can be added. Public Works Director Rigg answered all of her questions.

It was moved by Mayor Pro Tem Tanaka, seconded by Council Member Kaskanian, and carried by the following roll call vote to Award Construction Contract, Declare CEQA Exemption, Approve the Project Plans and Specifications, and Approve Expenditures of Remaining Budget as Contingency:

Ayes: Mayor Pro Tem Tanaka and Council Members Kaskanian, Henderson, Francis, and Mayor Cerda

Noes: None

Absent: None

16. DEPARTMENTAL ITEMS - RECREATION & HUMAN SERVICES – *No Items*

17. DEPARTMENTAL ITEMS – TRANSPORTATION – *No Items*

18. COUNCIL ITEMS – *No Items*

19. COUNCIL DIRECTIVES

Council Member Kaskanian

- 1) Requested a Proclamation for Armenian Genocide Remembrance Day, observed every 24 April. *Council Member Francis seconded it.*

- 2) Question or Directive for City Manager Osorio: Follow-up regarding Casinos Business Interruption Insurance for loss revenue. City Manager Osorio address the directive and stated that the City received 1.7 or 1.8 million to augment the loss of revenue that the city experience during the shutdown of the Lucky Lady.

Council Member Francis

- 1) Asked for an update regarding the COVID relief funds for our small businesses: What businesses benefited from the funds. City Manager Osorio stated that a full report was provided in a previous meeting, and he can resubmit the report that was generated for her review.
- 2) Asked for an update regarding the COVID relief funds for renters. City Manager Osorio reiterated that the request was also covered, and report will be sent to her.
- 3) Asked is there a Plan for Reopening the City and is there a way to update our residents of when the City fully reopens with no restrictions – “back to normal”. *Seconded by Mayor Cerda.*

City Manager Osorio explained that when the City gets to that point all outlets will be used to make everyone aware. Council Member Henderson stated that he would like to add a PSA to inform every one of the City Council Meetings.

- 4) Asked about the Prescription Drug Take-Back Day Event.
- 5) Asked for a letter of support to Maxine Waters in support of a Grant Proposal to divide funds for Autism Therapy Services. *Seconded by Council Member Henderson.*
- 6) Asked for a letter of support for a specific organization to get a grant for California Homeless Families. Mayor Cerda asked for additional information. City Attorney asked that she send the email to all Council Members for their review.

Council Member Henderson

- 1) Asked if our Homeless Plan dependent on us getting funding for homelessness.
- 2) In regard to traffic mitigation and counter measures research, can PD look into additional counter measure possibilities for 147th and 157th streets. *Seconded by Mayor Pro Tem Tanaka.*
- 3) Asked for status of Wi-Fi project for Rowley Park. City Manager Osorio stated that a report is being generated. Mayor Pro Tem Tanaka added that the COG has available funds for broadband

20. CITY MANAGER REMARKS RE: DIRECTIVES / COUNCIL ITEMS

City Manager Osorio gave a verbal report of information to follow-up on matters that had been directed or requested by the Mayor and Members of Council. Those items were, as follows:

1. The City received 1.4 million dollars to complete the Aquatic and Senior Center Renovation Project and also held the Groundbreaking Ceremony in front of Primm Pool.
2. Video presentation highlighting the Recreation and Human Services Department current and future events:
 - Garden Party, Thursday, March 24, 2022, from 5:30 p.m. – 6:30 p.m. at the City Hall Lawn. Special guest Congresswoman Maxine Waters.
 - Groundbreaking Ceremony, Community Aquatics & Senior Center on Thursday, April 7, 2022, at 10:00 a.m. 1654 W. 160th St, Gardena.
 - Spring Yard Sale, Saturday, April 9, 2022, at 7:00 a.m. – 1:00 p.m., Mas Fukai Park 15800 Brighton Ave., Gardena.
 - The Easter Bunny is Hopping into Gardena. Our bunny is feeling generous and will be giving away special surprises to our community members! You may see our bunny at your favorite local eatery. Locations hints will be posted on our social media pages.
 - Under the Sea Bingo, Thursday, April 14, 2022, 11:30 a.m. – 1:00 p.m. at the Nakaoka Community Center Auditorium. Seniors 60+, Enjoy Lunch & Play for free to Win Prizes! Pre-register by calling the Senior Citizens Bureau at 310-217-9552.
 - Spring Carnival at Mas Fukai Park on Friday, April 15, 2022: 5:00 p.m. – 11:00 p.m; Saturday, April 16, 2022: 2:00 p.m. – 11:00 p.m; Sunday, April 17, 2022: 2:00 p.m. – 10:00 p.m.
 - Easter at the Parks, Saturday, April 16, 2022, 10:00 a.m. – 12:00 p.m. at Freeman and Rowley Park. Egg Hunt Starts at 10:00 a.m. ages 12 & under.
 - Breakfast with the Easter Bunny at City Hall Lawn, Saturday, April 16, 2022, 8:30 a.m. – 11:30 a.m. Free Egg Hunt 10:30 a.m. (ages 12 & under).
 - Free COVID-19 Vaccinations Mobil Clinic, Tuesday, April 19, 2022, City Hall Complex Lawn, 1700 W. 162nd St., Gardena. Please call (310)217- 9537 for an appointment.
 - Happy Earth Day, Saturday, April 23, 2022, 8:00 a.m. – 2:00 p.m. Earth Day Community Clean-Up and Celebration Come Join Our Efforts to Keep Gardena Beautiful. For further information contact (310)217-9537.
 - Join Us for Our First-Ever Mariachi and Maracas, Saturday, April 30, 2022, 11:00 a.m. – 3:00 p.m. at the City Hall Complex. Special Performances – Food – Retail Vendors – Music.
 - The City of Gardena Food Truck & Street Fiesta presents The Inaugural Salsa Showdown, Saturday, April 30, 2022, at City Hall Complex. Sampling time 12:00 p.m. – 2:00 p.m., Amateur (Home Made) and Professional (Restaurant). If you are interested in competing, register at www.cityofgardena.org/events or call (310)217-9537.
 - Save the Date! Healthy Pet Clinic, Sunday, May 15, 2022, 10:00 a.m.-1:00 p.m. at the Nakaoka Community Center, for questions please call (310)217-9537.
 - Save the Date! City of Gardena's Dodger Day, Friday, July 8, 2022. Game start time 7:10 p.m. Come enjoy a night of baseball followed by a firework show.
 - Save the Date! City of Gardena Jazz Festival, Sunday, August 28, 2022, at Rowley Park. Stay tuned for ticket information & artist announcements on our social media pages.
 - City of Gardena Co-ed Softball, Friday Nights at Mas Fukai Park. Season begins April 22, 2022. Team registration: Friday, April 1 -Saturday, April 16, 2022.

Register online at www.cityofgardena.org/events; In-person: Nakaoka Community Center 1670 W. 162nd Street, Gardena.

- Announced the new Economic Development Manager Jackie Choi.
City Manager Osorio read Mrs. Choi's bio. Jackie came into the meeting and introduced herself.

Council Member Kaskanian had a question regarding the Under the Sea Bingo Event.

21. COUNCIL REMARKS

1. **COUNCIL MEMBER FRANCIS** – Since the last meeting, she attended the District 1 Neighborhood Watch Meeting; Garden Party with special guest Congresswoman Maxine Waters; Candidate Forum for the Special Election for Assembly District 62 to fill the vacancy that was previously held by the Honorable Autumn Burke. She also attended the Los Angeles Democratic Party Meeting. She welcomed our new Economic Development Manager Jackie Choi and looks forward to meeting with her. She would like to remind everyone that Spring Break is here, and we have a lot of young people around. She pointed out that in this month of April coincidentally, we are celebrating Ramadan, Easter, and Passover, its unusual and does not happen often. She wished everyone a safe and healthy holiday season. She wants to encourage everyone to remain diligent and keep the family safe and healthy as we are currently still under this Pandemic.
2. **MAYOR PRO TEM TANAKA** - Since the last meeting Mayor Pro Tem attended the tea party and thanked Congresswoman Maxine Waters, COG's 22nd Annual General Assembly, attended funeral for Ed Russ, celebration for four of the veterans at the VFW 1961 and 3261 they were honored with quilts, attended police promotion for Sergeant Reynaga, Grand Prix at Long Beach, Aquatic Senior Center groundbreaking, Police Foundation Scholarships, COG Steering Committee Meeting, and Special COG Board Meeting. Wished everyone a great Easter.
3. **COUNCIL MEMBER KASKANIAN** - Since the last meeting Council Member Kaskanian attended the Garden Tea Party with Congresswoman Maxine Water and thanked the congresswoman, also attended Pinning ceremony for officer Biscocho, Detective Reynaga's promotion to Sergeant, luncheon for the Gardena Police Foundation, Grand Prix at Long Beach, and the groundbreaking of the Senior Aquatics Center. Wished everyone a Happy Ramadan, Happy Passover, and Happy Easter.
4. **MAYOR CERDA** - Since the last meeting Mayor Cerda attended the Garden Tea Party and thanked Congresswoman Maxine Waters. Also attended funeral services for former Mayor Ed Russ, pinning ceremony for the new officer Biscocho, promotion ceremony for Sergeant Reynaga, ICA conference, groundbreaking for the new Senior Aquatics Center, Police Foundation Scholarship luncheon and thanked City Attorney Vasquez for giving back. Also shared she attended the barbecue at the VFW and funeral services for Officer Dixon's mother. Mayor Cerda added Cynthia Ann Evans to the remembrances.
5. **COUNCIL MEMBER HENDERSON** - Council Member Henderson welcomed Jackie Choi as the new Economic Development Manager. Since the last meeting Council Member Henderson attended the Garden Tea Party, groundbreaking at the Aquatic Senior Center, ICA conference, District 1 meeting, Responsible Governance Committee with the Los Angeles Business Federation, Business Federation University of Southern California, SKAG Regional Council Meeting, Police Foundation Lunch, and the VFW

luncheon. Lastly, wished everyone a Happy Easter and encouraged everyone to embrace each other.

22. ANNOUNCEMENT(S)

Mayor Cerda state that all announcements have been made under City Manager remarks.

23. REMEMBRANCES

Mr. Roy Jackson, 75 years of age, a Veteran, and a Gardena resident. Mr. Jackson was also a client of the Senior Meals Program; **Mrs. Hideko Kawahara**, 92 years of age, long time Gardena resident and a client of the Senior Meals Program, she is survived by her husband Herbert; Mrs. Blanca Almeida, 88 years of age, Mrs. Almeida was a client of the City of Gardena's Senior Citizen Day Care Center; **Doctor Alfonso Baez**, who had his medical practice in the City of Gardena, and served the Gardena community for over 40 years; and **Mr. IL Koo Lee**, 89 years of age, beloved grandfather of Katherine Rhee, Records Management Coordinator with the City Clerk's Office; **Cynthia Ann Evans**, mother of Officer Sean Dixon.

24. ADJOURNMENT

At 10:58 p.m., Mayor Cerda adjourned the Gardena City Council Meeting to the Closed Session portion of the City Council Meeting at 7:00 p.m., and the Regular City Council Meeting at 7:30 p.m. on Tuesday, April 26, 2022.

MINA SEMENZA

City Clerk of the City of Gardena and
Ex-officio Clerk of the Council

APPROVED:

Tasha Cerda, Mayor

By: _____
Becky Romero, Deputy City Clerk

MEMORANDUM

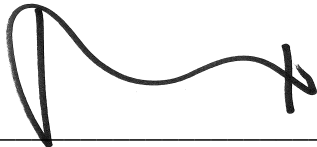
TO: Honorable Mayor and City Council
FROM: City Treasurer's Office
DATE: April 21, 2022
SUBJECT: WARRANT REGISTER
PAYROLL REGISTER

April 26, 2022 TOTAL WARRANTS ISSUED: \$2,757,705.49

Wire Transfer: 12152-12160
Prepay: 167034
Check Numbers: 167035-167222
Checks Voided:

Total Pages of Register: 21

April 22, 2022 TOTAL PAYROLL ISSUED: \$1,980,540.80



for J. Ingrid Tsukiyama, City Treasurer

cc: City Clerk

Voucher List
CITY OF GARDENA

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
12152	4/7/2022	419630 U.S. BANK	1956082		TAXABLE LEASE REVENUE REFUNDIN	285,466.83
					Total :	285,466.83
12153	4/7/2022	419630 U.S. BANK	1956085		LEASE REVENUE BONDS, SERIES 202	606,215.99
					Total :	606,215.99
12154	4/6/2022	104058 ADMINISURE INC.	040622		WORKERS' COMP CLAIMS ADMINISTR	53,565.38
					Total :	53,565.38
12155	4/11/2022	111989 COOK, BRAXTON	040622	034-00517	ENTERTAINMENT SERVICES - JAZZ FE	4,000.00
					Total :	4,000.00
12156	4/12/2022	104058 ADMINISURE INC.	041222		WORKERS' COMP CLAIMS	21,408.52
					Total :	21,408.52
12157	4/11/2022	111894 HEALTHNOW ADMINISTRATIVE, SERVICES	U4722		HEALTH INSURANCE CLAIMS	52,317.28
					Total :	52,317.28
12158	4/18/2022	111374 LINCOLN NATIONAL LIFE, INSURANCE COMP/ APRIL 2022			LIFE INSURANCE GRP PLANS	3,266.88
					Total :	3,266.88
12159	4/18/2022	104058 ADMINISURE INC.	041822		WORKERS' COMP CLAIMS ADMINISTR	52,482.12
					Total :	52,482.12
12160	4/18/2022	111894 HEALTHNOW ADMINISTRATIVE, SERVICES	U4723		HEALTH INSURANCE CLAIMS~	89,543.49
					Total :	89,543.49
167034	4/21/2022	112045 WOLLIN, RICHARD	041922		CLAIM FOR DAMAGES SETTLEMENT	62.50
					Total :	62.50
167035	4/26/2022	104058 ADMINISURE INC.	15021	023-01345	WORKERS' COMP CLAIMS ADMINISTR	12,030.00
					Total :	12,030.00
167036	4/26/2022	101748 AFTERMARKET PARTS COMPANY LLC, THE	82649891	037-10048	GTRANS AUTO PARTS	692.08
			82650003	037-10048	GTRANS AUTO PARTS	81.81
			82651221	037-10048	GTRANS AUTO PARTS	203.24
			82652541		GTRANS AUTO PARTS	923.95

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167036	4/26/2022	101748 AFTERMARKET PARTS COMPANY LLC, THE	(Continued)			
			82652542	037-10048	GTRANS AUTO PARTS	622.97
			82655085	037-10048	GTRANS AUTO PARTS	851.99
			82655145	037-10048	GTRANS AUTO PARTS	1,696.04
			82655182	037-10048	GTRANS AUTO PARTS	160.84
			82657468	037-10048	GTRANS AUTO PARTS	590.94
					Total :	5,823.86
167037	4/26/2022	101338 ALCO TARGET COMPANY	70890		PD TRAINING SUPPLIES	264.99
					Total :	264.99
167038	4/26/2022	111991 APB PROPERTIES LLC	B/L #19289		REFUND - BUSINESS LICENSE OVERP	22.95
					Total :	22.95
167039	4/26/2022	108625 ARAD OIL INC.	MARCH 2022		CAR WASH	240.00
					Total :	240.00
167040	4/26/2022	105293 ARC DOCUMENT SOLUTIONS, LLC	11190499		REPROGRAPHIC SERVICES - TREE TR	28.30
			11190503		REPROGRAPHIC SERVICES - LANDSC	28.30
					Total :	56.60
167041	4/26/2022	111551 ARECHIGA, OSVALDO	041122		REFUND - LOAN #003 REFINANCED	115.76
					Total :	115.76
167042	4/26/2022	106965 ASSAABLOY ENTRANCE, SYSTEMS US INC.	SEI/1507256		PW MAINT SUPPLIES	267.24
					Total :	267.24
167043	4/26/2022	104687 AT&T	17669233		TELEPHONE	393.39
			17958959		TELEPHONE	395.67
			17994366		TELEPHONE	851.53
			18050638		TELEPHONE	374.70
			18050949		TELEPHONE	16,036.92
			18053758		TELEPHONE	556.77
					Total :	18,608.98

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167044	4/26/2022	616090 AT&T	3103232408 04/01/22		TELEPHONE	2,436.26
					Total :	2,436.26
167045	4/26/2022	111170 AT&T FIRSTNET	287290885074X4102022		CITYWIDE CELL PHONE ACCT #287290	1,951.75
			287293420631X121021		PD CELL PHONE ACCT #287293420631	145.47
			287293420631X4102022		PD CELL PHONE ACCT #287293420631	144.99
			287298156560X4102022		COVID-19 FIRSTNET COMMUNICATION	1,630.66
			287303490376X4102022		BUS CELL PHONE ACCT #28730349037	428.06
					Total :	4,300.93
167046	4/26/2022	100474 AT&T LONG DISTANCE	041222		TELEPHONE	63.00
					Total :	63.00
167047	4/26/2022	100964 AT&T MOBILITY	287275680401X3012022		PD CELL PHONE ACCT #287275680401	202.52
			287275680401X4012022		PD CELL PHONE ACCT #287275680401	152.36
			828667974X04162022		CM CELL PHONE ACCT #828667974	86.46
			835577878X03012022		PD CELL PHONE ACCT #835577878	644.97
			835577878X04012022		PD CELL PHONE ACCT #835577878	645.97
					Total :	1,732.28
167048	4/26/2022	106138 AUDIOVISION, INC.	B/L #28875		REFUND - BUSINESS LICENSE OVERP,	24.76
					Total :	24.76
167049	4/26/2022	102880 AUTOPLEX, INC.	13733		2020 FORD INTRCPTR #1591740 OIL &	82.19
			13734		2016 FORD INTRCPTR #1484145 OIL &	45.54
			13739		2021 FORD INTRCPTR #1614738 OIL &	85.04
					Total :	212.77
167050	4/26/2022	110190 BASNET FAMILY CHILD CARE	MARCH 2022		CHILD CARE PROVIDER	10,791.00
					Total :	10,791.00
167051	4/26/2022	104141 BCD FOOD, INC.	B/L #24668		REFUND - BUSINESS LICENSE OVERP,	998.50
					Total :	998.50
167052	4/26/2022	102035 BD WHITE TOP SOIL CO., INC.	86631		PARK MAINT SUPPLIES	114.11
					Total :	114.11
167053	4/26/2022	111511 BEETRONICS B V	6488		PD SUPPLIES	391.50

Voucher List
CITY OF GARDENA

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167053	4/26/2022	111511 111511 BEETRONICS B V	(Continued)		Total :	391.50
167054	4/26/2022	102135 BEHREND, KENT	094	023-01346	IT NETWORK SUPPORT - OUTSIDE RE	4,593.75
			91	023-01346	IT NETWORK SUPPORT	3,400.00
					Total :	7,993.75
167055	4/26/2022	111606 BEST EQUIPMENT SERVICE	51464		TIRE MACHINE TRAINING	355.00
					Total :	355.00
167056	4/26/2022	103887 BESTLINE PLUMBING, INC.	B/L #35800		REFUND - BUSINESS LICENSE OVERP	75.00
					Total :	75.00
167057	4/26/2022	111875 BOAARCHITECTURE	21-2946-2	024-00805	FIRE STATION #158 ROOF REPLACEME	11,620.00
					Total :	11,620.00
167058	4/26/2022	108715 BOBBS FAMILY CHILDCARE	MARCH 2022		CHILD CARE PROVIDER	4,504.00
					Total :	4,504.00
167059	4/26/2022	112005 BORIONE, INC.	B/L #37761		REFUND - BUSINESS LICENSE OVERP	229.10
					Total :	229.10
167060	4/26/2022	110496 BOWL THAI	B/L #31861		REFUND - BUSINESS LICENSE OVERP	756.45
					Total :	756.45
167061	4/26/2022	105008 CALIFORNIA BUILDING STANDARDS, COMMIS JAN-MAR 2022			BUILDING STANDARDS ADMIN SPECIA	839.70
					Total :	839.70
167062	4/26/2022	103383 CALPORTLAND	95408354		STREET MAINT SUPPLIES	877.59
					Total :	877.59
167063	4/26/2022	110538 CANNON COMPANY	79923	024-00807	VERMONT AVE IMPROVEMENTS (ARTE	25,374.50
					Total :	25,374.50
167064	4/26/2022	110538 CANNON COMPANY	79922	024-00808	VERMONT ST IMPROVEMENT (ROSECI	19,061.75
					Total :	19,061.75
167065	4/26/2022	111946 CASTRO, DAMARIZ	RECEIPT #34896300		REFUND - PICNIC SHELTER RESERVA	100.00
					Total :	100.00

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167066	4/26/2022	111453 CATONE, BURNA	B/L #15098		REFUND - BUSINESS LICENSE OVERP	20.00
					Total :	20.00
167067	4/26/2022	303331 CDTFA	JAN-MAR 2022		UNDERGROUND STORAGE TANK MAIN	1,513.00
					Total :	1,513.00
167068	4/26/2022	111966 CELEDON'S EXERCISE EQUIPMENT, SERVICE 2835			GTRANS FITNESS EQUIPMENT MAINT	1,326.90
					Total :	1,326.90
167069	4/26/2022	103489 CF UNITED LLC	030122-033122		CAR WASH - MARCH 2022	72.00
					Total :	72.00
167070	4/26/2022	108378 CHARLES E. THOMAS COMPANY INC.	84778	037-10045	DESIGNATED OPERATOR SERVICES	200.00
					Total :	200.00
167071	4/26/2022	103127 CHILD 2 CHILD CONNECTION, FAMILY DAY C/	MARCH 2022		CHILD CARE PROVIDER	3,677.00
					Total :	3,677.00
167072	4/26/2022	111534 CLEAN ENERGY	PJI00025309	037-10062	GTRANS CNG FUELING STATION PROJ	616,788.15
					Total :	616,788.15
167073	4/26/2022	111416 COLANTUONO, HIGHSMITH &, WHATLEY, PC	51388		LEGAL SERVICES	718.05
					Total :	718.05
167074	4/26/2022	109913 COSTAR REALTY INFORMATION INC.	115904920		COSTAR SUITE - APRIL 2022	1,060.66
					Total :	1,060.66
167075	4/26/2022	102791 CPAC, INC.	1294497	023-01379	(20) COMPUTER REPLACEMENT PC & I	28,914.50
					Total :	28,914.50
167076	4/26/2022	104152 CREATIVE BUS SALES, INC.	XA113003890:01		GTRANS AUTO PARTS	37.60
					Total :	37.60
167077	4/26/2022	103512 CRENSHAW LUMBER CO.	45173		STREET MAINT SUPPLIES	30.76
					Total :	30.76
167078	4/26/2022	103353 CRM COMPANY, LLC.	LA19986		SCRAP TIRE DISPOSAL FEE	69.50
			LA19987		SCRAP TIRE DISPOSAL FEE	124.50

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167078	4/26/2022	103353 CRM COMPANY, LLC.	(Continued) LA20004		SCRAP TIRE DISPOSAL FEE	460.09
					Total :	654.09
167079	4/26/2022	110319 CWE DIRECTOR	22148	024-00766	MS4 & NPDES - MONITORING & COMPI	14,065.40
					Total :	14,065.40
167080	4/26/2022	111377 DE NOVO PLANNING GROUP	3360	032-00092	PROFESSIONAL SERVICES - UHAUL RI	7,276.25
					Total :	7,276.25
167081	4/26/2022	104310 DEPARTMENT OF CONSERVATION	JAN-MAR 2022		STRONG MOTION INSTRUMENTATION	3,802.58
					Total :	3,802.58
167082	4/26/2022	303459 DEPARTMENT OF JUSTICE	570855		FINGERPRINT APPS - MARCH 2022	2,530.00
					Total :	2,530.00
167083	4/26/2022	109269 DETROIT SPONGE & CHAMOIS CO.	203390		BUS WASH SUPPLIES	86.80
					Total :	86.80
167084	4/26/2022	104343 DISCOUNT SCHOOL SUPPLY	W81134070101	331-00057	FCC PROGRAM SUPPLIES	317.41
			W81134070102	331-00057	FCC PROGRAM SUPPLIES	3,068.44
					Total :	3,385.85
167085	4/26/2022	107621 EASTERN PNEUMATICS & HYDRAULIC	047368		REPAIR & RECALIBRATE TORQUE GUN	1,357.57
					Total :	1,357.57
167086	4/26/2022	105867 EL CAMINO COLLEGE	2672		PARKING LOT RENTAL FOR DRIVERS T	800.00
					Total :	800.00
167087	4/26/2022	110534 EL DORADO NATIONAL	90724199		GTRANS BUS VEHICLE SUPPLIES	166.16
					Total :	166.16
167088	4/26/2022	110532 ELECTRIC CAR SALES & SERVICE	28497		GTRANS AUTO PARTS	148.18
					Total :	148.18
167089	4/26/2022	105418 EMPIRE CLEANING SUPPLY	S4994694		CUSTODIAL SUPPLIES	1,436.30
			S5026950		CUSTODIAL SUPPLIES	864.40
			S5047248		CUSTODIAL SUPPLIES	536.19

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167089	4/26/2022	105418 EMPIRE CLEANING SUPPLY	(Continued) S5065143 S5076069 S5119869 S5146589 S5174708		CUSTODIAL SUPPLIES CUSTODIAL SUPPLIES PARK MAINT SUPPLIES CUSTODIAL SUPPLIES PARK MAINT SUPPLIES	2.69 50.70 138.52 1,091.74 400.79
Total :						4,521.33
167090	4/26/2022	107690 ENLIGHTENMENT CHILD, DEVELOPMENT CEI MARCH 2022			CHILD CARE PROVIDER	9,142.00
Total :						9,142.00
167091	4/26/2022	107510 ESCALANTE, WENDY E.	MARCH 2022		CHILD CARE PROVIDER	7,796.00
Total :						7,796.00
167092	4/26/2022	105650 EWING IRRIGATION PRODUCTS	16382338		PARK MAINT SUPPLIES	311.41
Total :						311.41
167093	4/26/2022	100055 FAIR HOUSING FOUNDATION	MARCH 2022		CDBG CONSULTANT	1,967.37
Total :						1,967.37
167094	4/26/2022	106129 FEDEX	7-710-87225 7-717-89945		SHIPPING SERVICES SHIPPING SERVICES	27.97 268.56
Total :						296.53
167095	4/26/2022	111415 FILTERBUY, INC	BAFEC8C7-0008		GTRANS SHOP SUPPLIES	225.44
Total :						225.44
167096	4/26/2022	103083 FIRST ADVANTAGE LNS OCC HEALTH, SOLUT 2504862203			DRUG TEST/ADMIN FEE	694.29
Total :						694.29
167097	4/26/2022	107724 GARCIA, CLAUDIA CRISTINA	MARCH 2022		CHILD CARE PROVIDER	11,159.00
Total :						11,159.00
167098	4/26/2022	207133 GARCIA, NANCY C.	MARCH 2022		CHILD CARE PROVIDER	10,490.00
Total :						10,490.00
167099	4/26/2022	112003 GARDENA AUTO BODY PLUS	B/L #34425		REFUND - BUSINESS LICENSE OVERP	164.00

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167099	4/26/2022	112003 112003 GARDENA AUTO BODY PLUS	(Continued)			Total : 164.00
167100	4/26/2022	107080 GARDENA BEAR WHEEL	56780		2015 FORD EXPLR #1462840	95.00
					Total :	95.00
167101	4/26/2022	106940 GARDENA BOWLING CENTER INC.	B/L #5889		REFUND - BUSINESS LICENSE OVERP,	254.50
					Total :	254.50
167102	4/26/2022	111995 GARDENA LF LLC	B/L #19623		REFUND - BUSINESS LICENSE OVERP,	410.00
			B/L #35306		REFUND - BUSINESS LICENSE OVERP,	50.00
					Total :	460.00
167103	4/26/2022	107011 GARDENA VALLEY NEWS, INC.	0116736		NOTICE OF PUBLIC HEARING -	220.50
					Total :	220.50
167104	4/26/2022	107034 GARDENA WELDING SUPPLY CO INC.	95 121469		GTRANS MAINT SUPPLIES	288.83
					Total :	288.83
167105	4/26/2022	619005 GAS COMPANY, THE	040522		GAS	9,123.97
			040722		CNG FUEL	927.33
					Total :	10,051.30
167106	4/26/2022	107056 GENFARE	90180983		GTRANS AUTO PARTS	35.41
			90181601		GTRANS AUTO PARTS	-37.74
			90181691		GTRANS AUTO PARTS	36.66
					Total :	34.33
167107	4/26/2022	112022 GILBERT PLUMBING	B/L #24334		REFUND - BUSINESS LICENSE OVERP,	75.00
					Total :	75.00
167108	4/26/2022	619004 GOLDEN STATE WATER CO.	040722		WATER	10,219.60
					Total :	10,219.60
167109	4/26/2022	107513 GRAINGER	9252956652		BUS FACILITY SUPPLIES	47.92
			9262674824		BUS FACILITY SUPPLIES	25.86
			9264721219		BUS FACILITY SUPPLIES	455.09
			9264721227		BUS FACILITY SUPPLIES	162.74
			9269429834		BUS FACILITY SUPPLIES	11.85

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167109	4/26/2022	107513 GRAINGER	(Continued)			
			9270833412		BUS FACILITY SUPPLIES	214.15
			9273174244		BUS FACILITY SUPPLIES	243.74
			9274696906		BUS FACILITY SUPPLIES	57.37
			9275036110		BUS FACILITY SUPPLIES	9.67
			9278465753		BUS FACILITY SUPPLIES	-214.15
					Total :	1,014.24
167110	4/26/2022	110435 GUERRERO, ANGELICA	MARCH 2022		CHILD CARE PROVIDER	11,421.00
					Total :	11,421.00
167111	4/26/2022	111484 HANNA, BROPHY, MACLEAN,, MCALEER & JET 2058886			PROFESSIONAL SERVICES	640.00
					Total :	640.00
167112	4/26/2022	108607 HENDERSON-BATISTE, TANEKA	MARCH 2022		CHILD CARE PROVIDER	4,050.00
					Total :	4,050.00
167113	4/26/2022	111549 HF & H CONSULTANTS, LLC	9719055		CONSULTING SERVICES - SOLID WAS1	4,657.00
					Total :	4,657.00
167114	4/26/2022	108434 HOME DEPOT CREDIT SERVICES	0034548		GTRANS MAINT SUPPLIES	703.65
			089551		GTRANS MAINT SUPPLIES	96.98
			4021312		GTRANS MAINT SUPPLIES	272.16
			6164325		GTRANS MAINT SUPPLIES	273.42
					Total :	1,346.21
167115	4/26/2022	109047 HSMARKET INC.	B/L #16646		REFUND - BUSINESS LICENSE OVERP,	125.00
					Total :	125.00
167116	4/26/2022	112023 HUD INDUSTRIES	B/L #6010		REFUND - BUSINESS LICENSE OVERP,	28.47
					Total :	28.47
167117	4/26/2022	111993 INLAND PACIFIC MANAGEMENT, INC	B/L #38516		REFUND - BUSINESS LICENSE OVERP,	49.00
					Total :	49.00
167118	4/26/2022	106714 INTERSTATE BATTERIES OF, CALIFORNIA CO.	130102743		GTRANS AUTO PARTS	547.53
			130102934		GTRANS AUTO PARTS	1,603.45
			130103109		GTRANS AUTO PARTS	442.03

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167118	4/26/2022	106714 INTERSTATE BATTERIES OF, CALIFORNIA CO. (Continued)	210027238		GTRANS AUTO PARTS	242.48
					Total :	2,835.49
167119	4/26/2022	110733 J & S PROPERTY MANAGEMENT AND, MAINTI 6318			LANDSCAPE MAINTENANCE SERVICES	1,295.00
					Total :	1,295.00
167120	4/26/2022	108555 JALISCO TIRE & AUTO REPAIR	033122		FLATS REPAIR	10.00
					Total :	10.00
167121	4/26/2022	105226 JEKAL FAMILY CHILD CARE	MARCH 2022		CHILD CARE PROVIDER	8,939.00
					Total :	8,939.00
167122	4/26/2022	112029 JERE COSTELLO REAL ESTATE	B/L #20794		REFUND - BUSINESS LICENSE OVERP	306.20
					Total :	306.20
167123	4/26/2022	110356 JIMNI SYSTEMS, INC.	B/L #39623		REFUND - BUSINESS LICENSE OVERP	75.00
					Total :	75.00
167124	4/26/2022	112034 KAREN STIFT	RA-STIFT		COVID-19 RENTAL ASSISTANCE PROGI	2,250.00
					Total :	2,250.00
167125	4/26/2022	110456 KHAIRZADA FAMILY CHILD CARE	MARCH 2022		CHILD CARE PROVIDER	3,013.00
					Total :	3,013.00
167126	4/26/2022	111045 KJ SERVICES	2398	020-00035	USED OIL PROGRAM EXPENSE - MARC	4,562.50
					Total :	4,562.50
167127	4/26/2022	105900 KONECRANES, INC.	154610256	037-10032	PREVENTATIVE MAINT & INSPECTION I	525.00
					Total :	525.00
167128	4/26/2022	110562 KOYAMA, HOWARD	B/L #34061		REFUND - BUSINESS LICENSE OVERP	10.00
					Total :	10.00
167129	4/26/2022	312240 L.A. COUNTY DEPARTMENT OF, PUBLIC WOR	22041105714 22041106029	024-00769 024-00769	INDUSTRIAL WASTE SERVICES TRAFFIC SIGNAL MAINT-HIGHWAY SAF	7,898.61 1,742.80
					Total :	9,641.41

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167130	4/26/2022	109939 LA UNIFORMS & TAILORING	11935		PD UNIFORM SUPPLIES	416.36
			11997		PD UNIFORM SUPPLIES	22.05
			12068		PD UNIFORM SUPPLIES	101.32
					Total :	539.73
167131	4/26/2022	112015 LACERDA, DALVANICE	MARCH 2022		CHILD CARE PROVIDER	11,512.00
					Total :	11,512.00
167132	4/26/2022	105874 LAWSON PRODUCTS, INC.	9309424504		BUS SHOP SUPPLIES	614.54
			9309437866		BUS SHOP SUPPLIES	321.93
					Total :	936.47
167133	4/26/2022	110777 LEARN N PLAY FAMILY DAYCARE	MARCH 2022		CHILD CARE PROVIDER	3,992.00
					Total :	3,992.00
167134	4/26/2022	112036 LEETAL HARLEV	RA-HAR-LEV		COVID-19 RENTAL ASSISTANCE PROGI	4,713.75
					Total :	4,713.75
167135	4/26/2022	108237 LEO WEB PROTECT	3384	035-01138	POLICE PRIVACY SERVICE SUBSCRIP	4,949.34
					Total :	4,949.34
167136	4/26/2022	102376 LEXISNEXIS RISK SOLUTIONS	1328345-20220331		MONTHLY SUBSCRIPTION FEE	1,957.20
					Total :	1,957.20
167137	4/26/2022	110920 LIBERTY MANUFACTURING, INC	465		PD RANGER SERVICES	408.00
					Total :	408.00
167138	4/26/2022	102233 LITTLE PEOPLE DAY CARE	MARCH 2022		CHILD CARE PROVIDER	7,755.00
					Total :	7,755.00
167139	4/26/2022	109563 LUCKY LADY CASINO	0850000164		ECONOMIC ASSISTANCE - MARCH 202	50,613.87
					Total :	50,613.87
167140	4/26/2022	112018 MARIN, EVERARDO M.	B/L #24135		REFUND - BUSINESS LICENSE OVERP	10.00
					Total :	10.00
167141	4/26/2022	112009 MARIN, HUMBERTO, DBA DIEGO S METAL WE	B/L #38976		REFUND - BUSINESS LICENSE OVERP	1,660.50

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167141	4/26/2022	112009 112009 MARIN, HUMBERTO, DBA DIEGO S META (Continued)				Total : 1,660.50
167142	4/26/2022	113003 MARTIN CHEVROLET	816444		PW AUTO PARTS	288.25
					Total :	288.25
167143	4/26/2022	107644 MARTINEZ, CHERYL NAOMI	MARCH 2022		CHILD CARE PROVIDER	11,404.00
					Total :	11,404.00
167144	4/26/2022	104773 MARTINEZ, KAMBY	MARCH 2022		CHILD CARE PROVIDER	10,361.00
					Total :	10,361.00
167145	4/26/2022	111998 MAS-YA CORPORATION	B/L #3177		REFUND - BUSINESS LICENSE OVERP	100.00
					Total :	100.00
167146	4/26/2022	113064 MCMASTER-CARR SUPPLY COMPANY	75310811		GTRANS SHOP SUPPLIES	421.46
			75554392		GTRANS SHOP SUPPLIES	148.53
			75725201		GTRANS SHOP SUPPLIES	75.21
			75886440		PW SHOP SUPPLIES	322.44
			75961276		GTRANS SHOP SUPPLIES	263.27
					Total :	1,230.91
167147	4/26/2022	110784 MD AUTOBODY	1447	037-10112	GTRANS BUS REPAIRS	9,373.00
					Total :	9,373.00
167148	4/26/2022	112044 MEA FORENSIC ENGINEERS &, SCIENTISTS, I S121336			PROFESSIONAL SERVICES	928.98
					Total :	928.98
167149	4/26/2022	110659 MELIA HOMES	031422		DEPOSIT REFUND - DEVELOPMENT SE	560.00
					Total :	560.00
167150	4/26/2022	108699 MEZIERE ENTERPRISES INC.	85476		ELECTRIC WATER PUMP	635.96
					Total :	635.96
167151	4/26/2022	111604 MICRO ELECTRONICS, INC	11850986	023-01338	COMPUTER REPLACEMENT PARTS	1,228.20
					Total :	1,228.20
167152	4/26/2022	110945 MINAGAR & ASSOCIATES, INC	874	024-00817	POLICIES FOR STREET RED-CURB ZO	4,767.63

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167152	4/26/2022	110945 110945 MINAGAR & ASSOCIATES, INC	(Continued)		Total :	4,767.63
167153	4/26/2022	111997 MIYASHIRO ENTERPRISES INC.	B/L #4130		REFUND - BUSINESS LICENSE OVERP	79.00
					Total :	79.00
167154	4/26/2022	112007 MURILLO, FIDEL & MARIA D., FM ENGINE REB	B/L #17881		REFUND - BUSINESS LICENSE OVERP	49.50
					Total :	49.50
167155	4/26/2022	111994 NOH FOODS OF HAWAII	B/L #28489		REFUND - BUSINESS LICENSE OVERP	270.00
					Total :	270.00
167156	4/26/2022	110819 NORTHERN SAFETY CO., INC.	904755002		COVID-19 EMERGENCY SUPPLIES	1,288.82
					Total :	1,288.82
167157	4/26/2022	110575 OCCUPATIONAL HEALTH CENTERS, OF CALIF	74848427		EMPLOYMENT PHYSICAL & RANDOM T	1,969.50
			74848830		PHYSICAL RECERTIFICATION	189.00
			74921839		PHYSICAL RECERTIFICATION & RAND	933.50
			74923681		PHYSICAL RECERTIFICATION	206.00
					Total :	3,298.00
167158	4/26/2022	115168 OFFICE DEPOT	229369313		HR OFFICE SUPPLIES	48.48
			229378532		HR OFFICE SUPPLIES	6.89
			231079305		REC OFFICE SUPPLIES	107.88
			231154166		PD OFFICE SUPPLIES	59.96
			232195078		PD OFFICE SUPPLIES	57.07
			232941721		BUS OFFICE SUPPLIES	104.68
			232943721		BUS OFFICE SUPPLIES	30.86
			232943731		BUS OFFICE SUPPLIES	27.33
			233543552		CM OFFICE SUPPLIES	53.92
			233653749		BUS OFFICE SUPPLIES	220.42
			233817246		PD OFFICE SUPPLIES	87.31
			233818533		PD OFFICE SUPPLIES	77.16
			233878523		PD OFFICE SUPPLIES	152.66
			233881497		PD OFFICE SUPPLIES	31.96
			234188838		PD OFFICE SUPPLIES	106.24
			234188838001		PD OFFICE SUPPLIES	10.72
			234193154		PD OFFICE SUPPLIES	259.08
			234698732		CM OFFICE SUPPLIES	47.77

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167158	4/26/2022	115168 OFFICE DEPOT	(Continued) 234818868 235986601		CM OFFICE SUPPLIES BUS OFFICE SUPPLIES Total :	30.44 102.12 1,622.95
167159	4/26/2022	111972 OLSON LAND OPPORTUNITES III, LLA	031422		DEPOSIT REFUND - DEVELOPMENT SE Total :	420.00 420.00
167160	4/26/2022	111358 O'REILLY AUTO PARTS	215079		GTRANS AUTO PARTS Total :	135.32 135.32
167161	4/26/2022	115810 ORKIN PEST CONTROL	225883785 226507718		PEST CONTROL - ACCT #27336703 PEST CONTROL - ACCT #27336703 Total :	211.00 261.00 472.00
167162	4/26/2022	112026 OROZCO, MACIAS SILVANO	B/L #20906		REFUND - BUSINESS LICENSE OVERP Total :	45.00 45.00
167163	4/26/2022	109890 OWUSU FAMILY CHILD CARE	MARCH 2022		CHILD CARE PROVIDER Total :	11,945.00 11,945.00
167164	4/26/2022	112000 PAN PIZZA LLC, THE	BL #39940		REFUND - BUSINESS LICENSE OVERP Total :	53.18 53.18
167165	4/26/2022	111999 PAN RESTAURANT, LLC, THE	BL #30560		REFUND - BUSINESS LICENSE OVERP Total :	720.19 720.19
167166	4/26/2022	112031 PARADISE TINTING	041122		WINDOW TINT - HR MANAGER OFFICE Total :	350.00 350.00
167167	4/26/2022	110403 PENN RECORDS MANAGEMENT	0129161		OFF-SITE STORAGE SERVICES - MARC Total :	58.00 58.00
167168	4/26/2022	116140 PETE'S ROAD SERVICE, INC.	573315 573494		SERVICE LABOR - SOLID/POLYFILL TIR TIRES - 1G6114 12580-18 GALAXY BEFI Total :	172.00 1,953.93 2,125.93
167169	4/26/2022	112002 POOL, AGUSTIN	B/L #27609		REFUND - BUSINESS LICENSE OVERP	61.50

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167169	4/26/2022	112002 112002 POOL, AGUSTIN	(Continued)		Total :	61.50
167170	4/26/2022	106092 PRUDENTIAL OVERALL SUPPLY	42703831	034-00508	UNIFORM & SUPPLY RENTAL	50.10
			42703832		UNIFORM & SUPPLY RENTAL	13.65
			42703833		UNIFORM & SUPPLY RENTAL	19.00
			42703835		UNIFORM & SUPPLY RENTAL	11.60
			42713833		CUSTODIAL SUPPLIES	1,569.96
			42715832		UNIFORM & SUPPLY RENTAL	149.89
			42715833		UNIFORM & SUPPLY RENTAL	48.41
			42715835		UNIFORM & SUPPLY RENTAL	13.65
			42715836		UNIFORM & SUPPLY RENTAL	19.00
			42715837		UNIFORM & SUPPLY RENTAL	91.60
			42715838		UNIFORM & SUPPLY RENTAL	11.60
			42717764		UNIFORM & SUPPLY RENTAL	149.89
			42717765		UNIFORM & SUPPLY RENTAL	51.00
			42717766		UNIFORM & SUPPLY RENTAL	50.10
			42718337		UNIFORM & SUPPLY RENTAL	1,434.35
			42720047		CUSTODIAL SUPPLIES	1,507.99
			42720048		UNIFORM & SUPPLY RENTAL	149.89
			42720049		SUPPLY RENTAL - MATS - CH	50.23
			42720050		SUPPLY RENTAL - MATS - GTRANS	50.10
			42720051		SUPPLY RENTAL - MATS - NCC	13.65
			42720052		SUPPLY RENTAL - MATS - GTRANS	19.00
			42720053		SUPPLY RENTAL - MATS - PD	91.60
			42720054		SUPPLY RENTAL - MATS - HS	11.60
					Total :	5,577.86
167171	4/26/2022	109242 QUACH, KHOI	FO2DA9FEDAC4		PURCHASE REIMBURSEMENT	284.85
					Total :	284.85
167172	4/26/2022	117603 QUALITY MEDICAL SERVICE	23760	037-10033	BUS FIRST AID SUPPLIES	580.97
					Total :	580.97
167173	4/26/2022	102283 QUICK COLOR PRINTING	15747		BANNERS - 72 X 24 WALKING CLUB BA	297.68
					Total :	297.68
167174	4/26/2022	103072 REACH	0422868		EAP SERVICES/REACHLINE NEWSLET	902.00

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167174	4/26/2022	103072 103072 REACH	(Continued)		Total :	902.00
167175	4/26/2022	100836 RESOURCE BUILDING MATERIALS	3333214		STREET MAINT SUPPLIES	162.63
					Total :	162.63
167176	4/26/2022	118476 RICOH USA, INC.	5064331725		RICOH MPC3300SPF COPIER USAGE C	918.19
			5064331786		RICOH MPC3300SPF USAGE CHARGES	920.20
			902786759		RICOH MPC3503 COPIER LEASE - FCC	209.22
			9029786206		RICOH COPIER LEASE & USAGE CHAR	2,561.87
			9029786401		RICOH PRO8100SE COPIER LEASE - PI	380.97
			9029786403		RICOH DD6650P COPIER LEASE - PRIN	556.24
			9029786758		RICOH MPC3503 COPIER LEASE - GTR	1,480.46
					Total :	7,027.15
167177	4/26/2022	109323 RIVERAS LAWNMOWER SHOP, INC.	1428		PARK MAINT SUPPLIES	1,999.26
					Total :	1,999.26
167178	4/26/2022	111867 RJM DESIGN GROUP	34940	024-00795	DESIGN & ENGINEERING SERVICES - /	55,409.40
					Total :	55,409.40
167179	4/26/2022	112004 S & H THREAD ROLL DIE CO. INC.	B/L #5263		REFUND - BUSINESS LICENSE OVERP	154.00
					Total :	154.00
167180	4/26/2022	119126 S.B.R.P.C.A.	04101		PD AUTO PARTS	1,026.84
			04102		PD AUTO PARTS	1,056.05
			04103		PD AUTO PARTS	1,221.43
			04104		PD AUTO PARTS	1,433.99
			04107	035-01142	PD AUTO PARTS	3,417.75
					Total :	8,156.06
167181	4/26/2022	119022 SAFE MART OF SOUTHERN, CALIFORNIA, INC	93248		PARK MAINT SUPPLIES	4.37
			93264		GTRANS MAINT SUPPLIES	5.87
					Total :	10.24
167182	4/26/2022	119016 SAM'S CLUB	6314 02/06/22		CITY CLERK PROGRAM SUPPLIES	115.32
					Total :	115.32
167183	4/26/2022	112006 SAN, NIKKAN	B/L #31077		REFUND - BUSINESS LICENSE OVERP	49.00

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167183	4/26/2022	112006 112006 SAN, NIKKAN	(Continued)		Total :	49.00
167184	4/26/2022	108654 SECTRAN SECURITY INC.	22032181		ARMORED TRANSPORTATION SERVICE	2,499.68
			22040745		ARMORED TRANSPORTATION SERVICE	812.18
			22040746		ARMORED TRANSPORTATION SERVICE	220.50
					Total :	3,532.36
167185	4/26/2022	110731 SHAW HR CONSULTING, INC	003233		PROFESSIONAL SERVICES - PERSONN	615.00
			003378		PROFESSIONAL SERVICES - PERSONN	720.00
			003418		PROFESSIONAL SERVICES - PERSONN	1,170.00
					Total :	2,505.00
167186	4/26/2022	106050 SHEHATA, AMY	MARCH 2022		CHILD CARE PROVIDER	8,707.00
					Total :	8,707.00
167187	4/26/2022	119233 SHERWIN-WILLIAMS CO.	5523-5		STREET MAINT SUPPLILES	846.65
					Total :	846.65
167188	4/26/2022	109918 SHIGE'S FOREIGN CAR SERVICE, INC.	8090881	035-01134	2018 FORD INTRCPTR #1554895 SERVI	221.89
			8090972	035-01134	2018 FORD INTRCPTR #1554678 SERVI	774.56
					Total :	996.45
167189	4/26/2022	111996 SHIGETA AMERICA INC.	B/L #31734		REFUND - BUSINESS LICENSE OVERP	54.00
					Total :	54.00
167190	4/26/2022	101649 SILVIA ESPINOZA FAMILY CHILD, CARE	MARCH 2022		CHILD CARE PROVIDER	6,406.00
					Total :	6,406.00
167191	4/26/2022	119378 SMARDAN SUPPLY CO.	S3763854		BUS FACILITY MAINT SUPPLIES	377.33
			S3794980		BUS FACILITY MAINT SUPPLIES	122.05
			S3800766		BLDG MAINT SUPPLIES	114.50
					Total :	613.88
167192	4/26/2022	119361 SMART & FINAL IRIS CO.	14402		REC PROGRAM SUPPLIES	48.37
			3101		SR BUREAU PROGRAM SUPPLIES	257.78
			36801		SR. BUREAU PROGRAM SUPPLIES	11.96
					Total :	318.11

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Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167193	4/26/2022	109531 SMILLIN, MAGE	MARCH 2022		CHILD CARE PROVIDER	10,827.00
					Total :	10,827.00
167194	4/26/2022	119447 SOUTH BAY FORD	508774		2015 FORD EXPLR #1462840 SERVICE	1,071.54
					Total :	1,071.54
167195	4/26/2022	619003 SOUTHERN CALIFORNIA EDISON	041422		LIGHT & POWER	4,673.04
					Total :	4,673.04
167196	4/26/2022	104126 SPECTRUM SOLUTIONS	0027122041122		CABLE & BACKUP INTERNET SERVICE	4,086.58
					Total :	4,086.58
167197	4/26/2022	907243 STEFAN MARLI PLASTERING CO.	B/L #19613		REFUND - BUSINESS LICENSE OVERP	113.30
					Total :	113.30
167198	4/26/2022	112027 SUN SMOG CORPORATION	B/L #27011		REFUND - BUSINESS LICENSE OVERP	34.50
					Total :	34.50
167199	4/26/2022	106736 SUPERIOR PLASTIC FABRICATION, INC.	B/L #20232 2022		REFUND - BUSINESS LICENSE OVERP	931.65
					Total :	931.65
167200	4/26/2022	119550 SWRCB	SW-0236589		ANNUAL PERMIT FEE	1,738.00
					Total :	1,738.00
167201	4/26/2022	110877 TAYLORING MINDS FAMILY CHILD, CARE	MARCH 2022		CHILD CARE PROVIDER	3,652.00
					Total :	3,652.00
167202	4/26/2022	111864 TCS RISK MANAGEMENT SERVICES	11973	023-01382	WORKERS COMP PROGRAM ASSESSM	3,875.00
					Total :	3,875.00
167203	4/26/2022	111978 THE SOHAGI LAW GROUP	17115		LEGAL SERVICES	4,357.50
					Total :	4,357.50
167204	4/26/2022	110238 TIREHUB, LLC	19601652 23164406		TIRES - GY WRL FORTITUDE HT BW 12	322.50
					TIRES- GY EAGLE ENFORCER AW 108\	871.62
					Total :	1,194.12
167205	4/26/2022	109775 TOMS TRUCK CENTER NORTH COUNTY	1262165	037-10052	GTRANS AUTO PARTS	142.40

Voucher List
CITY OF GARDENA

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167205	4/26/2022	109775 TOMS TRUCK CENTER NORTH COUNTY	(Continued) 1263289	037-10052	GTRANS AUTO PARTS	530.79
Total :						673.19
167206	4/26/2022	104226 TORRANCE BAKERY	B/L #24689		REFUND - BUSINESS LICENSE OVERP	1,119.00
Total :						1,119.00
167207	4/26/2022	104806 TOYOTA LIFT OF L.A.	PSI-0291244		SERVICE CALL - TOYOTA #8FGCU25 - C	207.70
Total :						207.70
167208	4/26/2022	111481 TRIO COMMUNITY MEALS, LLC	INV2230008418 INV2230008964 INV2230009490	034-00480 034-00480 034-00480	SENIOR FEEDING PROGRAM SENIOR FEEDING PROGRAM SENIOR FEEDING PROGRAM	10,599.44 10,537.99 10,507.26
Total :						31,644.69
167209	4/26/2022	109900 U.S. BANK CORPORATE PAYMENT, SYSTEMS	FINANCE 03/22/22 GOLDMAN 03/22/22 MACIEL 03/22/22 PD TRAINING 02/22/22 PD TRAINING2 2/22/22 PD TRAINING3 2/22/22 PD TRAINING4 2/22/22 SANTOS 03/22/22 TSUJIUCHI 03/22/22 V.OSORIO 03/22/22	023-01381	CAL CARD STATEMENT 02/23-03/22/22 CAL CARD STATEMENT 02/23-03/22/22 CAL CARD STATEMENT 02/23-03/22/22 CAL CARD STATEMENT 01/25-02/22/22 CAL CARD STATEMENT 01/25-02/22/22 CAL CARD STATEMENT 01/25-02/22/22 CAL CARD STATEMENT 01/25-02/22/22 CAL CARD STATEMENT 01/25-02/22/22 CAL CARD STATEMENT 02/23-03/22/22 CAL CARD STATEMENT 02/23-03/22/22 CAL CARD STATEMENT 02/23-03/22/22	11,327.89 1,109.99 170.04 3,243.89 1,915.22 918.15 1,385.45 79.91 2,667.36 275.89
Total :						23,093.79
167210	4/26/2022	104692 ULINE	144367569 147058150		BUS SHOP SUPPLIES BUS SHOP SUPPLIES	216.08 685.09
Total :						901.17
167211	4/26/2022	121275 UNDERGROUND SERVICE ALERT, OF SC	320220280		NEW TICKETS	201.40
Total :						201.40
167212	4/26/2022	121407 UPS	649922152 04/19/22		SHIPPING SERVICE CHARGES	153.09
Total :						153.09
167213	4/26/2022	105549 VALDEZ, MATILDE	MARCH 2022		CHILD CARE PROVIDER	13,961.00

Voucher List
CITY OF GARDENA

Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167213	4/26/2022	105549 105549 VALDEZ, MATILDE	(Continued)		Total :	13,961.00
167214	4/26/2022	122050 VERIZON WIRELESS	9902105783		BUS CELL PHONE SERVICE~	120.86
			9903850517		PW CELL PHONE SERVICE~	924.28
					Total :	1,045.14
167215	4/26/2022	111992 VISTA DEL PACIFICO PROPERTIES,, LLC	B/L #19292		REFUND - BUSINESS LICENSE OVERP,	60.00
					Total :	60.00
167216	4/26/2022	108353 WALTERS WHOLESALE ELECTRIC CO	8120234501		BLDG MAINT SUPPLIES	209.49
			93264		GTRANS MAINT SUPPLIES	21.05
			S118385165.007		SIGNS/SIGNALS SUPPLIES	-1,378.14
			S119769104.005		GTRANS MAINT SUPPLIES	128.93
			S119769104.007		GTRANS MAINT SUPPLIES	202.32
			S119788482		BLDG MAINT SUPPLIES	410.59
			S120328667		SIGNS/ SIGNALS MAINT SUPPLIES	562.29
					Total :	156.53
167217	4/26/2022	101195 WASTE RESOURCES GARDENA	042022		WASTE COLLECTION	258,392.62
					Total :	258,392.62
167218	4/26/2022	104107 WAXIE SANITARY SUPPLY	80790544		BUS WASH SUPPLIES	175.96
					Total :	175.96
167219	4/26/2022	110370 WESTERN COLLISION CENTER, INC	1069	035-01136	2018 FORD EXPLR #1554895 BODY REI	3,064.41
			1070	035-01136	2017 FORD EXPLORER #1368929 BOD\	342.74
			1072	035-01136	2018 NISSN FRONTIER #1529606 BODY	530.63
			1074	035-01136	2018 FORD EXPLORER #1554895 BOD\	6,024.71
			1075	035-01136	2016 FORD EXPLR #1488057 BODY REI	1,606.75
			1077	035-01136	2018 FORD EXPLR #1554674 BODY REI	2,245.03
					Total :	13,814.27
167220	4/26/2022	119387 WEX BANK	80098274		FUEL PURCHASES	31.55
					Total :	31.55
167221	4/26/2022	125001 YAMADA COMPANY, INC.	81806		TREE TRIMMING MAINT SUPPLIES	79.34
					Total :	79.34

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04/21/2022 2:27:36PM

Voucher List
CITY OF GARDENA

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Bank code : usb

Voucher	Date	Vendor	Invoice	PO #	Description/Account	Amount
167222	4/26/2022	107051 ZAVALETA, MARITZA	MARCH 2022		CHILD CARE PROVIDER	5,312.00
Total :						5,312.00
198 Vouchers for bank code : usb						Bank total : 2,757,705.49
198 Vouchers in this report						Total vouchers : 2,757,705.49

usb

CLAIMS VOUCHER APPROVAL

By:

This is to certify that the claims or demands covered by checks listed on pages 1 to 21 inclusive of the check register have been audited by the City Council of the City of Gardena and that all of the said checks are approved for payment except check numbers:

04/26/2022

Date _____

Date

Date _____

Date _____

Date _____



TO: THE HONORABLE MAYOR AND CITY COUNCIL
SUBJECT: PERSONNEL REPORT

1. Report the count of confirmed COVID-19 employee cases.
Total Count: One-Hundred Sixty-One (161)
 - a. Administrative Services Department: Five (5)
 - b. City Clerk's Office: Three (3)
 - c. Elected & City Manager's Offices: One (1)
 - d. Community Development Department: Four (4)
 - e. Transportation Department: Fifty-Two (52)
 - f. Police Department: Forty-Six (46)
 - g. Public Works Department: Twenty-Five (25)
 - h. Recreation & Human Services Department: Twenty-Five (25)
2. Report the Appointment of **JACKIE CHOI**, to the position of Economic Development Manager, Schedule 126 (\$8,113 - \$10,355/month) with the Community Development Department effective April 11, 2022.
3. Report the Promotion of **MARY SIMONELL**, to the position of Administrative Services Manager, Schedule 126 (\$8,113 - \$10,355/month) with the Administrative Services Department effective September 1, 2021.
4. Report the following individuals were placed on Paid Administrative Leave:
 - a. **KITU HUMPHREY**, Bus Operator with the Transportation Department, effective February 4, 2022.
 - b. **LUIS CASTILLO**, Police Officer with the Police Department, effective April 11, 2022.
 - c. **ROBBI CHAVEZ**, Bus Operator with the Transportation Department, effective April 13, 2022.
5. Report the recruitment for the Open/Competitive position of Human Resources Analyst (Administrative Services Department). This recruitment is open until filled.
6. Report the Recruitment for the Open/Competitive position of Risk Management Analyst (Administrative Services Department). This recruitment is open until filled.
7. Report the Recruitment for the Open/Competitive position of Transit Equipment Mechanic, (GTrans Department). This recruitment is open until filled.

RESOLUTION NO. 6573

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, MAKING THE LEGALLY REQUIRED FINDINGS TO RE-AUTHORIZE THE USE OF TELECONFERENCING IN ACCORDANCE WITH ASSEMBLY BILL 361 FOR MEETINGS OF THE GARDENA CITY COUNCIL AND OTHER COMMISSIONS, COMMITTEES AND BOARDS SUBJECT TO STATE OPEN MEETING LAWS

THE CITY COUNCIL OF THE CITY OF GARDENA DOES HEREBY RESOLVE AS FOLLOWS:

WHEREAS, international, national, state, and local health and governmental authorities are responding to an outbreak of respiratory disease caused by a novel coronavirus named “SARS-CoV-2,” and the disease it causes has been named “coronavirus disease 2019,” abbreviated COVID-19, (“COVID-19”); and

WHEREAS, on March 4, 2020, the Governor of the State of California, Gavin Newsom declared a State of Emergency in California to make additional resources available, formalize emergency actions already underway across multiple state agencies and departments, and help the State prepare for broader spread of COVID-19; and

WHEREAS, on March 4, 2020, the Los Angeles County Board of Supervisors and Department of Public Health declared a local emergency and local public health emergency to aid the regional healthcare and governmental community in responding to COVID-19; and

WHEREAS, on March 13, 2020, the President of the United States declared a National Emergency due to the continue spread and the effects of COVID-19; and

WHEREAS, on March 16, 2020, the City Manager, as the City’s Director of Emergency Services, did proclaim the existence of a local emergency as authorized by Government Code section 8630 and Gardena Municipal Code Chapter 2.56.060; and

WHEREAS, the Governor’s March 4, 2021, declaration of a state of emergency based on the COVID-19 pandemic remains in place; and

WHEREAS, the Proclamation of Existence of a Local Emergency issued by the City Manager, as the City’s Director of Emergency Services on March 16, 2020, has been ratified by the City Council via Resolution 6441 on March 19, 2020 and reaffirmed by Resolution No. 6454 on May 12, 2020, Resolution No 6469 on July 14, 2020, Resolution No. 6478 on September 8, 2020, Resolution No. 6483 on October 27, 2020, Resolution

No. 6489 on December 15, 2020, Resolution No. 6495 on February 9, 2021, Resolution No. 6503 on March 23, 2021, Resolution No. 6512 on May 11, 2021, Resolution No. 6521 on June 22, 2021, Resolution No. 6526 on August 10, 2021, Resolution No. 6533 on October 26, 2021, Resolution No. 6538 on December 14, 2021, Resolution No. 6559 on February 8, 2022 and Resolution No. 6567 on March 22, 2022, with the result that the proclamation of a local emergency based on the COVID-19 pandemic remains in place; and

WHEREAS, Paragraph 3 of Executive Order N-29-20, issued by the Governor on March 17, 2020, among other things, suspended the Brown Act requirements for teleconferencing, provided that notice and accessibility requirements were met, the public was allowed to observe and address the legislative body at the meeting, and the legislative body had a procedure for receiving and swiftly resolving requests for reasonable accommodation for individuals with disabilities, specifying that this suspension would remain in place during the period in which state or local public health officials have imposed or recommended social distancing measures; and

WHEREAS, paragraph 42 of Executive Order N-08-21, issued by the Governor on June 11, 2021, withdrew, and replaced paragraph 3 of Executive Order N-29-20's suspension of the Brown Act requirements for teleconferencing with a similar suspension of those requirements that it specified would remain in place only through September 30, 2021; and

WHEREAS, on September 16, 2021, the Governor signed into law Assembly Bill No. 361 ("AB 361"), which, until January 1, 2024, authorizes a local agency to use teleconferencing without complying with the teleconferencing requirements imposed by the Brown Act when a legislative body of a local agency holds a meeting during a declared state of emergency, as that term is defined, when state or local health officials have imposed or recommended measures to promote social distancing or when the legislative body has determined that meeting in person would present imminent risks to the health or safety of attendees; and

WHEREAS, AB 361 requires legislative bodies that hold teleconferenced meetings under its abbreviated teleconferencing procedures to give notice of the meeting and post agendas, as described, to allow members of the public to access the meeting and address

the legislative body, to give notice of the means by which members of the public may access the meeting and offer public comment, including an opportunity for all persons to attend via a call-in option or an internet-based service option, and to conduct the meeting in a manner that protects the statutory and constitutional rights of the parties and the public appearing before the legislative body; and

WHEREAS, AB 361 requires the legislative body to take no further action on agenda items when there is a disruption which prevents the public agency from broadcasting the meeting, or in the event of a disruption within the local agency's control which prevents members of the public from offering public comments, until public access is restored; and

WHEREAS, AB 361 prohibits the legislative body from requiring public comments to be submitted in advance of the meeting and specifies that the legislative body must provide an opportunity for the public to address the legislative body and offer comment in real time; and

WHEREAS, AB 361 prohibits the legislative body from closing the public comment period and the opportunity to register to provide public comment, until the public comment period has elapsed or until a reasonable amount of time has elapsed, as specified; and

WHEREAS, when there is a continuing state of emergency, or when state or local officials have imposed or recommended measures to promote social distancing, AB 361 requires a legislative body to make specified findings not later than 30 days after the first teleconferenced meeting pursuant to these provisions, and to make those findings every 30 days thereafter, in order to continue to meet under AB 361's abbreviated teleconferencing procedures; and

WHEREAS, this body previously adopted a Resolution, which made the findings required by AB 361 to allow the City Council and all City Commissions, Committees and Boards to continue to meet under AB 361's abbreviated teleconferencing procedures, and authorized the City Council and all City Commissions, Committees and Boards to conduct meetings under AB 361's abbreviated teleconferencing procedures, without complying with the requirements set forth in Government Code Section 54953(b)(3), subject to compliance with the requirements set forth in Government Code Section 54953(e)(2); and

WHEREAS, in light of the continuing State and local declarations of emergency resulting from the COVID-19 pandemic, the continuing recommendation by Los Angeles County Public Health officials of measures to promote social distancing, and the imminent risks to the health of safety of attendees at meetings conducted in person, the City Council desires to again make the findings required by AB 361 to allow the City Council and all City Commissions, Committees and Boards to continue to meet under AB 361's abbreviated teleconferencing procedures.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, DOES HEREBY FIND, DETERMINE, AND RESOLVE, AS FOLLOWS:

SECTION 1. The Recitals set forth above are true and correct and are incorporated into this Resolution by this reference.

SECTION 2. The City Council finds that the State and local declarations of emergency resulting from the COVID-19 pandemic remain in place, and that the state of emergency continues to directly impact the ability to meet safely in person.

SECTION 3. The City Council finds that local officials, namely, the Los Angeles County Department of Public Health, has continued to recommend measures to promote social distancing.

SECTION 4. As a result of the findings in Sections 1 through 3 above, the City Council and all City Commissions, Committees and Boards are authorized to conduct meetings under AB 361's abbreviated teleconferencing procedures, without complying with the requirements set forth in Government Code Section 54953(b)(3), subject to compliance with the requirements set forth in Government Code Section 54953(e)(2).

SECTION 5. If any section, subsection, sentence, clause, or phrase of this Resolution is for any reason held to be invalid or unconstitutional by a decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Resolution. The City Council hereby declares that it would have passed this Resolution and each and every section, subsection, sentence, clause, or phrase not declared invalid or unconstitutional without regard to whether any portion of this Resolution would be subsequently declared invalid or unconstitutional.

BE IT FURTHER RESOLVED that the City Clerk shall certify to the passage and adoption of this Resolution; shall cause the same to be entered among the original Resolutions of said City; and shall make a minute of the passage and adoption thereof in the records of the proceedings of the City Council of said City in the minutes of the meeting at which the same is passed and adopted.

Passed, approved, and adopted this 26th day of April 2022.

TASHA CERDA, Mayor

ATTEST:

MINA SEMENZA, City Clerk

APPROVED AS TO FORM:



CARMEN VASQUEZ, City Attorney



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 8.F
Section: CONSENT CALENDAR
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: Approve Amendment 02 to Local Agreement CCTR-1084 with the California Department of Social Services for additional funding of the Gardena Family Child Care Program

CONTACT: RECREATION & HUMAN SERVICES

COUNCIL ACTION REQUIRED:

RECOMMENDATION AND STAFF SUMMARY:

Staff respectfully recommends that Council approve Amendment 02 to Local Agreement CCTR-1084 with the California Department of Social Services which provides additional funding for the Gardena Family Child Care Program for Fiscal Year 2021-22. This additional funding will primarily cover increased provider rates but can also be used for staff increases and serving additional children.

The Gardena Family Child Care Program (GFCC) provides quality, educational, subsidized child care in licensed family child care homes in Gardena and bordering cities. Services are provided to low-income families whose parents are employed, in school/training, seeking employment, or are incapacitated and require assistance. GFCC staff also offers technical assistance to family child care providers in the GFCC network in areas such as curriculum, the child care environment, and developmental and age appropriate practices.

Beginning July 1, 2021 administration of the program at the State level transferred from the California Department of Education (CDE) to the California Department of Social Services (CDSS). All program requirements remain the same for the foreseeable future.

For Fiscal Year 2021-2022 additional revenue and expenditures encumbered in the amount of \$329,063 to the City from the California Department of Social Services for the Gardena.

FINANCIAL IMPACT/COST:

Family Child Care Program. This Amendment increases the total contract to \$3,285,659.

No financial impact to the General Fund.

ATTACHMENTS:

[CCTR-1084-02.pdf](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio". The signature is fluid and cursive, with a period at the end.

Clint Osorio, City Manager

***Amendment 02*****LOCAL AGREEMENT FOR CHILD DEVELOPMENT SERVICES
ALLOCATION LETTER**

3266 FY 21/22 Rate Reform and MRA Increase

DATE: July 01, 2021**CONTRACT NUMBER:** CCTR-1084**PROGRAM TYPE:** GENERAL CHILD CARE &
DEV PROGRAMS**PROJECT NUMBER:** 19-2180-00-1**STATE AGENCY: CALIFORNIA DEPARTMENT OF SOCIAL SERVICES****CONTRACTOR'S NAME:** CITY OF GARDENA

This agreement with the State of California dated July 01, 2021 designated as number CCTR-1084 and Amendment #01 (Budget Act Amendment/COLA/Family Fee Credit) shall be amended in the following particulars but no others:

The Maximum Reimbursable Amount (MRA) payable pursuant to the provisions of this agreement shall be amended by deleting reference to \$2,956,596.00 and inserting \$3,285,659.00 in place thereof.

The Maximum Rate per child day of enrollment payable pursuant to the provisions of the agreement shall be amended by deleting reference to \$51.55 and inserting \$62.66 in place thereof.

SERVICE REQUIREMENTS

The minimum Child Days of Enrollment (CDE) Requirement shall be amended by deleting reference to 57,358.0 and inserting 52,436.0 in place thereof.

Minimum Days of Operation (MDO) Requirement shall be 254. (No Change)

EXCEPT AS AMENDED HEREIN all terms and conditions of the original agreement shall remain unchanged and in full force and effect.

IMPORTANT: Signature is not required.

AMOUNT ENCUMBERED BY THIS DOCUMENT	PROGRAM/CATEGORY (CODE AND TITLE)		FUND TITLE	
\$ 329,063	Child Development Programs			
PRIOR AMOUNT ENCUMBERED FOR THIS CONTRACT	(OPTIONAL USE)			
\$ 2,956,596	See Attached			
TOTAL AMOUNT ENCUMBERED TO DATE	ITEM	CHAPTER	STATUTE	FISCAL YEAR
\$ 3,285,659	See Attached			
	OBJECT OF EXPENDITURE (CODE AND TITLE)			
	706			

CONTRACTOR'S NAME: CITY OF GARDENA

CONTRACT NUMBER: CCTR-1084

Amendment 02

AMOUNT ENCUMBERED BY THIS DOCUMENT \$ 0	PROGRAM/CATEGORY (CODE AND TITLE) Child Development Programs		FUND TITLE Federal	
PRIOR AMOUNT ENCUMBERED \$ 528,832	(OPTIONAL USE)0656 FC# 93.596 PC# 000321 13609-2180			
TOTAL AMOUNT ENCUMBERED TO DATE \$ 528,832	ITEM 30.10.020.001 5180-101-0890	CHAPTER B/A	STATUTE 2021	FISCAL YEAR 2021-2022
	OBJECT OF EXPENDITURE (CODE AND TITLE) 706 SACS: Res-5025 Rev-8290			

AMOUNT ENCUMBERED BY THIS DOCUMENT \$ 0	PROGRAM/CATEGORY (CODE AND TITLE) Child Development Programs		FUND TITLE Federal	
PRIOR AMOUNT ENCUMBERED \$ 243,100	(OPTIONAL USE)0656 FC# 93.575 PC# 000324 15136-2180			
TOTAL AMOUNT ENCUMBERED TO DATE \$ 243,100	ITEM 30.10.020.001 5180-101-0890	CHAPTER B/A	STATUTE 2021	FISCAL YEAR 2021-2022
	OBJECT OF EXPENDITURE (CODE AND TITLE) 706 SACS: Res-5025 Rev-8290			

AMOUNT ENCUMBERED BY THIS DOCUMENT \$ 0	PROGRAM/CATEGORY (CODE AND TITLE) Child Development Programs		FUND TITLE General	
PRIOR AMOUNT ENCUMBERED \$ 2,131,520	(OPTIONAL USE)0656 23254-2180			
TOTAL AMOUNT ENCUMBERED TO DATE \$ 2,131,520	ITEM 30.10.020.001 5180-101-0001	CHAPTER B/A	STATUTE 2021	FISCAL YEAR 2021-2022
	OBJECT OF EXPENDITURE (CODE AND TITLE) 706 SACS: Res-6105 Rev-8590			

AMOUNT ENCUMBERED BY THIS DOCUMENT \$ 329,063	PROGRAM/CATEGORY (CODE AND TITLE) Child Development Programs		FUND TITLE Federal	
PRIOR AMOUNT ENCUMBERED \$ 0	(OPTIONAL USE)0656 FC# 93.575 PC# 000000 14551-2180			
TOTAL AMOUNT ENCUMBERED TO DATE \$ 329,063	ITEM 30.10.020. 5180-101-0890	CHAPTER B/A	STATUTE 2021	FISCAL YEAR 2021-2022
	OBJECT OF EXPENDITURE (CODE AND TITLE) 706 SACS: Res-5162 Rev-8290			

AMOUNT ENCUMBERED BY THIS DOCUMENT \$ 0	PROGRAM/CATEGORY (CODE AND TITLE) Child Development Programs		FUND TITLE Federal	
PRIOR AMOUNT ENCUMBERED \$ 53,144	(OPTIONAL USE)0156 FC# 93.575 PC# 000000 15557-2180			
TOTAL AMOUNT ENCUMBERED TO DATE \$ 53,144	ITEM 30.10.020 5180-101-0890	CHAPTER B/A	STATUTE 2021	FISCAL YEAR 2021-2022
	OBJECT OF EXPENDITURE (CODE AND TITLE) 706 SACS: Res-5161 Rev-8290			



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 12.A
Section: DEPARTMENTAL
ITEMS - COMMUNITY
DEVELOPMENT
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: PUBLIC HEARING: ORDINANCE NO. 1840: Adopting Chapter 18.74 to Title 18, Zoning, of the Gardena Municipal Code Relating to Reasonable Accommodations Policy and Procedures and Directing Staff to File a Notice of Exemption from California Environmental Quality Act Pursuant to the Common Sense Exemption.

COUNCIL ACTION REQUIRED:

Staff Recommendation: Conduct a Public Hearing; Please allow three (3) minutes for each speaker; and Introduce Ordinance No. 1840

RECOMMENDATION AND STAFF SUMMARY:

Federal Law and State Law require that persons with disabilities be provided a reasonable accommodation from a land use regulation, policy, or practice that would prevent such a person from having an equal opportunity for housing. Additionally, the recently adopted 2021-2029 6th Cycle Housing Element included a commitment to adopt a reasonable accommodation ordinance.

Ordinance No.1840 provides a process for individuals with disabilities to make requests for, and be provided, reasonable accommodation, when reasonable accommodation is warranted based upon sufficient evidence, from the various City laws, rules, policies, practices and/or procedures of the City, including land use and zoning regulations.

On February 15, 2022, the Planning Commission voted 5-0-0, recommending that the City Council adopt Ordinance No. 1840. The Planning Commission's staff report and resolution of approval, are attached hereto to provide further detail of the project.

FINANCIAL IMPACT/COST:

None.

ATTACHMENTS:

[Planning Commission Packet, Dated February 15, 2022.pdf](#)
[Ordinance No. 1840](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio", is centered within a light gray rectangular box.

Clint Osorio, City Manager

CITY OF GARDENA
PLANNING AND ENVIRONMENTAL QUALITY COMMISSION

STAFF REPORT
RESOLUTION NO. PC 5-22

AGENDA ITEM # 5.B

DATE: February 15, 2022

TO: Chair Langley and Members of the Planning and Environmental Quality Commission

FROM: Greg Tsujiuchi, Community Development Director

APPLICANT: City of Gardena

LOCATION: Citywide

REQUEST: Adoption of Resolution No. 5-22 recommending that the City Council adopt Ordinance No. 1840 adding Chapter 18.74 to the Gardena Municipal Code relating to reasonable accommodations

Background

Federal law (the Fair Housing Act, Americans with Disabilities Act, and the Rehabilitation Act of 1973) and State Law (California Fair and Equal Housing Act) require that persons with disabilities be provided a reasonable accommodation from a land use regulation, policy, or practice that would prevent such person from having an equal opportunity for housing. While the City has made it a policy for years to provide reasonable accommodations if requested, the recently adopted 2021-2029 6th Cycle Housing Element included a commitment to adopt a reasonable accommodation ordinance which sets for the process for requesting a reasonable accommodation.

The proposed ordinance is modeled on the City of Oakland's ordinance whose draft was revised in response to concerns raised by Disability Rights California, an advocacy agency for people with disabilities.

Ordinance Summary

Ordinance No. 1840 adds a new Chapter 18.74 to the City's zoning provisions. The stated purpose of the Chapter is to establish a procedure for people with disabilities to make requests for a reasonable accommodation in the application of the City's zoning and building laws, rules, policies and practices so that a disabled person may use and enjoy a dwelling.

Requests for a reasonable accommodation may be made by the person with a disability, a representative of that person, or a developer of housing for disabled persons.

A request for a reasonable accommodation must be in writing and include specified information, including the reason for the request. If the request is made in conjunction with a request for a discretionary approval, then to the extent feasible, the request should be filed with the related application. However, all requests are to remain confidential to respect the individual's right of privacy and the determination will be made by the Director of Community Development.

The required findings to grant an accommodation request are as follows:

1. That the housing, which is the subject of the request for reasonable accommodation, will be used by people with disabilities protected under fair housing laws.
2. That the accommodation is necessary to afford people with disabilities an equal opportunity to use and enjoy the dwelling;
3. That the requested accommodation will not require a fundamental alteration to zoning laws, rules, policies, practices and procedures; and
4. That the requested accommodation will not impose an undue financial or administrative burden on the City.

Appeals of the Director's decision may be made to the City Manager.

Analysis

Gardena Municipal Code section 18.52.010 specifies that the zoning code may be amended whenever the public necessity, convenience, general welfare, or good land use and zoning practices so require. Additionally, the ordinance must be consistent with the General Plan.

Ordinance No. 18.40 is required to be adopted by federal and State law in order to provide housing opportunities to disabled individuals. The Ordinance therefore promotes the public necessity, convenience, and general welfare. As discussed above, the Ordinance is also consistent with the City's General Plan as it implements one of the obligations of the City under the newly adopted Housing Element.

CEQA

This Ordinance is categorically exempt from CEQA pursuant to the common sense exemption set forth in Guidelines section 15061(b)(3) that CEQA only applies to projects which have the potential for causing a significant effect on the environment and where it can be seen with certainty that there is no possibility that the activity will have a significant effect, the activity is not subject to CEQA. This Ordinance enacts a procedure as required by federal and state law and does not change the density, intensity, or allowed uses or would have other effects on the environment. For these same reasons, the Ordinance

also qualifies for an exemption under CEQA Guidelines section 15305 (Class 5) for minor alterations in land use limitations in areas with an average slope of less than 20%. No part of Gardena has a slope in excess of 20%. The changes are not for any specific project and therefore will not impact any environmental resource of hazardous or critical concern, will not create cumulative impacts, or impacts to scenic highways, hazardous waste sites, or historical resources. Because this is an ordinance pertaining to citywide development standards there will not be any significant effects on the environment due to unusual circumstances. As such, staff is directed to file a Notice of Exemption pursuant to CEQA Guidelines sections 15061(b)(3) and 15305.

Recommendation

It is recommended that the Planning Commission approve the attached resolution recommending that the City Council approve the attached ordinance to provide reasonable accommodations to persons with disabilities in order to increase housing opportunities in the City and comply with State and federal law.

RESOLUTION NO. PC 5-22

A RESOLUTION OF THE PLANNING AND ENVIRONMENTAL QUALITY COMMISSION OF THE CITY OF GARDENA, CALIFORNIA, RECOMMENDING THAT THE CITY COUNCIL ADOPT ORDINANCE NO. 1840 ADDING CHAPTER 18.74 TO TITLE 18, ZONING, OF THE GARDENA MUNICIPAL CODE RELATING TO REASONABLE ACCOMMODATIONS POLICY AND PROCEDURES AND DIRECTING STAFF TO FILE A NOTICE OF EXEMPTION

THE PLANNING COMMISSION OF THE CITY OF GARDENA, CALIFORNIA, DOES HEREBY RESOLVE AS FOLLOWS:

A. The federal Fair Housing Amendments Act of 1988 and California's Fair Employment and Housing Act impose an affirmative duty on local governments to make reasonable accommodation in their land use and zoning regulations and practices when necessary;

B. Fair Housing Laws include "Fair Housing Amendments Act of 1988" (42 U.S.C. § 3601 et seq.), including reasonable accommodation required by 42 U.S.C. § 3604(f)(3)(B), and the "California Fair Employment and Housing Act" (California Government Code Section 12900 et seq.), including reasonable accommodation required specifically by California Government Code Sections 12927(c)(1) and 12955(l), as any of these statutory provisions now exist or may be amended from time to time;

C. The State Housing and Community Development Department (HCD) encourages cities to adopt written procedures for reasonable accommodation requests with respect to zoning regulations, permit processing, and building codes in light of the aforementioned laws and a city's affirmative duty to comply with fair housing laws;

D. One of HCD's comments on the City's 6th Cycle Housing Element related to the City's procedures and findings regarding reasonable accommodations;

E. The City shall provide a process for individuals with disabilities to make requests for, and be provided, reasonable accommodation, when reasonable accommodation is warranted based upon sufficient evidence, from the various City laws, rules, policies, practices and/or procedures of the City, including land use and zoning regulations;

F. It is the intent of this chapter that, notwithstanding time limits provided to perform specific functions, application review, decision making and appeals proceed expeditiously, especially where the request is time sensitive, so as to reduce impediments to equal access to housing;

G. On February 15, 2022, the Planning and Environmental Quality Commission held a public hearing at which time it considered all material and evidence, whether written or oral; and

NOW, THEREFORE, THE PLANNING AND ENVIRONMENTAL QUALITY COMMISSION OF THE CITY OF GARDENA DOES HEREBY RESOLVE AS FOLLOWS:

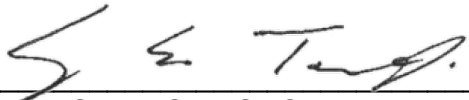
The Planning Commission hereby recommends that the City Council adopt Ordinance No. 1840, attached hereto as Exhibit A, adding chapter 18.74 to Title 18, Zoning, of the Gardena Municipal code relating to reasonable accommodations policy and procedures, and recommends the City Council directs staff to file a notice of exemption.

PASSED, APPROVED, AND ADOPTED this 15th day of February 2022.



LANGLEY STEPHEN, CHAIR
PLANNING AND ENVIRONMENTAL
QUALITY COMMISSION

ATTEST:



GREG TSUJIUCHI, SECRETARY
PLANNING AND ENVIRONMENTAL QUALITY COMMISSION
STATE OF CALIFORNIA
COUNTY OF LOS ANGELES
CITY OF GARDENA

I, Greg Tsujiuchi, Planning and Environmental Quality Commission Secretary of the City of Gardena, do hereby certify that the foregoing Resolution was duly adopted by the Planning and Environmental Quality Commission of the City of Gardena at a regular meeting thereof, held the 15th day of February 2022, by the following vote of the Planning and Environmental Quality Commission:

AYES: Langley, Kanhan, Sherman, Henderson, Eaton

NOES:

ABSENT:

Attachments:

- Exhibit A: Draft Ordinance No. 1840

ORDINANCE NO. 1840

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, ADDING CHAPTER 18.74 TO TITLE 18, ZONING, OF THE GARDENA MUNICIPAL CODE RELATING TO REASONABLE ACCOMMODATIONS POLICY AND PROCEDURES

WHEREAS, the federal Fair Housing Amendments Act of 1988 and California's Fair Employment and Housing Act impose an affirmative duty on local governments to make reasonable accommodation in their land use and zoning regulations and practices when necessary; and

WHEREAS, Fair Housing Laws include "Fair Housing Amendments Act of 1988" (42 U.S.C. § 3601 et seq.), including reasonable accommodation required by 42 U.S.C. § 3604(f)(3)(B), and the "California Fair Employment and Housing Act" (California Government Code Section 12900 et seq.), including reasonable accommodation required specifically by California Government Code Sections 12927(c)(1) and 12955(l), as any of these statutory provisions now exist or may be amended from time to time; and

WHEREAS, the State Housing and Community Development Department (HCD) encourages cities to adopt written procedures for reasonable accommodation requests with respect to zoning regulations, permit processing, and building codes in light of the aforementioned laws and a city's affirmative duty to comply with fair housing laws; and

WHEREAS, one of HCD's comments on the City's 6th Cycle Housing Element related to the City's procedures and findings regarding reasonable accommodations; and

WHEREAS, the City shall provide a process for individuals with disabilities to make requests for, and be provided, reasonable accommodation, when reasonable accommodation is warranted based upon sufficient evidence, from the various City laws, rules, policies, practices and/or procedures of the City, including land use and zoning regulations; and

WHEREAS, it is the intent of this chapter that, notwithstanding time limits provided to perform specific functions, application review, decision making and appeals proceed expeditiously, especially where the request is time sensitive, so as to reduce impediments to equal access to housing; and

WHEREAS, the Planning Commission held a duly noticed public hearing on Ordinance No.1840 on February 15, 2022 at which time it considered all evidence presented, both written and oral; and

WHEREAS, after the close of the public hearing the Planning Commission adopted Resolution No. PC. 5-22 recommending that the City Council adopt Ordinance No. 1840 as revised, including the addition of Chapter 18.74 to Title 18 for reasonable accommodation policy and procedures; and

WHEREAS, on April 26, 2022 the City Council held a duly noticed public hearing on revised Ordinance No. 1840 at which time it considered all evidence presented, both written and oral;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, DOES HEREBY ORDAIN AS FOLLOWS:

SECTION 1. FINDINGS.

- A. The City Council finds that adopting the changes set forth in this Ordinance represents good planning practices because it provides individuals with disabilities reasonable accommodation in rules, policies, practices, and procedures to ensure the equal access to housing and facilitate the development of housing for individuals with disabilities.
- B. The City Council further finds that this Ordinance is consistent with the City's General Plan.

SECTION 2. Chapter 18.74 titled Reasonable Accommodations Policy and Procedures is hereby added to the Gardena Municipal Code to read as follows.

18.74 REASONABLE ACCOMMODATIONS POLICY AND PROCEDURES

18.74.010 Title, purpose, and applicability.

- A. Title and Intent. The provisions of this Chapter shall be known as the Reasonable Accommodations Policy and Procedures. The intent of the Reasonable Accommodations Policy and Procedures is to provide flexibility in the application of the zoning and building codes for individuals with a disability when flexibility is necessary to eliminate barriers to housing opportunities. This Chapter will facilitate compliance with federal and state fair housing laws and promote housing opportunities for residents of Gardena.
- B. Purpose. The purpose of this Chapter is to establish a procedure for persons with disabilities seeking fair access to housing to make requests for a reasonable accommodation in the application of Gardena's zoning and building laws, rules, policies, practices and procedures pursuant to Section 3604(f)(3)(b) of Title 42 of the United States Code (the "Fair Housing Act") and Section 12955 et seq. of the California Government Code (the "California Fair Employment and Housing Act"), which prohibit local government from refusing to make reasonable accommodations in policies and practices when these accommodations are necessary to afford persons with disabilities equal opportunity to use and enjoy a dwelling.

- C. Applicability. A request for a reasonable accommodation may include a modification or exception to the rules, standards and practices for the siting, development and use of housing or housing-related facilities that would eliminate regulatory barriers and provide a person with a disability equal opportunity to housing of their choice.

18.74.020 Definitions.

For the purposes of this Chapter, unless otherwise apparent from the context, certain words and phrases have the meanings stated in this section. The definitions stated herein apply to differing forms of the word or phrase, as required by context.

- A. "Director" means the Community Development Director or the Director's designee.
- B. "Eligible person" means a person with a disability, a representative of such person, or a developer of housing for persons with disabilities.
- C. "Person with a Disability" is any person who has a physical or mental impairment that limits one or more major life activities; anyone who is regarded as having such impairment; or anyone who has a record of such impairment.
- D. "Reasonable accommodation" for purposes of this chapter means providing individuals with disabilities or developers of housing for people with disabilities, flexibility in the application of land use and zoning and building regulations, policies, practices and procedures, or even waiving certain requirements when it is necessary to eliminate barriers to housing opportunities.
- E. "Request for Reasonable Accommodation" means a request to modify land use, zoning and building regulations, policies, practices, or procedures in order to give people with disabilities an equal opportunity to use and enjoy housing opportunities.

18.74.030 Notice to public.

Notice of the City of Gardena's Reasonable Accommodations Policy and Procedure along with an application form shall be displayed in the Community Development Department and on the City's website.

18.74.040 Reasonable accommodation request.

- A. Any eligible person may request a reasonable accommodation in land use, zoning and building regulations, policies, practices and procedures by filing an application with the Community Development Department.

- B. Requests for reasonable accommodation shall be in writing and provide the following information:
 - 1. Name and address of the individual(s) requesting reasonable accommodation;
 - 2. Name and address of the property owner(s);
 - 3. Address of the property for which accommodation is requested;
 - 4. Description of the requested accommodation and the regulation(s), policy or procedure for which accommodation is sought;
 - 5. Reason that the requested accommodation may be necessary for the individual(s) with the disability to use and enjoy the dwelling.
 - 6. If necessary to reach a determination on the request for reasonable accommodation, the reviewing authority may request further information from the applicant consistent with fair housing laws, specifying in detail the information that is required. In the event that a request for additional information is made, the thirty (30) day period to issue a decision is stayed until the applicant responds to the request
- C. Any information identified by an applicant as confidential shall be retained in a manner so as to respect the privacy rights of the applicant and shall not be made available for public inspection.
- D. If an individual needs assistance in making the request for reasonable accommodation, the City will provide assistance to ensure that the process is accessible.
- E. While a request for reasonable accommodation is pending, all laws and regulations otherwise applicable to the property that is the subject of the request shall remain in full force and effect.

18.74.050 Timing of request.

- A. A request for reasonable accommodation may be filed at any time that the accommodation may be necessary to ensure equal access to housing.
- B. If the project for which the request is being made also requires one or more related discretionary approvals (including, but not limited to, design review, conditional use

permit, variance or subdivision), then to the extent feasible, the applicant shall file the request for reasonable accommodation together with the related application for discretionary approval.

18.74.060 Review procedures.

- A. The Director shall act on requests for a reasonable accommodation and shall make reasonable accommodations in rules, policies, practices, or services when those accommodations may be necessary to afford persons with disabilities equal opportunities to use and enjoy housing opportunities.
- B. The Director shall issue a written determination on a request for a reasonable accommodation within a timely manner but no later than thirty (30) days of the date of receipt of a complete application form and may: (1) grant the accommodation request; (2) grant the accommodation request subject to specified nondiscriminatory conditions of approval; or (3) deny the request. All written determinations shall give notice of the right to appeal as specified in Section 18.74.090. The notice of determination shall be sent to the applicant by first class mail or in a format requested by the applicant.
- C. For requests for a reasonable accommodation involving related applications for discretionary approval, the application shall be processed and considered separately from any discretionary elements of the same proposal. If the request for a reasonable accommodation cannot be effectuated until a final decision is rendered on the related discretionary approval(s), a "provisional decision" can be granted within the 30 day time frame and shall become final at the same time as the discretionary approval(s). The applications for the discretionary approval(s) shall be separately considered and shall be subject to the procedures specified in the applicable Zoning Code section. The appropriate decision-making body shall act on all discretionary permits, but not the reasonable accommodation request.

18.74.070 Findings for requests.

- A. In making a determination to grant a requested accommodation, the Director shall make all of the following findings for requests:
 - 1. That the housing, which is the subject of the request for reasonable accommodation, will be used by people with disabilities protected under fair housing laws.

2. That the accommodation is necessary to afford people with disabilities an equal opportunity to use and enjoy the dwelling;
 3. That the requested accommodation will not require a fundamental alteration to zoning laws, rules, policies, practices and procedures; and
 4. That the requested accommodation will not impose an undue financial or administrative burden on the City.
- B. None of the findings of this Section are intended to supersede any other findings which might also be required for a discretionary permit that is reviewed concurrently with the request for accommodation.

18.74.080 Finality of decision.

- A. For requests for reasonable accommodations not involving related land use permits, a decision by the Director shall become final ten (10) calendar days after the date of initial decision.
- B. For requests for reasonable accommodations involving related land use permits, a decision by the Director shall become final (10) calendar days after the date of decision on the related land use permit or the date of denial of the provisional permit, whichever is later.
- C. In the event that the last date of appeal falls on a weekend, holiday or when City offices are closed, the next date such offices are open for business shall be the last date of appeal.

18.74.090 Appeal Procedure

- A. Within ten (10) days of the date of the Director's written decision, an applicant may appeal an adverse decision. Appeals from the adverse decision shall be made in writing.
- B. If an individual needs assistance in filing an appeal on an adverse decision, the City will provide assistance to ensure that the appeal process is accessible.
- C. All appeals shall contain a statement of the grounds for the appeal. Any information identified by an applicant as confidential shall be retained in a manner so as to respect the privacy rights of the applicant and shall not be made available for public inspection.
- D. Appeals shall be heard by the City Manager within thirty days of filing an appeal. The City Manager shall issue a written decision within ten days of the hearing and

the decision shall be final.

- E. Nothing in this procedure shall preclude an aggrieved individual from seeking any other state or federal remedy available.

SECTION 3. CEQA. This Ordinance is categorically exempt from CEQA pursuant to the common sense exemption set forth in Guidelines section 15061(b)(3) that CEQA only applies to projects which have the potential for causing a significant effect on the environment and where it can be seen with certainty that there is no possibility that the activity will have a significant effect, the activity is not subject to CEQA. This Ordinance enacts a procedure as required by federal and state law and does not change the density, intensity, or allowed uses or would have other effects on the environment. For these same reasons, the Ordinance also qualifies for an exemption under CEQA Guidelines section 15305 (Class 5) for minor alterations in land use limitations in areas with an average slope of less than 20%. No part of Gardena has a slope in excess of 20%. The changes are not for any specific project and therefore will not impact any environmental resource of hazardous or critical concern, will not create cumulative impacts, or impacts to scenic highways, hazardous waste sites, or historical resources. Because this is an ordinance pertaining to citywide development standards there will not be any significant effects on the environment due to unusual circumstances. As such, staff is directed to file a Notice of Exemption pursuant to CEQA Guidelines sections 15061(b)(3) and 15305.

SECTION 4. Severability. If any section, subsection, subdivision, paragraph, sentence, clause or phrase of this ordinance, or any part thereof is for any reason held to be unconstitutional, such decision shall not affect the validity of the remaining portion of this ordinance or any part thereof. The City Council hereby declares that it would have passed each section, subsection, subdivision, paragraph, sentence, clause or phrase thereof, irrespective of the fact that any one or more section, subsection, subdivision, paragraph, sentence, clause or phrase be declared unconstitutional.

SECTION 5. This Ordinance shall take effect on the thirty-first day after passage.

SECTION 6. Certification. The City Clerk shall certify the passage of this ordinance and shall cause the same to be entered in the book of original ordinances of said City; shall make a minute passage and adoption thereof in the records of the meeting at which time the same is passed and adopted; and shall, within fifteen (15) days after the passage and adoption thereof, cause the same to be published as required by law, in a publication of general circulation.

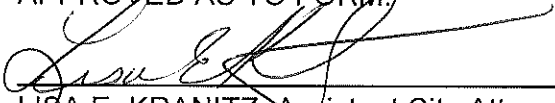
PASSED, APPROVED AND ADOPTED this ____ day of _____, 2022.

TASHA CERDA, Mayor

ATTEST:

MINA SEMENZA, City Clerk

APPROVED AS TO FORM:



LISA E. KRANITZ, Assistant City Attorney



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 14.A
Section: DEPARTMENTAL
ITEMS - POLICE
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: PUBLIC HEARING: ORDINANCE NO. 1841, Adopting a Military Equipment Use Policy of the City of Gardena, California Governing the Use of Military Equipment pursuant to Assembly Bill 481

COUNCIL ACTION REQUIRED:

Staff Recommendation: Conduct a Public Hearing, please allow three (3) minutes for each speaker, and introduce Ordinance No. 1841.

RECOMMENDATION AND STAFF SUMMARY:

BACKGROUND

On September 30, 2021, Governor Newsom signed into law Assembly Bill 481 (AB 481 or the Bill), codified at Government Code sections 7070 through 7075 (Attachment 1), which requires a law enforcement agency to obtain approval from the applicable governing body, via adoption of a “military equipment” use policy (the Policy) by ordinance (the Ordinance), prior to the law enforcement agency funding, acquiring, or using equipment deemed military equipment as defined in Assembly Bill 481.

Items deemed to be “military equipment” by AB 481 are used as a component of overall best practices for law enforcement agencies throughout the country. These tools have been tested in the field and are used by law enforcement agencies to enhance public and officer safety. None of the equipment in Gardena Police Department’s inventory has been obtained from the military, nor is it solely designated for military use. Loss of these items would jeopardize the welfare of citizens and peace officers within the Gardena Police Department.

The term “military equipment,” as used in AB 481, in fact, does not necessarily indicate the equipment that has been used by or acquired through the military. Pursuant to AB 481, items deemed to be “military equipment” include, but are not limited to, unmanned aerial or ground vehicles, armored vehicles, command and control vehicles, pepper balls, less lethal shotguns, less lethal 40mm projectile launchers, and diversionary devices.

The Gardena Police Department (GPD) is committed to using the most up-to-date tools and equipment to safeguard the citizens of Gardena. Many of the items deemed to be “military equipment” by AB 481 are in fact employed by GPD, and law enforcement agencies across

the country, in order to specifically reduce risk to community members. These items provide peace officers with the ability to safely resolve volatile situations which otherwise might rise to the level of a lethal force encounter. To that end, the items at issue in this report, and accompanying Military Equipment Use Policy, also provide GPD's peace officers with vital tools that facilitate compliance with its stringent use of force policy.

DISCUSSION

There is significant interest in ensuring that law enforcement continues to have access to equipment that will provide peace officers as many options as possible to safeguard lives, ensure safety, and protect civil liberties. The use of the tools identified below is vital to GPD's mission and will continue to be strictly regulated through internal processes and oversight.

The proposed Ordinance (Attachment 2) is in compliance with AB 481 and is necessary to adopt in order to approve GPD's Policy 706, which constitutes GPD's Military Equipment Use Policy (Exhibit A to Attachment 2). As required by AB 481, the draft Policy was posted on the Police Department's website on March 23, 2022, 30 days prior to the introduction of the Ordinance. Policy 706 outlines each item identified in Government Code section 7070, that is currently owned and utilized by the police department. The Policy also includes the current use and cost of each item. These particular items, and their stated uses, have been in place prior to the implementation of AB 481. Therefore, future acquisitions of any item deemed to be "military equipment" will require a further public meeting, policy update, and City Council approval.

The proposed Policy 706 safeguards the public's welfare, safety, civil rights, and civil liberties. Policy 706 ensures that there are safeguards, including transparency, oversight, and accountability measures in place. For instance, Policy 706 requires that GPD conduct an annual audit of military equipment, and present a military equipment report at a yearly community meeting. Members of the public are provided direction per the Policy on how to register complaints with the police department related to its use of military equipment. All items which result in a use of force will be investigated, as is already required by existing GPD policy.

There are no reasonable alternatives to the items listed below as these are the best standards and practices. Additionally, GPD has not discovered alternative items that can achieve the same officer and civilian safety objectives. Therefore, each item's necessity is further described below:

- **Command & Control Recreational Vehicle (RV):** The Command & Control Recreational Vehicle is a motorhome. This RV will be deployed during critical incidents such as major disasters, pre-planned high-risk warrant operations, Crisis Negotiation Team operations, large-scale pre-planned events, natural disasters, and community outreach events. The RV provides mobility, sheltering, and logistical support during any

of the previously mentioned incidents or scenarios.

- **Armored personnel carriers, Humvees, wheeled vehicles that have a breaching or entry apparatus:** Armored vehicles are used to provide ballistic protection to officers and citizens during a rescue, critical incidents, and other hazardous situations. These vehicles allow officers closer access to high-risk situations while substantially reducing the physical risk to the officers and citizens. These vehicles are built on commercial vehicle chassis and are primarily a reinforcement of civilian commercial vehicles. As such, there are no reasonable alternatives to providing the same level of ballistic protection.
- **Specialized firearms and ammunition, including assault weapons:** Patrol rifles, SWAT rifles, and sniper rifles enable officers when in compliance with the GPD's Use of Force Policy, to address medium to long-distance threats, or those threats who are heavily armed, protected by armor, or both. Further, in both short and long-distance deployments, they allow officers precision shot placement, minimizing the risk to officers and innocent citizens.
- **Diversionsary Devices:** Diversionsary Devices are used as a non-lethal device to disorient or divert a violent felon's attention away from officers. This can allow officers to gain safer access to a high-risk situation, giving extra time to assess and analyze existing threats. This can prevent injury to officers and citizens. These devices can often lead to a safer resolution and allow officers to take a citizen into custody without force. Diversionsary devices have become the industry standard and the best option for law enforcement when their use is reasonable and necessary.
- **Chemical Agents:** Chemical agents such oleoresin capsicum (OC) are less lethal methods used to address violent or riotous crowds when there is a risk of physical safety. They are also used to safely gain compliance of a suspect from a fixed location or safely detain a suspect who poses a risk of violence to officers. Tear gas allows peace officers to deploy a less lethal chemical agent into a structure where other weapons would not be capable of doing so. These weapons are less lethal and afford peace officers an added option to avoid lethal force encounters. When these items are reasonable and necessary for use, there is no alternative.
- **Specialty Impact Munitions (SIMs):** The 40mm launcher affords the ability to use less-lethal chemical agents and impact munition This allows officers to address a threat from a greater distance and provides an alternative option for deadly force when reasonable. The bean bag shotgun also allows officers to confront a potentially armed or dangerous suspect at a longer distance. This can potentially prevent a deadly force encounter. When necessary, there is no alternative to these less lethal weapon systems.

All use of what has been deemed military equipment by AB 481 must be reasonably necessary and conform to the Gardena Police Department's use of force and other policies. All the facts and circumstances surrounding the incident must be carefully weighed and considered before authorizing the use of, and/or utilizing this equipment.

The proposed policy was posted on the Gardena Police Department's website on March 23, 2022.

The public hearing notice for this Ordinance was published in the Gardena Valley News on April 14, 2022.

The Gardena Department seeks City Council adoption of the attached Military Equipment Use Policy – 706 (Exhibit A to Proposed Ordinance No. 1841) to allow GPD to continue to use the vital equipment specified therein and allow neighboring police agencies to use military equipment in this jurisdiction when providing mutual-aid during exigent circumstances.

Staff recommends that the City Council Conduct a Public Hearing, please allow three (3) minutes for each speaker, and introduce Ordinance No. 1841.

FINANCIAL IMPACT/COST:

There is no fiscal impact associated with introducing the Ordinance. There are no new financial considerations for existing military equipment and munitions.

ATTACHMENTS:

[Attachment 1 - AB 481.pdf](#)

[Attachment 2 - Gardena Ordinance No 1841 with Exhibit A \(Military Equipment Policy\).pdf](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio".

Clint Osorio, City Manager

Assembly Bill No. 481

CHAPTER 406

An act to add Chapter 12.8 (commencing with Section 7070) to Division 7 of Title 1 of the Government Code, relating to military equipment.

[Approved by Governor September 30, 2021. Filed with
Secretary of State September 30, 2021.]

LEGISLATIVE COUNSEL'S DIGEST

AB 481, Chiu. Law enforcement and state agencies: military equipment: funding, acquisition, and use.

Existing law designates the Department of General Services as the agency for the State of California responsible for distribution of federal surplus personal property, excepting food commodities, and requires the department to, among other things, do all things necessary to the execution of its powers and duties as the state agency for the distribution of federal personal surplus property, excepting food commodities, in accordance with specified federal law. Existing law, the Federal Surplus Property Acquisition Law of 1945, authorizes a local agency, as defined, to acquire surplus federal property without regard to any law which requires posting of notices or advertising for bids, inviting or receiving bids, or delivery of purchases before payment, or which prevents the local agency from bidding on federal surplus property. Existing federal law authorizes the Department of Defense to transfer surplus personal property, including arms and ammunition, to federal or state agencies for use in law enforcement activities, subject to specified conditions, at no cost to the acquiring agency.

This bill would require a law enforcement agency, defined to include specified entities, to obtain approval of the applicable governing body, by adoption of a military equipment use policy, as specified, by ordinance at a regular meeting held pursuant to specified open meeting laws, prior to taking certain actions relating to the funding, acquisition, or use of military equipment, as defined. The bill would also require similar approval for the continued use of military equipment acquired prior to January 1, 2022. The bill would allow the governing body to approve the funding, acquisition, or use of military equipment within its jurisdiction only if it determines that the military equipment meets specified standards. The bill would require the governing body to annually review the ordinance and to either disapprove a renewal of the authorization for a type, as defined, of military equipment or amend the military equipment use policy if it determines, based on an annual military equipment report prepared by the law enforcement agency, as provided, that the military equipment does not comply with the above-described standards for approval. The bill would specify these provisions do not preclude a county or local municipality from implementing

additional requirements and standards related to the purchase, use, and reporting of military equipment by local law enforcement agencies.

This bill would also require a state agency, as defined, to create a military equipment use policy before engaging in certain activities, publish the policy on the agency's internet website, and provide a copy of the policy to the Governor or the Governor's designee, as specified. The bill would also require a state agency that seeks to continue use of military equipment acquired prior to January 1, 2022, to create a military equipment use policy.

This bill would also include findings that the changes proposed by this bill address a matter of statewide concern rather than a municipal affair and, therefore, apply to all cities, including charter cities.

By adding to the duties of local officials with respect to the funding, acquisition, and use of military equipment, this bill would impose a state-mandated local program.

The California Constitution requires local agencies, for the purpose of ensuring public access to the meetings of public bodies and the writings of public officials and agencies, to comply with a statutory enactment that amends or enacts laws relating to public records or open meetings and contains findings demonstrating that the enactment furthers the constitutional requirements relating to this purpose.

This bill would make legislative findings to that effect.

The California Constitution requires the state to reimburse local agencies and school districts for certain costs mandated by the state. Statutory provisions establish procedures for making that reimbursement.

This bill would provide that no reimbursement is required by this act for a specified reason.

The people of the State of California do enact as follows:

SECTION 1. The Legislature finds and declares all of the following:

(a) The acquisition of military equipment and its deployment in our communities adversely impacts the public's safety and welfare, including increased risk of civilian deaths, significant risks to civil rights, civil liberties, and physical and psychological well-being, and incurment of significant financial costs. Military equipment is more frequently deployed in low-income Black and Brown communities, meaning the risks and impacts of police militarization are experienced most acutely in marginalized communities.

(b) The public has a right to know about any funding, acquisition, or use of military equipment by state or local government officials, as well as a right to participate in any government agency's decision to fund, acquire, or use such equipment.

(c) Decisions regarding whether and how military equipment is funded, acquired, or used should give strong consideration to the public's welfare, safety, civil rights, and civil liberties, and should be based on meaningful public input.

(d) Legally enforceable safeguards, including transparency, oversight, and accountability measures, must be in place to protect the public's welfare, safety, civil rights, and civil liberties before military equipment is funded, acquired, or used.

(e) The lack of a public forum to discuss the acquisition of military equipment jeopardizes the relationship police have with the community, which can be undermined when law enforcement is seen as an occupying force rather than a public safety service.

SEC. 2. Chapter 12.8 (commencing with Section 7070) is added to Division 7 of Title 1 of the Government Code, to read:

CHAPTER 12.8. FUNDING, ACQUISITION, AND USE OF MILITARY
EQUIPMENT

7070. For purposes of this chapter, the following definitions shall apply:

(a) "Governing body" means the elected body that oversees a law enforcement agency or, if there is no elected body that directly oversees the law enforcement agency, the appointed body that oversees a law enforcement agency. In the case of a law enforcement agency of a county, including a sheriff's department or a district attorney's office, "governing body" means the board of supervisors of the county.

(b) "Law enforcement agency" means any of the following:

(1) A police department, including the police department of a transit agency, school district, or any campus of the University of California, the California State University, or California Community Colleges.

(2) A sheriff's department.

(3) A district attorney's office.

(4) A county probation department.

(c) "Military equipment" means the following:

(1) Unmanned, remotely piloted, powered aerial or ground vehicles.

(2) Mine-resistant ambush-protected (MRAP) vehicles or armored personnel carriers. However, police versions of standard consumer vehicles are specifically excluded from this subdivision.

(3) High mobility multipurpose wheeled vehicles (HMMWV), commonly referred to as Humvees, two and one-half-ton trucks, five-ton trucks, or wheeled vehicles that have a breaching or entry apparatus attached. However, unarmored all-terrain vehicles (ATVs) and motorized dirt bikes are specifically excluded from this subdivision.

(4) Tracked armored vehicles that provide ballistic protection to their occupants and utilize a tracked system instead of wheels for forward motion.

(5) Command and control vehicles that are either built or modified to facilitate the operational control and direction of public safety units.

(6) Weaponized aircraft, vessels, or vehicles of any kind.

(7) Battering rams, slugs, and breaching apparatuses that are explosive in nature. However, items designed to remove a lock, such as bolt cutters,

or a handheld ram designed to be operated by one person, are specifically excluded from this subdivision.

(8) Firearms of .50 caliber or greater. However, standard issue shotguns are specifically excluded from this subdivision.

(9) Ammunition of .50 caliber or greater. However, standard issue shotgun ammunition is specifically excluded from this subdivision.

(10) Specialized firearms and ammunition of less than .50 caliber, including assault weapons as defined in Sections 30510 and 30515 of the Penal Code, with the exception of standard issue service weapons and ammunition of less than .50 caliber that are issued to officers, agents, or employees of a law enforcement agency or a state agency.

(11) Any firearm or firearm accessory that is designed to launch explosive projectiles.

(12) “Flashbang” grenades and explosive breaching tools, “tear gas,” and “pepper balls,” excluding standard, service-issued handheld pepper spray.

(13) Taser Shockwave, microwave weapons, water cannons, and the Long Range Acoustic Device (LRAD).

(14) The following projectile launch platforms and their associated munitions: 40mm projectile launchers, “bean bag,” rubber bullet, and specialty impact munition (SIM) weapons.

(15) Any other equipment as determined by a governing body or a state agency to require additional oversight.

(16) Notwithstanding paragraphs (1) through (15), “military equipment” does not include general equipment not designated as prohibited or controlled by the federal Defense Logistics Agency.

(d) “Military equipment use policy” means a publicly released, written document governing the use of military equipment by a law enforcement agency or a state agency that addresses, at a minimum, all of the following:

(1) A description of each type of military equipment, the quantity sought, its capabilities, expected lifespan, and product descriptions from the manufacturer of the military equipment.

(2) The purposes and authorized uses for which the law enforcement agency or the state agency proposes to use each type of military equipment.

(3) The fiscal impact of each type of military equipment, including the initial costs of obtaining the equipment and estimated annual costs of maintaining the equipment.

(4) The legal and procedural rules that govern each authorized use.

(5) The training, including any course required by the Commission on Peace Officer Standards and Training, that must be completed before any officer, agent, or employee of the law enforcement agency or the state agency is allowed to use each specific type of military equipment to ensure the full protection of the public’s welfare, safety, civil rights, and civil liberties and full adherence to the military equipment use policy.

(6) The mechanisms to ensure compliance with the military equipment use policy, including which independent persons or entities have oversight

authority, and, if applicable, what legally enforceable sanctions are put in place for violations of the policy.

(7) For a law enforcement agency, the procedures by which members of the public may register complaints or concerns or submit questions about the use of each specific type of military equipment, and how the law enforcement agency will ensure that each complaint, concern, or question receives a response in a timely manner.

(e) “State agency” means the law enforcement division of every state office, officer, department, division, bureau, board, and commission or other state body or agency, except those agencies provided for in Article IV (except Section 20 thereof) or Article VI of the California Constitution.

(f) “Type” means each item that shares the same manufacturer model number.

7071. (a) (1) A law enforcement agency shall obtain approval of the governing body, by an ordinance adopting a military equipment use policy at a regular meeting of the governing body held pursuant to the Bagley-Keene Open Meeting Act (Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of Title 2) or the Ralph M. Brown Act (Chapter 9 (commencing with Section 54950) of Part 1 of Division 2 of Title 5), as applicable, prior to engaging in any of the following:

(A) Requesting military equipment made available pursuant to Section 2576a of Title 10 of the United States Code.

(B) Seeking funds for military equipment, including, but not limited to, applying for a grant, soliciting or accepting private, local, state, or federal funds, in-kind donations, or other donations or transfers.

(C) Acquiring military equipment either permanently or temporarily, including by borrowing or leasing.

(D) Collaborating with another law enforcement agency in the deployment or other use of military equipment within the territorial jurisdiction of the governing body.

(E) Using any new or existing military equipment for a purpose, in a manner, or by a person not previously approved by the governing body pursuant to this chapter.

(F) Soliciting or responding to a proposal for, or entering into an agreement with, any other person or entity to seek funds for, apply to receive, acquire, use, or collaborate in the use of, military equipment.

(G) Acquiring military equipment through any means not provided by this paragraph.

(2) No later than May 1, 2022, a law enforcement agency seeking to continue the use of any military equipment that was acquired prior to January 1, 2022, shall commence a governing body approval process in accordance with this section. If the governing body does not approve the continuing use of military equipment, including by adoption pursuant to this subdivision of a military equipment use policy submitted pursuant to subdivision (b), within 180 days of submission of the proposed military equipment use policy to the governing body, the law enforcement agency shall cease its use of

the military equipment until it receives the approval of the governing body in accordance with this section.

(b) In seeking the approval of the governing body pursuant to subdivision (a), a law enforcement agency shall submit a proposed military equipment use policy to the governing body and make those documents available on the law enforcement agency's internet website at least 30 days prior to any public hearing concerning the military equipment at issue.

(c) The governing body shall consider a proposed military equipment use policy as an agenda item for an open session of a regular meeting and provide for public comment in accordance with the Bagley-Keene Open Meeting Act (Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of Title 2) or the Ralph M. Brown Act (Chapter 9 (commencing with Section 54950) of Part 1 of Division 2 of Title 5), as applicable.

(d) (1) The governing body shall only approve a military equipment use policy pursuant to this chapter if it determines all of the following:

(A) The military equipment is necessary because there is no reasonable alternative that can achieve the same objective of officer and civilian safety.

(B) The proposed military equipment use policy will safeguard the public's welfare, safety, civil rights, and civil liberties.

(C) If purchasing the equipment, the equipment is reasonably cost effective compared to available alternatives that can achieve the same objective of officer and civilian safety.

(D) Prior military equipment use complied with the military equipment use policy that was in effect at the time, or if prior uses did not comply with the accompanying military equipment use policy, corrective action has been taken to remedy nonconforming uses and ensure future compliance.

(2) In order to facilitate public participation, any proposed or final military equipment use policy shall be made publicly available on the internet website of the relevant law enforcement agency for as long as the military equipment is available for use.

(e) (1) The governing body shall review any ordinance that it has adopted pursuant to this section approving the funding, acquisition, or use of military equipment at least annually and, subject to paragraph (2), vote on whether to renew the ordinance at a regular meeting held pursuant to the Bagley-Keene Open Meeting Act (Article 9 (commencing with Section 11120) of Chapter 1 of Part 1 of Division 3 of Title 2) or the Ralph M. Brown Act (Chapter 9 (commencing with Section 54950) of Part 1 of Division 2 of Title 5), as applicable.

(2) The governing body shall determine, based on the annual military equipment report submitted pursuant to Section 7072, whether each type of military equipment identified in that report has complied with the standards for approval set forth in subdivision (d). If the governing body determines that a type of military equipment identified in that annual military equipment report has not complied with the standards for approval set forth in subdivision (d), the governing body shall either disapprove a renewal of the authorization for that type of military equipment or require modifications

to the military equipment use policy in a manner that will resolve the lack of compliance.

(f) Notwithstanding subdivisions (a) to (e), inclusive, if a city contracts with another entity for law enforcement services, the city shall have the authority to adopt a military equipment use policy based on local community needs.

7072. (a) A law enforcement agency that receives approval for a military equipment use policy pursuant to Section 7071 shall submit to the governing body an annual military equipment report for each type of military equipment approved by the governing body within one year of approval, and annually thereafter for as long as the military equipment is available for use. The law enforcement agency shall also make each annual military equipment report required by this section publicly available on its internet website for as long as the military equipment is available for use. The annual military equipment report shall, at a minimum, include the following information for the immediately preceding calendar year for each type of military equipment:

(1) A summary of how the military equipment was used and the purpose of its use.

(2) A summary of any complaints or concerns received concerning the military equipment.

(3) The results of any internal audits, any information about violations of the military equipment use policy, and any actions taken in response.

(4) The total annual cost for each type of military equipment, including acquisition, personnel, training, transportation, maintenance, storage, upgrade, and other ongoing costs, and from what source funds will be provided for the military equipment in the calendar year following submission of the annual military equipment report.

(5) The quantity possessed for each type of military equipment.

(6) If the law enforcement agency intends to acquire additional military equipment in the next year, the quantity sought for each type of military equipment.

(b) Within 30 days of submitting and publicly releasing an annual military equipment report pursuant to this section, the law enforcement agency shall hold at least one well-publicized and conveniently located community engagement meeting, at which the general public may discuss and ask questions regarding the annual military equipment report and the law enforcement agency's funding, acquisition, or use of military equipment.

7073. (a) A state agency shall create a military equipment use policy prior to engaging in any of the following:

(1) Requesting military equipment made available pursuant to Section 2576a of Title 10 of the United States Code.

(2) Seeking funds for military equipment, including, but not limited to, applying for a grant, soliciting or accepting private, local, state, or federal funds, in-kind donations, or other donations or transfers.

(3) Acquiring military equipment either permanently or temporarily, including by borrowing or leasing.

(4) Collaborating with a law enforcement agency or another state agency in the deployment or other use of military equipment within the territorial jurisdiction of the governing body.

(5) Using any new or existing military equipment for a purpose, in a manner, or by a person not previously approved by the governing body pursuant to this chapter.

(6) Soliciting or responding to a proposal for, or entering into an agreement with, any other person or entity to seek funds for, or to apply to receive, acquire, use, or collaborate in the use of, military equipment.

(7) Acquiring military equipment through any means not provided by this subdivision.

(b) No later than May 1, 2022, a state agency seeking to continue the use of any military equipment that was acquired prior to January 1, 2022, shall create a military equipment use policy.

(c) A state agency that is required to create a military equipment use policy pursuant to this section shall do both of the following within 180 days of completing the policy:

(1) Publish the military equipment use policy on the agency's internet website.

(2) Provide a copy of the military equipment use policy to the Governor or the Governor's designee.

7074. The Legislature finds and declares that ensuring adequate oversight of the acquisition and use of military equipment is a matter of statewide concern rather than a municipal affair as that term is used in Section 5 of Article XI of the California Constitution. Therefore, this chapter applies to all cities, including charter cities and shall supersede any inconsistent provisions in the charter of any city, county, or city and county.

7075. Nothing in this chapter shall preclude a county or local municipality from implementing additional requirements and standards related to the purchase, use, and reporting of military equipment by local law enforcement agencies.

SEC. 3. The Legislature finds and declares that Section 1 of this act, which adds Chapter 12.8 (commencing with Section 7070) to Division 7 of Title 1 of the Government Code, furthers, within the meaning of paragraph (7) of subdivision (b) of Section 3 of Article I of the California Constitution, the purposes of that constitutional section as it relates to the right of public access to the meetings of local public bodies or the writings of local public officials and local agencies. Pursuant to paragraph (7) of subdivision (b) of Section 3 of Article I of the California Constitution, the Legislature makes the following findings:

Requiring local agencies to hold public meetings prior to the acquisition of military equipment further exposes that activity to public scrutiny and enhances public access to information concerning the conduct of the people's business.

SEC. 4. No reimbursement is required by this act pursuant to Section 6 of Article XIII B of the California Constitution because the only costs that may be incurred by a local agency or school district under this act would

result from a legislative mandate that is within the scope of paragraph (7) of subdivision (b) of Section 3 of Article I of the California Constitution.

O

ORDINANCE NO. 1841

AN ORDINANCE OF THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, ADOPTING A MILITARY EQUIPMENT USE POLICY OF THE CITY OF GARDENA, CALIFORNIA GOVERNING THE USE OF MILITARY EQUIPMENT PURSUANT TO ASSEMBLY BILL 481.

THE CITY COUNCIL OF THE CITY OF GARDENA DOES HEREBY FIND AND RESOLVE AS FOLLOWS:

WHEREAS, on September 30, 2021, Governor Gavin Newsom signed into law Assembly Bill 481 ("AB 481"), adding Chapter 12.8, "Funding, Acquisition and Use of Military Equipment", to Division 7 of Title 1 of the Government Code (sections 7070 – 7075), relating to the use of military equipment by California law enforcement agencies; and

WHEREAS, AB 481 seeks to provide transparency, oversight, and an opportunity for meaningful public input on decisions regarding whether and how military equipment is funded, acquired, or used; and

WHEREAS, the Gardena Police Department is in possession of certain items of equipment that qualify as "military equipment" under AB 481 and further intends to acquire other items of military equipment; and

WHEREAS, AB 481 requires, inter alia, that a law enforcement agency possessing and using such qualifying equipment must prepare a publicly released, written, military equipment use policy document covering the inventory, description, quantity, purpose, capabilities, use, lifespan, acquisition, maintenance, authorized use, fiscal impacts, procedures, training, oversight, and complaint process, applicable to the Department's use of such equipment; and

WHEREAS, pursuant to Government Code section 7071(a)(2), if seeking to continue the use of any military equipment that was acquired prior to January 1, 2022, the Gardena Police Department was obligated to, and has met the requirement, of commencing a City Council approval process for the Military Equipment Use Policy no later than May 1, 2022; and

WHEREAS, as further required by Government Code section 7071(a)(2), if the City Council does not approve the continuing use of military equipment, including by adoption pursuant to a Military Equipment Use Policy, within 180 days of submission of the proposed Military Equipment Use Policy to City Council, the Gardena Police Department shall cease its use of the military equipment until it receives the approval of City Council in accordance with this Ordinance; and

WHEREAS, Government Code Section 7071(b) requires that the Gardena Police Department post to its website the Military Equipment Use Policy that it plans to propose to the City Council, at least 30 days prior to any public hearing concerning the policy; and

WHEREAS, the Gardena Police Department has prepared a proposed Military Equipment Policy (“Policy”), attached hereto as Exhibit “A” and incorporated herein; and

WHEREAS, on March 23, 2022, the Gardena Police Department posted its draft Military Equipment Use Policy to its public website, thereby complying with the 30-day posting requirement prior to a public hearing before City Council on April 26, 2022; and

WHEREAS, the policy must be approved by the City Council by ordinance, and reviewed annually thereafter; and

WHEREAS, the military equipment inventoried and presented to the City Council is necessary because there is no reasonable alternative that can achieve the same objective of officer and civilian safety;

WHEREAS, the proposed Military Equipment Use Policy will safeguard the public’s health, welfare, safety, civil rights, and civil liberties;

WHEREAS, the equipment is reasonably cost effective compared to available alternatives that can achieve the same objective of officer and civilian safety;

WHEREAS, prior military equipment use complied with the applicable equipment use policy (which included equipment now defined as military equipment) that was in effect at the time, or if prior uses did not comply with the accompanying military equipment use policy, corrective action has been taken to remedy nonconforming uses and ensure future compliance;

WHEREAS, the Police Department has submitted the proposed Policy to the City Council and thereafter has made those documents available on the Police Department’s website for at least 30 days prior to the public hearing concerning the military equipment at issue;

WHEREAS, the Policy satisfies the requirements of Government Code Section 7070(d);

WHEREAS, the City Council of the City of Gardena, having received the information required under AB 481 regarding the Gardena Police Department’s use of military equipment as defined in said law, deems it to be in the best interest of the City to and hereby does approve the Military Equipment Policy.

WHEREAS, all legal prerequisites prior to the adoption of this Ordinance have occurred.

NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF GARDENA, DOES HERBY ORDAIN AS FOLLOWS:

SECTION 1: Recitals. The City Council finds that all the recitals, facts, findings, and conclusions set forth above in the preamble of this Ordinance are true and correct.

SECTION 2: Approval of Military Equipment Policy.

Military Equipment Policy.

- (a) The Military Equipment Policy shall govern the use of military equipment by the Gardena Police Department. The Policy is attached to this Ordinance as Exhibit A.
- (b) The Policy shall be made publicly available on the Police Department's website for as long as the military equipment is available for use or as otherwise ordained by the City Council.
- (c) The Police Department shall submit an annual military equipment report to the City Council containing the information required by Government Code Section 7072 and the City Council shall thereafter determine whether each type of military equipment identified therein complied with the standards for approval set forth in Government Code Section 7071(d).
- (d) The City Council shall on an annual basis and at a regular meeting thereof review this ordinance and vote on whether to renew it pursuant to Government Code Section 7071(e)(2).
- (e) The definitions set forth in Government Code section 7070 shall apply to this ordinance. Any provision of state law referred to herein shall mean and include any amended or successor provision thereof.

SECTION 3: Compliance with CEQA. Adoption of this Ordinance is exempt from the California Environmental Quality Act (CEQA) pursuant to Section 15061 (b)(3) (General Rule) of the CEQA Guidelines because it is not a "project" and because it can be seen with certainty that there is no possibility that the passage of this Ordinance will have a significant effect on the environment.

SECTION 4: Inconsistencies. Any provision of the Gardena Municipal Code or appendices thereto inconsistent with the provisions of this Ordinance, to the extent of such inconsistencies and no further, is hereby repealed or modified to that extent necessary to affect the provisions of this Ordinance.

SECTION 5: Uncodified Ordinance. This Ordinance shall not be codified in the Gardena Municipal Code unless and until the City Council so ordains.

SECTION 6: Severability. If any chapter, article, section, subsection, subdivision, sentence, clause, phrase, word, or portion of this Ordinance, or the application thereof to any person, is for any reason held to be invalid or unconstitutional by the decision of any court of competent jurisdiction, such decision shall not affect the validity of the remaining portion of this Ordinance or its application to other persons. The City Council hereby declares that it would have adopted this Ordinance and each chapter, article, section, subsection, subdivision, sentence, clause, phrase, word, or portion thereof, irrespective of the fact that any one or more subsections, subdivisions, sentences, clauses, phrases, or portions of the application thereof to any person, be declared

invalid or unconstitutional. No portion of this Ordinance shall supersede any local, state, or federal law, regulation, or codes dealing with life safety factors.

SECTION 7: Effective Date. This ordinance shall be in full force and effect thirty (30) days after its second reading and adoption.

SECTION 8: Certification. The City Clerk shall certify the passage of this ordinance and shall cause the same to be entered in the book of original ordinances of said City; shall make a minute passage and adoption thereof in the records of the meeting at which time the same is passed and adopted; and shall, within fifteen (15) days after the passage and adoption thereof, cause the same to be published as required by law, in a publication of general circulation.

APPROVED AND ADOPTED on this ____ day of _____, 2022.

TASHA CERDA, Mayor

ATTEST:

MINA SEMENZA, City Clerk

APPROVED AS TO FORM:



CARMEN VASQUEZ, City Attorney

EXHIBIT A

MILITARY EQUIPMENT POLICY

Military Equipment

706.1 PURPOSE AND SCOPE

State

The purpose of this policy is to provide guidelines for the approval, acquisition, and reporting requirements of military equipment (Government Code § 7070; Government Code § 7071; Government Code § 7072).

706.1.1 DEFINITIONS

State

Definitions related to this policy include (Government Code § 7070):

Governing body – The elected or appointed body that oversees the Department.

Military equipment – Includes but is not limited to the following:

- Unmanned, remotely piloted, powered aerial or ground vehicles.
- Mine-resistant ambush-protected (MRAP) vehicles or armored personnel carriers.
- High mobility multipurpose wheeled vehicles (HMMWV), two-and-one-half-ton trucks, five-ton trucks, or wheeled vehicles that have a breaching or entry apparatus attached.
- Tracked armored vehicles that provide ballistic protection to their occupants.
- Command and control vehicles that are either built or modified to facilitate the operational control and direction of public safety units.
- Weaponized aircraft, vessels, or vehicles of any kind.
- Battering rams, slugs, and breaching apparatuses that are explosive in nature. This does not include a handheld, one-person ram.
- Firearms and ammunition of .50 caliber or greater, excluding standard-issue shotguns and standard-issue shotgun ammunition.
- Specialized firearms and ammunition of less than .50 caliber, including firearms and accessories identified as assault weapons in Penal Code § 30510 and Penal Code § 30515, with the exception of standard-issue firearms.
- Any firearm or firearm accessory that is designed to launch explosive projectiles.
- Noise-flash diversionary devices and explosive breaching tools.
- Munitions containing tear gas or OC, excluding standard, service-issued handheld pepper spray.
- TASER® Shockwave, microwave weapons, water cannons, and long-range acoustic devices (LRADs).
- Kinetic energy weapons and munitions.
- Any other equipment as determined by a governing body or a state agency to require additional oversight.

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Military Equipment

706.2 POLICY

State

It is the policy of the Gardena Police Department that members of this department comply with the provisions of Government Code § 7071 with respect to military equipment.

706.3 MILITARY EQUIPMENT COORDINATOR

Best Practice

The Chief of Police should designate a member of this department to act as the military equipment coordinator. The responsibilities of the military equipment coordinator include but are not limited to:

- (a) Acting as liaison to the governing body for matters related to the requirements of this policy.
- (b) Identifying department equipment that qualifies as military equipment in the current possession of the Department, or the equipment the Department intends to acquire that requires approval by the governing body.
- (c) Conducting an inventory of all military equipment at least annually.
- (d) Collaborating with any allied agency that may use military equipment within the jurisdiction of Gardena Police Department (Government Code § 7071).
- (e) Preparing for, scheduling, and coordinating the annual community engagement meeting to include:
 - 1. Publicizing the details of the meeting.
 - 2. Preparing for public questions regarding the department's funding, acquisition, and use of equipment.
- (f) Preparing the annual military equipment report for submission to the Chief of Police and ensuring that the report is made available on the department website (Government Code § 7072).
- (g) Establishing the procedure for a person to register a complaint or concern, or how that person may submit a question about the use of a type of military equipment, and how the Department will respond in a timely manner.

706.4 MILITARY EQUIPMENT INVENTORY

State

The following constitutes a list of qualifying equipment for the Department:

ARMORED VEHICLES

Type: *Lenco BearCat G2 (FORD F-550 CHASSIS; VIN: 1FDAF5HT5DEB79977)*

Quantity: 1

Cost: \$259,932.03 (estimated)

Lifespan: 20+ years based on maintenance and care (estimated)

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Military Equipment

Capabilities: The Lenco BearCat G2 can support first responders in any hazardous, high-risk, or critical incidents which would benefit from having a vehicle that provides a high level of ballistic protection.

Manufacturer's Description: The Lenco BearCat G2 is the standard tactical armored vehicle for special operations units within the US Law Enforcement community. Since the early 2000s, agencies such as LAPD, LASD SEB, NYPD ESU, Boston PD and hundreds of Federal, State and Local Law Enforcement agencies have made the BearCat G2 part of their standard operating procedure. The G2 has excellent on-road driving characteristics and maneuverability in tight urban settings. The large floor plan seats 10 – 12 fully equipped officers with a long list of tactical features only found on the Lenco BearCat line of armored SWAT vehicles for Police and Government.

Purpose: The purpose of the BearCat is to provide protection for the members of the Gardena Police Department and community members in high risk or critical incidents, such as serving high risk search warrants, arrest warrants of dangerous subjects, the safe transportation of law enforcement officers and for the rescue of injured residents and personnel.

Authorized Use: The use of armored vehicles shall be authorized by a watch commander or SWAT commander, based on the specific circumstances of a given critical incident. Armored vehicles shall be used only by officers trained in their deployment and in a manner consistent with Department policy and training.

Fiscal Impact: \$0 – 10,000 (estimated for maintenance)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: All drivers/operators shall attend formalized instruction and be trained in vehicle operations and practical driving instruction.

Type: *Major Incident Response Vehicle (MIRV) (FORD E-350 CHASSIS WITH MARATHON INDUSTRIES UTILITY BED "BOX STYLE"; VIN: 1FDWE35L87DA27297)*

Quantity: 1

Cost: \$60,000.00 (estimated)

Lifespan: 15+ years based on maintenance and care (estimated)

Capabilities: The MIRV is a custom-built vehicle used by SWAT personnel to transport the tools used by the SWAT Team. The MIRV can also serve as a mobile command post for SWAT operations. The MIRV seats two department personnel.

Manufacturer's Description: N/A

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Military Equipment

Purpose: To be used in response to critical incidents where SWAT personnel are deployed. The equipment transported by the MIRV is used to enhance officer and community safety and assist in resolving critical incidents.

Authorized Uses: The use of the MIRV shall only be authorized by a SWAT commander based on the specific circumstances of a given critical incident. The MIRV shall be used only by officers trained in its deployment and operation in a manner consistent with Department policy and training.

Fiscal Impact: \$0 – 10,000.00 (estimated for maintenance)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: Every SWAT operator is authorized to operate the MIRV.

Type: *Mobile Command Center Recreational Vehicle (RV) (2014 THOR OUTLAW 37LS)*

Quantity: 1

Cost: \$102,865.00 (estimated)

Lifespan: 15+ years based on maintenance and care (estimated)

Capabilities: The Mobile Command Center RV is a community meeting center as well as a command vehicle for emergency incidents.

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Military Equipment

Manufacturer's Description:

Engine Brand Name	Triton®
Engine Type	V10
Cylinders	10
Horsepower (bhp/kW)	362 / 270.1
Horsepower RPM	4750
Torque (Ft Lbs/Nm)	457 / 619.6
Torque RPM	3250
Fuel Requirements	Regular
Fuel Type	Gas
Chassis Model	F-Series Super Duty
Chassis Brand	Ford
Displacement (l)	6.8
Carburetion Type	Fuel Injected
Length (ft/m)	38.33 / 11.7
Width (in/mm)	101 / 2565.4
Height (in/mm)	155 / 3937
Wheelbase (in/mm)	242 / 6146.8
Towing Capacity (lbs/kgs)	5000 / 2268
GVWR (lbs/kgs)	24000 / 10886.4
Fuel Capacity (gal/l)	80 / 302

Purpose: To be used in response to critical incidents where personnel are deployed. It can also be used as a community meeting center.

Authorized Uses: The use of the RV can be used as a community meeting center or for critical incidents. If for a critical incident, it shall only be authorized by an Incident Commander based on the specific circumstances of a given critical incident. The RV shall be used only by officers trained in its deployment and in a manner consistent with Department policy and training.

Fiscal Impact: \$0 – 10,000.00 (estimated for maintenance)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: The RV shall be used only by officers trained in its deployment and in a manner consistent with Department policy and training.

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Military Equipment

PROJECTILES

Type: 40mm Sponge Rounds (Part #6325)

Quantity: Not to Exceed 1000

Cost: \$17.00 each (estimated)

Lifespan: 5 years from date of manufacture

Capability: The 40mm eXact iMPact™ Sponge Round will prove most successful for incapacitation when used within its optimal energy range of approximately 5 – 40 meters, although it may be used in situations from 1.5 – 50 meters. The optimal zone offers the necessary energy and accuracy to target the large muscle groups of the buttocks, thigh, and even the knees of the subject. These areas provide sufficient pain stimulus, while greatly reducing serious or life-threatening injuries.

Manufacturer's Description: This lightweight, high-speed projectile incorporates a plastic body and a foam (sponge) nose which is spin stabilized via the incorporated rifling collar and the 40mm launcher's rifled barrel. The round utilizes smokeless powder as the propellant and has velocities that are extremely consistent. The 40mm eXact iMPact™ Sponge Round is a "point-of-aim, point-of-impact" direct fire round that is most commonly used by tactical teams in situations where maximum deliverable energy is desired for the incapacitation of an aggressive, non-compliant subject. In many municipalities, these are being selected for both tactical call outs and as an available option for patrol.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.

Authorized Uses: Situations for use of the non-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Fiscal Impact: \$0 – 17,000.00 (estimated)

Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

Training: Sworn personnel utilizing 40mm less-lethal chemical agents or impact rounds are trained in their use by certified less lethal and chemical agent instructors.

Type: 40mm Oleoresin Capsicum (OC) (Part #-6320)

Quantity: Not to Exceed 100

Cost: \$18.25 each (estimated)

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Lifespan: 5 years from date of manufacture

Capability: The 40mm Direct Impact munition is a less lethal 40mm lightweight plastic and crushable foam projectile fired from a single 40mm launcher. It delivers OC irritant upon impact.

Manufacturer's Description: The 40mm Direct Impact® munition is a point-of-aim, point-of-impact direct-fire round. An excellent solution whether you need to incapacitate a single subject or control a crowd. When loaded with OC powder, the Direct Impact combines blunt trauma with the effects of an irritant powder, maximizing the potential for incapacitation.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.

Authorized Uses: Situations for use of the non-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Fiscal Impact: \$0 – 1,825.00 (estimated)

Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

Training: Only SWAT operators or members of the Mobile Field Force Team who have completed the required POST training shall be permitted to deploy the 40mm OC. Use is established by the SWAT Commander and/or Incident Commander.

Type: 40mm Oleoresin Capsicum (OC) Ferret (Part # 2290)

Quantity: Not to Exceed 100

Cost: \$20.06 each (estimated)

Lifespan: 5 years from date of manufacture

Capability: It is capable of penetrating barriers, such as windows, hollow core doors, wallboard, and thin plywood. Upon impact the nose of the projectile ruptures and instantaneously delivers the agent payload inside a structure or vehicle.

Manufacturer's Description: The Ferret® 40 mm Barricade Penetrating Round is filled with an OC powder chemical agent. It is a frangible projectile that is spin stabilized utilizing barrel rifling. It is non-burning and designed to penetrate barriers. Primarily used by tactical teams, it is designed to penetrate barriers, such as windows, hollow core doors, wallboard, and thin plywood. Upon impact the nose of the projectile ruptures and instantaneously delivers the agent payload inside a structure or vehicle.

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Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.

Authorized Uses: Situations for use of the non-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Fiscal Impact: \$0 – 2,006.00 (estimated)

Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

Training: SWAT operators utilizing 40mm less-lethal chemical agents or impact rounds are trained in their use by certified less-lethal and chemical agent instructors.

Type: 40mm CS Ferret (Part # 2292)

Quantity: Not to Exceed 100

Cost: \$19.44 each (estimated)

Lifespan: 5 years from date of manufacture

Capability: The 40mm CS Ferret is a less lethal 40mm round used to penetrate barriers, such as windows, hollow core doors, wallboard, and thin plywood. Upon impacting the barrier, the nose cone ruptures and instantaneously delivers a small chemical payload inside of a structure of vehicle.

Manufacturer's Description: The Ferret® 40 mm Barricade Penetrating Round is filled with a CS powder chemical agent. It is a frangible projectile that is spin stabilized utilizing barrel rifling. It is non-burning and designed to penetrate barriers. Primarily used to dislodge barricaded subjects, it can also be used for area denial. Primarily used by tactical teams, it is designed to penetrate barriers, such as windows, hollow core doors, wallboard and thin plywood. Upon impact the nose of the projectile ruptures and instantaneously delivers the agent payload inside a structure or vehicle.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.

Authorized Uses: Situations for use of the non-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Fiscal Impact: \$0 – 1,944.00 (estimated)

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Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

Training: SWAT operators utilizing 40mm less-lethal chemical agents or impact rounds are trained in their use by certified less-lethal and chemical agent instructors.

Type: *Projectile Pepper Ball Munition (Inert)*

Quantity: Not to Exceed 10,000

Cost: \$853.00 (375 rounds) (estimated)

Lifespan: 3 years from date of manufacture

Capabilities: This projectile can travel at a velocity of 280-300 fps and is best suited for training, qualifications, and direct impact when chemical exposure is not desired.

Manufacturer's Description: Containing a harmless, scented powder, this projectile is best suited for training, qualifications, and direct impact when chemical exposure is not desired.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for use of the non-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only those officers who have been trained in the use of Pepper Ball launchers are authorized to use the Pepper Ball launchers and munitions. All other Gardena Police Department policies remain in effect, including, but not limited to, Gardena Police Department Policy 300 – Use of Force.

Fiscal Impact: \$0 – 22,178.00 (estimated)

Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

Training: SWAT operators and members of the Mobile Field Force Team utilizing Pepper Ball launchers and munitions are trained in their use by a POST-certified, less-lethal and chemical agent instructor.

Type: *Live-X Projectile Pepper Ball Munition (Live-X)*

Quantity: Not to Exceed 2250

Cost: \$1,060.00 each (375 rounds) (estimated)

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Lifespan: 3 years from date of manufacture

Capabilities: This projectile can travel at 280-300 fps with a payload of 2.5 grams. It is the equivalent of 10 regular Pepper Ball Live™ rounds.

Manufacturer's Description: Our most potent and powerful concentration of PAVA pepper powder. One round of LIVE-XTM contains the equivalent PAVA irritant chemical agent in 10 regular Pepper Ball® LIVE™ rounds.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for use of the non-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only those officers who have been trained in the use of Pepper Ball launchers are authorized to use the Pepper Ball launchers and munitions. All other Gardena Police Department policies remain in effect, including, but not limited to, Gardena Police Department Policy 300 – Use of Force.

Fiscal Impact: \$0 – 6,360.00 (estimated)

Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

Training: SWAT operators and members of the Mobile Field Force Team utilizing Pepper Ball launchers and munitions are trained in their use by a POST-certified, less-lethal and chemical agent instructor.

PROJECTILE LAUNCHERS

Type: *Defense Technology 40mm Launcher (Part #1425)*

Quantity: Not to Exceed 40

Cost: \$1,193.23 each (estimated)

Lifespan: 25 years (estimated)

Capabilities: 40mm launchers are capable of firing a variety of munitions with a maximum effective range of 120 feet. 40mm launchers can deliver 40mm munitions in the form of chemical agents, sponge baton rounds, or combined use sponge baton Oleoresin Capsicum (OC) chemical round agent rounds.

Manufacturer's Description: Manufactured exclusively for Defense Technology®, the 40LMTS is a tactical single shot launcher that features an expandable ROGERS Super Stoc and an adjustable Integrated Front Grip (IFG) with light rail. The ambidextrous Lateral Sling Mount (LSM) and QD mounting systems allow both a single and two point sling

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attachment. The 40LMTS will fire standard 40mm less lethal ammunition, up to 4.8 inches in cartridge length. The Picatinny Rail Mounting System will accept a wide array of enhanced optics/sighting systems.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.

Authorized Uses: Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; crowd control and civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Fiscal Impact: \$0 - \$47,729.20 (estimated)

Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

Training: Sworn personnel utilizing 40mm less-lethal chemical agents or impact rounds are trained in their use by certified less lethal and chemical agent instructors.

Type: *Defense Technology 40mm 4 or 6-Shot Launcher (Part # 1440)*

Quantity: Not to Exceed 2

Cost: \$2,783.88 each (estimated)

Lifespan: 15 years (estimated)

Capabilities: 40mm launchers are capable of firing a variety of munitions with a maximum effective range of 120 feet. 40mm launchers can deliver 40mm munitions in the form of chemical agents, sponge baton rounds, or combined use sponge baton Oleoresin Capsicum (OC) chemical round agent rounds.

Manufacturer's Description: Designed for riot and tactical situations, the Defense Technology® 1440 40mm Tactical 4-Shot Launcher is low-profile and lightweight, providing multi-shot capability in an easy to carry launcher. It features the Rogers Super Stoc™ expandable gun stock, an adjustable Picatinny mounted front grip, and a unique direct-drive system to advance the magazine cylinder.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable.

Authorized Uses: Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; crowd control and civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

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Fiscal Impact: \$0 – 5,567.76 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: SWAT operators and members of the Mobile Field Force Team utilizing 40mm less-lethal chemical agents or impact rounds are trained in their use by certified less lethal and chemical agent instructors.

Type: *Pepper Ball Launchers (Full Tactical Carbine (FTC))*

Quantity: Not to Exceed 8 launchers

Cost: \$999.95 each (estimated)

Lifespan: 20 years (estimated)

Capabilities: A non-lethal munitions system that employs paint ball launchers to fire “pepper balls” that contain powdered OC in place of the paint. The pepper ball delivery system combines chemical agent exposure with kinetic energy impact to aid in its effectiveness in addressing armed and/or violent individuals or crowds. Pepper ball munitions also include glass breaking rounds and marking rounds.

Manufacturer’s Description: Pepper Ball launchers are designed for minimum time between launches and quick reload speed, so whether in a crowd control scenario, tactical or even Mobile Field Force situation, the Pepper Ball system offers flexibility, safety and security, all within one platform. Launchers range from a compact lightweight hand-held style that fits on a standard duty belt to a longer barreled shoulder-mounted launcher with greater range and projectile capacity. Each launcher is air powered, with either carbon dioxide (CO2), nitrogen, or compressed air powering the launch of projectiles. Pepper Ball launchers are not classified as firearms.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for use of the less lethal weapons systems may include, but are not limited to self-destructive, dangerous and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only those SWAT operators or members of the Mobile Field Force Team who have been trained in the use of Pepper Ball launchers are authorized to use the Pepper Ball launchers.

Fiscal Impact: \$0 - 7,999.60 (estimated)

Policy and Procedure: Lexipol Policy 303 Control Devices and Techniques

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Training: Only assigned operators or members of the Mobile Field Force Team who have completed the required training from POST-certified instructors shall be permitted to deploy the Pepper Ball Launchers and Pepper Ball Munitions. Use is established by the SWAT Commander and/or Incident Commander.

AMMUNITION

Type: *Duty: Winchester Ranger, .223 Remington 55 grain pointed soft point*

Range: Winchester 5.66mm, 55 grain Full Metal Jacket

Quantity: Duty Not to Exceed: 10,000 rounds
Range Not to Exceed: 10,000 rounds

Cost: Duty: \$0.57 per round, \$572.00 for 1000 rounds (estimated)
Range: \$0.37 per round, \$378.00 per 1000 rounds (estimated)

Lifespan: 5 years from date of purchase

Capabilities: The projectile is capable of penetrating soft body armor being worn by armed subjects.

Manufacturer's Description: The .223/5.66 cartridge is used as a lethal option designed to stop a violent encounter.

Purpose: To be utilized with the AR 15/M4 Carbine/HK 416 in accordance with Department policy.

Authorized Uses: To be utilized with the AR 15/M4 Carbine/HK 416 in accordance with Department policy.

Fiscal Impact: Duty: \$0 – 5,720.00 (estimated)
Range: \$0 – 3,780.00 (estimated)

Policy and Procedure: Lexipol Policy 306 Firearms Policy

Training: All sworn personnel are trained by POST-certified firearms instructors for the use M4 and AR 15s. SWAT operators receive additional training from POST-certified firearms instructors in the operation of the HK 416.

Type: *Defense Technology 12-Gauge Drag Stabilized Round (Part # 3027)*

Quantity: Not to Exceed 250

Cost: \$5.82 each (estimated)

Lifespan: 5 years from manufacture date

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Capabilities: This round has a velocity of 270 fps with a maximum effective range of 75 feet.

Manufacturer's Description: The Drag Stabilized™ 12-Gauge Round is a translucent 12-Gauge shell loaded with a 40-Gram tear shaped bag made from a cotton and ballistic material blend and filled with #9 shot. This design utilizes four stabilizing tails and utilizes smokeless powder as the propellant. The 12-Gauge Drag Stabilized Round has secured its place as the Law Enforcement Communities' number one choice for specialty impact munitions.

Purpose: To limit the escalation of conflict where the employment of lethal force is prohibited or undesirable.

Authorized Uses: Situations for use of the non-lethal weapon, the Remington 870, system may include, but are not limited to: self-destructive, dangerous, and/or combative individuals; civil unrest incidents; potentially vicious animals; and training exercises or approved demonstrations.

Fiscal Impact: \$0 – 1,455.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: Only sworn personnel who have completed the required POST training shall be permitted to deploy the Defense Technology 12-Gauge Drag Stabilized Round.

Type: .308 Caliber Rifle Ammunition (Winchester S308M)

Quantity: Not to Exceed 2,000

Cost: \$1.29 each (case of 200 rounds \$259.00) (estimated)

Lifespan: 5 years from manufacture date

Capabilities: This ammunition enables SWAT long rifle operators the ability to engage hostile suspects at a distance with precision rifle fire.

Manufacturer's Description: Designed for use in rifles equipped with fast twist (1:7" to 1:9") barrels; Match-style Bullet - Proven performance and extreme accuracy on the range; Proven Hollow Point Boattail Design - Sleek profile, large boattail and small hollow point maximizes long-range accuracy.

Purpose: To be used with the Remington 700 or Remington R10.

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Authorized Uses: The .308 Caliber Rifle Ammunition is authorized when used by the Remington 700 or Remington R10.

Fiscal Impact: \$0 – 2,590.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: Only assigned SWAT long rifle operators who have completed the required training shall be permitted to operate the rifle with this ammunition. Use is established by the SWAT Commander and/or Incident Commander.

Type: *Duty: Winchester Ranger, 9mm Luger 115 grain Hollow Point*

Range: Winchester Target, 9mm Luger 115 grain Full Metal Jacket

Quantity: Duty: Not to Exceed 30,000
Range: Not to Exceed 30,000

Cost: Duty: \$0.32 per round, \$324.000 per 1,000 rounds (estimated)
Range: \$0.22 per round, \$223.00 per 1,000 rounds (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: This ammunition enables SWAT operators the ability to stop an armed subject at various distances.

Manufacturer's Description:

Duty: Threat stopping performance. It's what makes Ranger T-Series the trusted duty load law enforcement agencies across America. The bullet's patented, segment engineered design enhances expansion, penetration and weight retention through a variety of intervening barriers.

Range: Backed by generations of legendary excellence, Winchester "USA White Box" stands for consistent performance and outstanding value, offering high-quality ammunition to suit a wide range of shooter's needs.

Purpose: To be used with the MP-5.

Authorized Uses: The Winchester Ranger and Winchester Target Ammunition are authorized when used with the MP-5.

Fiscal Impact: Duty: \$0 – 9,720.00 (estimated)
Range: \$0 – 6,690.00 (estimated)

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Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: Only assigned SWAT operators who have completed the required training shall be permitted to operate the MP-5. Use is established by the SWAT Commander and/or Incident Commander.

FIREARMS:

Type: *AR 15/M4 Carbine/HK416*

Quantity: Not to Exceed 100

Cost: \$865.26 (estimated)

Lifespan: No expiration

Capabilities: The AR 15/Carbine Rifle/HK 416 is a firearm capable of accurately stopping an armed subject at various distances.

Manufacturer's Description: A lightweight, air-cooled, gas-operated, magazine-fed shoulder-fired weapon designed for semi-automatic fire (or select fire for HK416).

Purpose: To be used as a precision weapon to address a threat with more precision and/or greater distances than a handgun, if present and feasible.

Authorized Uses: Only members that are POST certified are authorized to use a rifle. Members may deploy the patrol rifle in any circumstance where the member can articulate a reasonable expectation that the rifle may be needed. Examples of some general guidelines for deploying the patrol rifle may include, but are not limited to:

- a. Situations where the member reasonably anticipates an armed encounter.
- b. When a member is faced with a situation that may require accurate and effective fire at long range.
- c. Situations where a member reasonably expects the need to meet or exceed a suspect's firepower.
- d. When a member reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage.
- e. When a member reasonably believes that a suspect may be wearing body armor.
- f. When authorized or requested by a supervisor.
- g. When needed to euthanize an animal.

HK 416's are only authorized for SWAT use in tactical situations.

Fiscal Impact: \$0 – 1,000.00 each (estimated for maintenance)

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Policy and Procedure: Lexipol Policy 306.33 Patrol Rifles

Training: All sworn personnel are trained by POST-certified firearms instructors for the use of M4s and AR 15s. SWAT operators receive additional training from POST-certified firearms instructors in the operation of the HK 416.

Type: *Remington 870 Magnum 12 Gauge Shot Lock (Repurposed Remington 870 Magnum modified with a breaching barrel)*

Quantity: Not to Exceed 3

Cost: \$0

Lifespan: 25 years (estimated)

Capabilities: This tool allows for officers to safely utilize shotgun breaching rounds to destroy deadbolts, locks, and hinges. The stand-off that is attached to the end of the barrel allows for positive placement of the device into the correct position and vents gasses to prevent overpressure. This device can also defeat windows and sliding glass doors with a flash bang round.

Manufacturer's Description: The Remington 870 family of shotguns was first introduced by Remington in the 1950s and since, has become one of the most popular USA-made pump action shotguns ever. Sales of the 870 reached over 7 million guns by 1996 and have continued to grow. This particular model is configured with a pistol grip and door-breaching accessory threaded into the barrel making it ideal for forceful entry situations.

Purpose: During crisis situations, it may become necessary for a SWAT team to facilitate an entry into a target location. It is critical the point of entry is breached as quickly and as safely as possible. A quick and effective breach may be required to provide an added degree of safety and tactical advantage in order to accomplish a mission.

Authorized Uses: A shot gun breach should only be utilized after taking into consideration the overall mission, officer and citizen safety, the overall construction of the structure, the presence of unstable chemicals, explosives or incendiary materials, and whether other means of mechanical breaching would be effective and safe to use. The option to use a shot gun breach shall be at the discretion of the SWAT Team Leader or the Incident Commander.

Fiscal Impact: \$0 – 150.00 (estimated for maintenance)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: Only assigned operators who have completed the required POST training shall be permitted to deploy the Remington 870 Magnum 12 Gauge Shot Lock.

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Type: *Remington 870 – Less-Lethal Shotgun (Repurposed Remington Shotguns from Patrol)*

Quantity: Not to Exceed 4

Cost: \$946.00 (estimated)

Lifespan: 25 years (estimated)

Capabilities: This less lethal shotgun is specifically designated for use with kinetic energy projectiles and is specially marked in a manner that makes them readily identifiable as such. It can deploy at a distance up to 75 feet. They are 12-gauge with a 6+1 magazine capacity.

Manufacturer's Description: As one of the most popular shotguns of all time, the Model 870 is offered in dozens of configurations to suit hundreds of applications. It is the heart of the Model 870's landmark dependability and durability.

Purpose: To limit the escalation of conflict where the employment of lethal force is prohibited or undesirable.

Authorized Use: Situations for use of the less lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; potentially vicious animals; and training exercises or approved demonstrations.

Fiscal Impact: \$0 – 200.00 (estimated for maintenance)

Policy and Procedure: Lexipol Policy 306

Training: Only sworn personnel who have completed the required POST training shall be permitted to deploy the Remington 870.

Type: *MP-5 Select Fire Firearm*

Quantity: Not to Exceed 20

Cost: \$3,128.29 each (estimated)

Lifespan: No expiration

Capabilities: A compact, modular, lightweight, select fire firearm chambered in 9mm. The MP-5 is one of the most widely used firearm by SWAT teams in North America. The firearm provides the ability to deliver precision gun fire with a shoulder fired weapons system that is accurate, reliable, and safe. Its compact design allows for ease of maneuverability when operating in the open or within interior environments.

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Manufacturer's Description: Probably the most popular series of select fire guns in the world, it functions according to the proven roller-delayed blowback principle. Tremendously reliable, with maximum safety for the user, easy to handle, modular, extremely accurate and extraordinarily easy to control when firing – features that are particularly appreciated by security forces and military users worldwide.

Purpose: To be used as a precision weapon to address a threat with more precision and/or greater distances than a handgun, if present and feasible.

Authorized Uses: A sworn police officer who is member of the SWAT team may utilize an MP-5. Members may deploy the MP-5 in any circumstance where the member can articulate a reasonable expectation that the MP-5 may be needed. Examples of some general guidelines for deploying the MP-5 may include, but are not limited to:

- a. Situations where the member reasonably anticipates an armed encounter.
- b. When a member is faced with a situation that may require accurate and effective fire at long range.
- c. Situations where a member reasonably expects the need to meet or exceed a suspect's firepower.
- d. When a member reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage.
- e. When a member reasonably believes that a suspect may be wearing body armor.
- f. When authorized or requested by a supervisor.
- g. When needed to euthanize an animal.

Fiscal Impact: \$0 – 500.00 (estimated for maintenance)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: Only assigned SWAT operators who have completed the required training shall be permitted to operate the MP-5. Use is established by the SWAT Commander and/or Incident Commander.

Type: *Remington 700 Precision .308 Bolt Action Rifle*

Quantity: Not to Exceed 4

Cost: \$2,000 (estimated)

Lifespan: No expiration

Capabilities: The bolt action sniper rifle provides SWAT long rifleman the ability to engage a suspect at up to 600 yards with precision accuracy.

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Manufacturer's Description: It's the number one bolt-action of all time, proudly made in the U.S.A. For over 50 years, more Model 700s have been sold than any other bolt-action rifle before or since. The legendary strength of its 3-rings-of-steel receiver paired with a hammer-forged barrel, combine to yield the most popular bolt-action rifle in history. Top choice of elite military snipers, the Model 700 is unequalled in tactical precision. Whether defending freedom or pursuing big game, its out-of-the-box accuracy is unmatched.

Purpose: To be used as a precision weapon to address a threat with more precision and/or greater distances than a handgun, if present and feasible.

Authorized Uses: SWAT operators who have been trained as a long rifleman/observer may use the Remington 700 during SWAT team operations. Examples of some general guidelines for deploying the Remington 700 may include, but are not limited to:

- a. Situations where the member reasonably anticipates an armed encounter.
- b. When a member is faced with a situation that may require accurate and effective fire at long range.
- c. Situations where a member reasonably expects the need to meet or exceed a suspect's firepower.
- d. When a member reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage.
- e. When a member reasonably believes that a suspect may be wearing body armor.
- f. When authorized or requested by a supervisor.
- g. When needed to euthanize an animal.

Fiscal Impact: \$0 – 5,200.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes pursuant to State and Federal law.

Training: Only assigned SWAT long rifle operators who have completed the required training shall be permitted to operate the rifle. Use is established by the SWAT Commander and/or Incident Commander.

Type: *Remington R10 .308 Caliber Select Fire Rifle*

Quantity: Not to Exceed 4

Cost: \$2,836.00 each (estimated)

Lifespan: No expiration

Capabilities: This is a semi-automatic precision rifle with precision optics and provides SWAT long rifleman the ability to engage a suspect at up to 800 meters with precision accuracy.

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Manufacturer's Description: The R10's hammer-forged, sniper-grade barrel features 5R rifling for added precision and an effective range out to 800 m. All R10s have fully ambidextrous controls and free floated modular Remington Arms Handguards.

Purpose: The rifle provides SWAT long rifle operators and team spotters the ability to rapidly deploy and provide overwatch for team movements.

Authorized Uses: SWAT operators who have been trained as a long rifleman/observer may use the Remington R10 during SWAT team operations. Examples of some general guidelines for deploying the Remington R10 may include, but are not limited to:

- a. Situations where the member reasonably anticipates an armed encounter.
- b. When a member is faced with a situation that may require accurate and effective fire at long range.
- c. Situations where a member reasonably expects the need to meet or exceed a suspect's firepower.
- d. When a member reasonably believes that there may be a need to fire on a barricaded person or a person with a hostage.
- e. When a member reasonably believes that a suspect may be wearing body armor.
- f. When authorized or requested by a supervisor.
- g. When needed to euthanize an animal.

Fiscal Impact: \$0 – 2,000.00 (estimated for maintenance)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: Only assigned SWAT long rifle operators who have completed the required training shall be permitted to operate the rifle. Use is established by the SWAT Commander and/or Incident Commander.

HAND THROWN GAS

Type: *Flameless Oleoresin Capsicum (OC) Expulsion (Part # 2040)*

Quantity: Not to Exceed 30

Cost: \$36.00 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: This canister's contents are expelled upon actuation of a CO2 cartridge that will affect a confined area consisting of approximately 1,500 square feet. The Flameless Expulsion Canister has a 1.5 second delay, followed by sub-munitions that mechanically activate a CO2 cartridge. The released CO2 pressure expels the powder through one or

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two (or both) ports on the side of the canister within seconds.

Manufacturer's Description: The Flameless Expulsion canister is designed for indoor use. This canister's contents are expelled upon actuation of a CO2 cartridge that will affect a confined area consisting of approximately 1,500 square feet. The Flameless Expulsion Canister has a 1.5 second delay, followed by sub-munitions that mechanically activate a CO2 cartridge. The released CO2 pressure expels the powder through one or two (or both) ports on the side of the canister within seconds. The Flameless Expulsion canister is extremely safe for indoor use. The extremely light powder from the agent will remain airborne for extended periods depending on the draft conditions. The Expulsion canister cannot be launched.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only officers who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 1,080.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize chemical agents only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

Type: *Multi-Use CS Smoke (Part #1082)*

Quantity: Not to Exceed 50

Cost: \$26.33 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: A high volume continuous burn canister that expels its payload in approximately 20 - 40 seconds.

Manufacturer's Description: Designed specifically for outdoor use in crowd control situations, the canister is a high volume continuous burn canister that expels its payload in approximately 20 - 40 seconds. It has slightly less chemical content than the Spede-Heat™ version, but differs mainly in size. The longer burn time may allow for throwback by individuals wearing burn protection such as a welder's mitt. The canisters may be

Gardena Police Department

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Military Equipment

protected from advancing individuals with the use of less lethal impact munitions. The device should be deployed utilizing wind advantage.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only officers who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 1,316.50 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize chemical agents only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

Type: *Stinger CS Rubber Balls (Part # 1088)*

Quantity: Not to Exceed 100

Cost: \$45.00 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: The Stinger® CS Rubber Ball is a maximum effect device that delivers four stimuli for psychological and physiological effects: rubber pellets, light, sound, and CS. It has an initial 1.5 second delay that initiates fuze assembly separation, followed by another .5 second delay before the blast which is sufficient to project the rubber balls and chemical agent in a 50-foot radius.

Manufacturer's Description: The Stinger® canister is a combination Less Lethal Impact Munitions and Distraction Device® that may incorporate optional CS or OC laden powder, if desired. The Stinger® canister is a maximum effect device as it delivers up to four stimuli for psychological and physiological effect: rubber pellets, light, sound, and optional chemical agent or Oleoresin Capsicum (OC). The Stinger® canister has an initial 1.5 second delay that initiates fuze assembly separation, followed by another 0.5 second delay before the function of the device. The blast is sufficient to project the rubber balls and optional chemical agent in a 50-foot radius.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest

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incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: SWAT operators and members of the Mobile Field Force Team who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 4,500.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

Type: *Triple Chaser Smoke (Part #1027)*

Quantity: Not to Exceed 25

Cost: \$35.50 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: When deployed, the canisters separate and land approximately 20 feet apart allowing increased area coverage in a short period of time. This apparatus can be hand thrown or launched from a fired delivery system and is an effective way to quickly deploy a wide blanket of agent.

Manufacturer's Description: The Triple-Chaser® is a fast burning, medium volume canister. It is a pyrotechnic canister consisting of three (3) separate canisters pressed together with separating charges between each section. When deployed, this apparatus will separate into three (3) distinct sub-munitions spaced approximately 20 feet apart – allowing increased area coverage in a short period of time, from one deployment. Terrain and surface conditions can affect the distance of the separating sub-munitions.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only SWAT operators and members of the Mobile Field Force Team who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 887.50 (estimated)

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Policy and Procedure: It is the policy of the Gardena Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

Type: *Triple Chaser CS (Part #1027)*

Quantity: Not to Exceed 25

Cost: \$47.00 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: When deployed, the canisters separate and land approximately 20 feet apart allowing increased area coverage in a short period of time. This apparatus can be hand thrown or launched from a fired delivery system and is an effective way to quickly deploy a wide blanket of agent.

Manufacturer's Description: The Triple-Chaser® is a fast burning, medium volume canister. It is a pyrotechnic canister consisting of three (3) separate canisters pressed together with separating charges between each section. When deployed, this apparatus will separate into three (3) distinct sub-munitions spaced approximately 20 feet apart – allowing increased area coverage in a short period of time, from one deployment. Terrain and surface conditions can affect the distance of the separating sub-munitions.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only SWAT operators and members of the Mobile Field Force Team who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 1,175.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize chemical agents only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

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Type: *Pocket Tactical CS (Part #1016)*

Quantity: Not to Exceed 100

Cost: \$25.19 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: The Pocket Tactical is a small lightweight easily carried device that provides a medium volume of chemical agent or smoke for certain situations.

Manufacturer's Description: The Pocket Tactical is a quick burning, reduced volume, continuous discharge canister available in Oleoresin Capsicum (OC), CN, CS, and Saf-Smoke. Pelletized chemical agent or smoke is discharged through one (1) gas port located on the bottom of the canister. The Pocket Tactical is a small, lightweight, easily carried device that provides a medium volume of chemical agent or smoke for certain situations. It was designed with the tactical team in mind for distraction, concealment, rescue, or signaling. The pocket canister is not specifically intended as a crowd management device; however, it can be used in chemical configurations in conjunction with larger smoke canisters to "piggy back" chemical agents into a predominately smoke environment. This device should be deployed utilizing wind advantage. It should NOT be deployed onto rooftops, in crawl spaces, or indoors due to its fire-producing capability. Hand throw or launch.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only SWAT operators and members of the Mobile Field Force Team who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 2,519.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize chemical agents only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

Type: *Flameless Tri-Chamber CS (Part #1032)*

Quantity: Not to Exceed 20

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Cost: \$36.63 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: The design of the Tri-Chamber Flameless CS canister allows the contents to burn within an internal can and disperse the agent safely with reduced risk of fire. It is designed primarily for indoor tactical situations to detect and/or dislodge a barricaded subject. It can be used in crowd control as well as tactical deployment situations by Law Enforcement and Corrections but was designed with the barricade situation in mind. Its applications in tactical situations are primarily to detect and/or dislodge barricaded subjects.

Manufacturer's Description: The Tri-Chamber Flameless canister is designed for indoor use. This canister's pyrotechnic contents are burned within an internal can that is one of three in this design. The internal combustion allows the chemical-laden smoke to be released through three (3) ports on the outer canister side while safely containing any of the fire-producing properties within the two internal canisters. The fuze is shrouded to further protect surrounding materials from the possibility of fire. The Tri-Chamber Flameless canister can be used in crowd control as well as tactical deployment situations by Law Enforcement and Corrections, but was designed with the barricade situation in mind. Its applications in tactical situations are primarily to detect and/or dislodge barricaded subjects.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only SWAT operators and members of the Mobile Field Force Team who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 732.60 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize chemical agents only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

Type: *Flameless Tri-Chamber Smoke (Part #1033)*

Quantity: Not to Exceed 20

Cost: \$29.50 each (estimated)

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Lifespan: 5 years from date of manufacture

Capabilities: The Tri-Chamber Flameless canister can be used in crowd control as well as tactical deployment situations. Its applications in tactical situations are primarily to detect and/or dislodge barricaded subjects.

Manufacturer's Description: The Tri-Chamber Flameless canister is designed for indoor use. This canister's pyrotechnic contents are burned within an internal can that is one of three in this design. The internal combustion allows the chemical-laden smoke to be released through three (3) ports on the outer canister side while safely containing any of the fire-producing properties within the two internal canisters. The fuze is shrouded to further protect surrounding materials from the possibility of fire.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only SWAT operators and members of the Mobile Field Force Team who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 590.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize chemical agents only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

Type: *MK 46 Vertical 1st Defense (Part # 56746V)*

Quantity: Not to Exceed 10

Cost: \$335.00 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: This will deliver 26 short bursts of Oleoresin Capsicum (OC) at an effective range of 25-30 ft.

Manufacturer's Description: The MK-46 features a trigger handle, is intended for use in crowd management and will deliver 26 short bursts of Oleoresin Capsicum (OC) at an effective range of 25-30 ft. This .7% MC OC aerosol product utilizes a stream delivery

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method providing a target-specific, strong concentrated stream for greater standoff. Non-flammable / Electronic Discharge Weapon (EDW) safe.

Purpose: To limit the escalation of conflict where employment of lethal force is prohibited or undesirable. Situations for the use of the less-lethal weapon systems may include, but are not limited to self-destructive, dangerous, and/or combative individuals; civil unrest incidents; circumstances where a tactical advantage can be obtained; potentially vicious animals; and training exercises or approved demonstrations.

Authorized Uses: Only SWAT operators and members of the Mobile Field Force Team who have received POST certification in the use of chemical agents are authorized to use chemical agents.

Fiscal Impact: \$0 – 3,350.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize chemical agents only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: SWAT operators and members of the Mobile Field Force Team utilizing chemical agent canisters are certified by POST less-lethal and chemical agent instructors.

DIVERSIONARY DEVICES

Type: *Low Roll Distraction Device (Part #8922 – HH)*

Quantity: Not to Exceed 50

Cost: \$46.00 each (estimated)

Lifespan: 5 years from date of manufacture

Capabilities: Diversionary Devices are capable of releasing large amounts of stored energy in the form of heat, light, pressure, and noise. They are intended to temporarily distract, confuse, and disorient subjects. They can also be used as “attention-getting” devices.

Manufacturer’s Description: The 11-Gram Low Roll II® Non-Reloadable Distraction Device®, High Humidity utilizes an M201A1 type fuze with Hex design steel body. This compact version of the 8933 Low Roll Distraction Device body is the newest version of the first reusable non-bursting canisters that limits movement and rolling once deployed.

Purpose: A distraction device is ideal for distracting dangerous suspects during assaults, hostage rescue, room entry, or other high-risk arrest situations. It produces atmospheric overpressure and brilliant white light, and as a result, can cause short-term (6-8 seconds) physiological/psychological, sensory deprivation to give officers a tactical advantage.

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Authorized Uses: Diversionary Devices shall only be used by SWAT operators who have been trained in their proper use; in hostage and barricaded suspect situations; in high-risk warrant (search/arrest) services where there may be extreme hazards to officers; during other high-risk situations where their use would enhance officer safety; and during training exercises.

Fiscal Impact: \$0 – 2,300.00 (estimated)

Policy and Procedure: It is the policy of the Gardena Police Department to utilize this equipment only for official law enforcement purposes and pursuant to State and Federal law, including those regarding the use of force.

Training: Prior to use, SWAT operators must attend diversionary device training that is conducted by POST-certified instructors.

706.5 APPROVAL

State

The Chief of Police or the authorized designee shall obtain approval from the governing body by way of an ordinance adopting the military equipment policy. As part of the approval process, the Chief of Police or the authorized designee shall ensure the proposed military equipment policy is submitted to the governing body and is available on the department website at least 30 days prior to any public hearing concerning the military equipment at issue (Government Code § 7071). The military equipment policy must be approved by the governing body prior to engaging in any of the following (Government Code § 7071):

- (a) Requesting military equipment made available pursuant to 10 USC § 2576a.
- (b) Seeking funds for military equipment, including but not limited to applying for a grant, soliciting or accepting private, local, state, or federal funds, in-kind donations, or other donations or transfers.
- (c) Acquiring military equipment either permanently or temporarily, including by borrowing or leasing.
- (d) Collaborating with another law enforcement agency in the deployment or other use of military equipment within the jurisdiction of this department.
- (e) Using any new or existing military equipment for a purpose, in a manner, or by a person not previously approved by the governing body.
- (f) Soliciting or responding to a proposal for, or entering into an agreement with, any other person or entity to seek funds for, apply to receive, acquire, use, or collaborate in the use of military equipment.
- (g) Acquiring military equipment through any means not provided above.

706.6 COORDINATION WITH OTHER JURISDICTIONS

State

Military equipment used by any member of this Department shall be approved for use and in accordance with this Department policy. Any military equipment that is deployed or used by

Gardena Police Department

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Military Equipment

other jurisdictions that are providing mutual aid to this Department shall comply with their respective military equipment use policies. Situations may arise where the Gardena Police Department may deploy or use military equipment owned by other law enforcement agencies, in these situations, Gardena Police Department is authorized to deploy or use a different agency's military equipment as authorized in this policy.

The Gardena Police Department hereby adopts the military equipment use policy as is approved, and may be amended from time to time, under Government Code section 7070 *et seq.*, for jurisdictions that the Gardena Police Department may engage with to provide mutual aid. This section is in no way a limitation to the ability of the Gardena Police Department to deploy or use the military equipment of another jurisdiction.

706.7 ANNUAL REPORT

State

Upon approval of a military equipment policy, the Chief of Police or the authorized designee should submit a military equipment report to the governing body for each type of military equipment approved within one year of approval, and annually thereafter for as long as the military equipment is available for use (Government Code § 7072).

The Chief of Police or the authorized designee should also make each annual military equipment report publicly available on the department website for as long as the military equipment is available for use. The report shall include all information required by Government Code § 7072 for the preceding calendar year for each type of military equipment in department inventory.

706.8 COMMUNITY ENGAGEMENT

State

Within 30 days of submitting and publicly releasing the annual report, the Department shall hold at least one well-publicized and conveniently located community engagement meeting, at which the Department should discuss the report and respond to public questions regarding the funding, acquisition, or use of military equipment.

706.9 COMPLIANCE PROCEDURE

This procedure is to ensure compliance with the military equipment use policy. All complaints, concerns, or questions submitted regarding this policy will be handled pursuant to the Department's normal complaint process (Lexipol Policy 1010) and be handled in a timely manner.



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 15.A
Section: DEPARTMENTAL
ITEMS - PUBLIC WORKS
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: Approve Consultation Contract for HF&H Consultants, LLC to Monitor the Solid Waste Contract and Manage Senate Bill 1383 Requirements for the City of Gardena.

COUNCIL ACTION REQUIRED:

Staff Recommendation: Approve Consultation Contract

RECOMMENDATION AND STAFF SUMMARY:

The Solid Waste Management Franchise Agreement with Waste Resources of Gardena was recently approved by Council and effective March 22, 2022. The Agreement incorporated the diversion goals by the California Integrated Waste Management Act of 1989 and recent regulation requirements.

With the State's increase in regulations for waste diversion and recycling services, Senate Bill (SB) 1383 requires a reduction of methane emissions resulting from decomposition of organic waste in landfills. SB 1383 requires a reduction of organic waste disposed in landfills by 75% by 2025. The burden was then placed on local jurisdictions to enact and enforce ordinances to comply with SB 1383 regulations. As a result, the City adopted a mandatory organic recycling ordinance to incorporate into the City's Municipal Code.

Staff respectfully recommends the City Council approve the two-year contract for HF&H Consultants, LLC (HF&H) to monitor the Solid Waste Contract and manage the SB 1383 requirements. HF&H will provide legislative and regulatory updates, prepare education and outreach materials for recycling and organics diversion, analyze reports to ensure requirements are met, reconcile Recycling Disposal Reporting System and prepare documentation to be included in the CalRecycle's annual Electronic Report.

From 2020 to 2022, HF&H successfully updated the Solid Waste contract and ordinances to include the SB 1383 requirements for the City of Gardena. With over 20 years of experience, HF&H is the subject matter expert in solid waste, recycle compliance and environmental mandate requirements.

FINANCIAL IMPACT/COST:

Financial Impact: \$210,000 for two-year contract

Funding Sources:

1. CalRecycle awarded the City a grant for \$80,167; funds were provided for a Consultant to assist the City with tracking and providing guidance for SB 1383 requirements
2. Waste Resources of Gardena's Regulatory Reimbursement for AB 939/SB 1383

compliance which generates \$150,000 per year

ATTACHMENTS:

[City of Gardena HFH Consultants Proposal to Provide Consulting Services Final.pdf](#)

[HFH Consultant City Agreement 2022.pdf](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio", is written over a light blue rectangular background.

Clint Osorio, City Manager

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John W. Farnkopf, PE
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April 13, 2022

Mr. Allan Rigg, P.E., AICP
Director of Public Works
City of Gardena
1700 West 162nd Street
Gardena, California 92047

Re: Proposal to Provide Solid Waste Consultant Services

Dear Mr. Rigg:

HF&H Consultants (HF&H) is pleased to submit this proposal to the City of Gardena (City) to provide solid waste consultant services. HF&H has a long history of successfully providing these services to jurisdictions throughout California since 1989.

We believe that HF&H brings the following qualifications and benefits to the City:

- 1. We are an industry recognized thought-leader in environmental strategic planning, goal setting, policy development and program implementation.*** Clients of HF&H receive innovative and pragmatic solid waste and recycling plans that have been developed with decade's worth of diverse experience. Our pioneer role in the zero-waste planning field, assisting communities such as the cities of San Diego, Santa Monica, and Livermore, and the County of San Diego, has provided us with an unmatched menu of services and programs, as well as unrivaled implementation experience. This range of experience allows us to develop both short and long-term goals that meet the specific needs of our clients, while maintaining a realistic understanding of the impacts on client costs and diversion.
- 2. HF&H is regarded as the industry expert for SB 1383 compliance.*** In 2019, CalRecycle engaged HF&H to develop a stakeholder input group and create Model SB 1383 Implementation Tools and Guidance. These model tools were developed to support jurisdictions and other regulated entities across the state with implementing programs and policies to reach compliance with SB 1383 regulations. The model tools include a Model Enforcement Ordinance, Model Procurement Policy, Model Franchise Agreement, and Model Food Recovery Agreement. In total, HF&H has worked with over 70 communities throughout California, representing over 7 million residents, continuously adapting compliance to fit a variety of real-world conditions. Our range of experience supporting California jurisdictions with SB 1383 includes, but is not limited to, strategic planning, cost modeling, sole source and competitive procurements, ordinance development, and engagement in the regulatory process.
- 3. We identify the individual needs of our clients.*** At HF&H we partner with key stakeholders, including City Council, City staff, residents, and other applicable parties, to set measurable, achievable goals.


Mr. Allan Rigg
April 13, 2022
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The purpose of these goals is to meet the specific needs of the community and achieve regulatory compliance while minimizing the financial impact on ratepayers. Again, our experience has helped us develop a vast array of facilitation methods, including online surveys, webinars, live streams, and council workshops. HF&H staff includes SWANA and CRRA certified zero waste instructors.

4. ***HF&H does not provide solid waste consulting services to waste haulers.*** HF&H exclusively provides consulting services to municipalities for the better interest of our clients and to avoid potential conflicts of interest that may arise in firms that attempt to serve public agencies and haulers. We believe this independence is particularly important for objective proposal evaluation and effective negotiations during the procurement of a solid waste services agreement. Additionally, our municipal focus ensures that we are aware of the unique requirements of public officials.

Thank you for the opportunity to provide you with this information. We look forward to an opportunity to continue our partnership with the City. If you have any questions, please contact Debbie Morris at (949) 251-1106 or dmorris@hfh-consultants.com.

Very truly yours,
HF&H CONSULTANTS, LLC



Laith Ezzet, CMC
Senior Vice President



Debbie Morris
Senior Manager

SECTION 1: SCOPE OF WORK

Task 1: Franchise Management

HF&H has developed hauler report monitoring mechanisms to assess increases/decreases in residential curbside recycling and organics diversion, and commercial/multi-family diversion on a monthly basis. Under this contract, HF&H will monitor these programs closely and measure the success of recycling efforts implemented by Waste Resources of Gardena (WRG).

Public education is vital to ensuring the success of the City's diversion programs. The City's pending franchise agreement with WRG contains specific public education and outreach requirements. HF&H will monitor the quantity and quality of public education pieces prepared by WRG, suggest topics for public education pieces, and will review public education pieces for accuracy.

The franchise management task will also include our review of WRG's annual rate increase request. We will review the accuracy of the WRG's calculations, in accordance with the allowable annual increase in the franchise agreement, and document recommended adjustments to the submittal, if applicable.

HF&H shall attend virtual monthly meetings with City staff and WRG to monitor WRG's compliance with contractual requirements and discuss the success of recycling programs and plans to improve waste diversion.

Task 2: Maintenance Activities

HF&H will assist with various waste management-related inquiries and miscellaneous tasks that arise from time to time. These tasks will include legislative research and reporting, monitoring the activities and objectives of the Los Angeles County Integrated Waste Management Task Force ("Task Force"), and providing general solid waste and recycling liaison assistance.

To perform this task, HF&H will:

- Track solid waste legislation, regulations, CalRecycle policy decisions, and other solid waste issues pertinent to the City;
- Provide legislative and regulatory updates and discuss significant items at face-to-face meetings; and,
- Monitor Task Force meetings and initiatives.

This task will also include communication with the City's CalRecycle representative to ensure ongoing compliance with state regulations such as CalGreen, AB 341, AB 827, AB 939, AB 2176 and SB 1383. Additionally, this task may require the development of new programs or the enhancement of existing diversion programs.

Task 3: Coordinate, Promote and Monitor Recycling Programs

HF&H will provide public education support for the commercial, multi-family, and single-family curbside recycling programs to increase the diversion rates in these sectors.

To perform this task, HF&H will:

- Monitor both the commercial/multi-family and the single-family recycling programs throughout the year, including review of monthly tonnage and customer count reports submitted by the contractor, and attendance at monthly meetings with the City and the contractor.
- Prepare public education and outreach materials.

Task 4: Analyze Monthly and Quarterly Reports

HF&H has developed an excel-based program which analyzes the monthly and quarterly reports to be submitted by WRG. Through the use of this program, HF&H can identify potential irregularities and/or inaccuracies of the data submitted via WRG's reports. The program also tracks the progress of AB 939, AB 341, and SB 1383 compliance.

Part 5: Mandatory Commercial Recycling and Organics Regulation Compliance

In 2021, HF&H assisted the City in developing the ordinances required by SB 1383, including the mandatory organics and recycling ordinance. HF&H will track the progress of customer compliance with the mandatory programs. Additionally, HF&H will:

- Assist the City by preparing and submitting, for City approval, public education and outreach materials to encourage participation in the source separated recyclables and organics collection programs.
- Review program participation levels and WRG's outreach and discuss findings during the monthly franchise management meetings with WRG and the City.
- Prepare documentation to be included with the City's Electronic Annual Report (EAR) submitted to CalRecycle and assist the City in responding to other inquiries by CalRecycle.
- Brief the City on new updates to key recycling legislation.

Part 6: SB 1383 Assistance

In addition to the SB 1383 compliance tasks included in previous tasks, HF&H will perform the following to assist the City in complying with SB 1383:

- Review information provided by WRG to confirm that they provide their customers with information on properly separating materials, organic waste prevention, on-site recycling, methane reduction benefits, how to recycle organic waste, self-haul requirements, and edible food donation.
- Develop drafts for review by the City of public education and outreach information for edible food generators. This information will be distributed by the City to the Tier One and Tier Two Edible Food Generator lists provided by WRG.
- HF&H will prepare, for the City's review, the annual SB 1383 compliance report required by 14 CCR 18994.2 based on information available to us. HF&H will submit this electronic report to CalRecycle on behalf of the City by October 1, 2022, and August 1 annually, thereafter.
- On an ongoing basis, maintain all electronic implementation records provided to us in Sharepoint so that they may be accessed by CalRecycle within ten business days of request (14 CCR 18995.2).
- HF&H will utilize CalRecycle's organic waste and edible food recovery capacity planning tools to provide the information to the County on behalf of the City. The initial data is due to the County on June 15, 2022. This will be conducted in accordance with 14 CCR 18992.1, 18992.2, 18992.3 and is due to CalRecycle from the County on August 1, 2022, and August 1, 2024.

Part 7: Recycling and Disposal Reporting System Reconciliation

Governor Brown signed AB 901 (Gordon, Chapter 746, Statutes of 2015) into law to change how organics, recyclable material, and solid waste are reported to CalRecycle. The Recycling and Disposal Facility Reporting System (RDRS) law requires the following businesses to report directly to CalRecycle on a quarterly basis on types, quantities, and destinations of materials that are disposed of, sold, or transferred inside or outside of the state:

- Recycling facilities
- Composting facilities
- Disposal facilities including landfills
- Transformation facilities
- Engineered municipal solid waste conversion facilities
- Transfer/processor facilities
- Contract haulers
- Food waste self-haulers
- Brokers
- Transporters

The RDRS will provide greater transparency of materials reported as originating from the City by these entities.

HF&H will perform the following tasks to review the tonnage and facilities reported on the RDRS:

1. Compare WRG's tonnage reports to the RDRS, identify differences, and request that WRG make the appropriate revisions to their reports.
2. Review facility reports which allocate tonnages to the City.
3. Identify haulers from facility reports that do not have the authority to provide collection services in the City.
4. Prepare letters for the City to send to illegal haulers, requesting them to cease operations in the City.
5. Prepare documentation listing inaccuracies or inconsistencies identified, forward the form and all reference information to CalRecycle and include this information in the EAR.

Part 8: CalRecycle Assistance

1. HF&H will review the City's Electronic Annual Report to CalRecycle prepared by WRG.
2. HF&H will assist the City by responding to questions from CalRecycle and prepare for and participate in the annual conference calls and meetings with CalRecycle.

SECTION 2: FEE PROPOSAL

The City can compensate HF&H for its consulting services through the SB 1383 grant and the AB 939/SB 1383 Regulatory Reimbursement paid by WRG. Section 3.2 of the pending agreement with WRG includes an AB 939/SB 1383 Regulatory Reimbursement of 1.5% of gross revenues collected by WRG. The contract value in 2020 was approximately \$14 million which would equate to over \$200,000 in the Regulatory Reimbursement, and the contract value may increase once the new agreement is implemented.

We will perform the scope of work based on time and materials. Estimated costs for the three proposed periods are as follows:

- April 27, 2022 through June 30, 2022 - \$30,000;
- July 1, 2022 to June 30, 2023 - \$90,000; and,
- July 1, 2023 to June 30, 2024) - \$90,000

The workplans on the following pages itemize hours by task and staff classification. Hours may be shifted among tasks.

We will bill the City once per month based on the number of hours worked and expenses incurred. Payment is due within 30 days of invoicing. Hourly rates are shown below.

Professional Fees

Hourly rates for professional and administrative personnel through December 31, 2022, are as follows and will adjust by 3% each January 1 thereafter:

<u>Position</u>	<u>Rate</u>
Executive	\$300 - \$315
Senior Project Manager	\$285 - \$295
Project Manager	\$240 - \$250
Senior Associate	\$210 - \$225
Associate Analyst	\$160 - \$170
Assistant Analyst	\$145 - \$150
Administrative Staff	\$110 - \$120

Direct Expenses

Standard charges for common direct expenses are as follows:

Automobile Travel	Prevailing IRS mileage rate
Airfare and Public Transit	Actual Cost

Table 1: April 27, 2022 through June 30, 2022

Task Description	Sr. Vice President	Sr. Project Manager	Sr. Associate	Associate	Total Hours
1. Franchise Management					
1A Monitor contractor compliance	2	2	2	4	10
1B Gather, review and analyze contractor's reports		Time included in Task 4			
1C Review public education developed by contractor	-	4	-	8	12
1D Schedule and attend monthly meetings	-	2	2	4	8
1E Maintain and update action items	-	-	-	2	2
Subtotal: Task 1 Hours	2	8	4	18	32
Task 1 Fees	630	2,320	900	3,042	6,892
2. Maintenance Activities					
2A Track solid waste legislation, and policy decisions	-	2	-	-	2
2B Provide regulatory updates	-	2	-	-	2
Subtotal: Task 2 Hours	-	4	-	-	4
Task 2 Fees	\$ -	\$ 1,160	\$ -	\$ -	\$ 1,160
3. Coordinate, Promote and Monitor Recycling Programs					
3A Monitor recycling programs	-	4	4	4	12
3B Prepare public education and outreach materials	-	2	-	3	5
Subtotal: Task 3 Hours	-	6	4	7	17
Task 3 Fees	\$ -	\$ 1,740	\$ 900	\$ 1,183	\$ 3,823
4. Analyze Monthly & Quarterly Reports; Conduct Biennial Audit					
4A Receive and analyze contractor's reports	-	4	4	4	12
4B Track submittal of contractor reports	-	-	-	2	2
4C Review mathematical accuracy of gross receipts reports	-	-	-	3	3
4D Prepare excel document summarizing reports to City	-	12	2	6	20
4E Calculate ratio of gross receipts to tonnage	-	-	-	2	2
Subtotal: Task 4 Hours	-	16	6	17	39
Task 4 Fees	\$ -	\$ 4,640	\$ 1,350	\$ 2,873	\$ 8,863
5. Mandatory Commercial Recycling and Organics Regulation Compliance					
5A Prepare public education and outreach materials	-	-	2	4	6
5B Review program participation	-	-	-	2	2
Subtotal: Task 5 Hours	-	-	2	6	8
Task 5 Fees	\$ -	\$ -	\$ 450	\$ 1,014	\$ 1,464
6. SB 1383 Assistance					
6A Develop public education and outreach to Tier 1 and Tier edible food generators	-	-	1	2	3
6B Maintain implementation records	-	-	2	8	10
6C Provide organics and edible food capacity to County	-	-	4	16	20
Subtotal: Task 6 Hours	-	-	7	26	33
Task 6 Fees	\$ -	\$ -	\$ 1,575	\$ 4,394	\$ 5,969
7 CalRecycle Assistance					
7A Respond to questions from CalRecycle	-	2	-	6	8
Subtotal: Task 7 Hours	-	2	-	6	8
Task 7 Fees	\$ -	\$ 580	\$ -	\$ 1,014	\$ 1,594
Total Hours	2	36	23	80	141
Hourly Rate	\$ 315	\$ 290	\$ 225	\$ 169	
Subtotal	\$ 630	\$ 10,440	\$ 5,175	\$ 13,520	\$ 29,765
Expenses					\$ 235
Total Fees and Expenses					\$ 30,000

* Hours may be shifted among tasks

Table 2: Contract Year 1: July 1, 2022 to June 30, 2023

Task Description	Sr. Vice President	Sr. Project Manager	Sr. Associate	Associate	Total Hours
1. Franchise Management					
1A Monitor contractor compliance	2	6	8	16	32
1B Gather, review and analyze contractor's reports		Time included in Task 4			
1C Review and verify contractor's annual rate adjustment	2	2	8	-	12
1D Review public education developed by contractor	-	-	-	8	8
1E Schedule and attend monthly meetings	2	24	8	24	58
1F Maintain and update action items	-	4	-	12	16
Subtotal: Task 1 Hours	6	36	24	60	126
Task 1 Fees	1,890	10,440	5,400	10,140	27,870
2. Maintenance Activities					
2A Track solid waste legislation, and policy decisions	-	8	-	-	8
2B Provide regulatory updates	-	4	-	-	4
2C Prepare reports and documents	2	4	-	8	14
Subtotal: Task 2 Hours	2	16	-	8	26
Task 2 Fees	\$ 630	\$ 4,640	\$ -	\$ 1,352	\$ 6,622
3. Coordinate, Promote and Monitor Recycling Programs					
3A Monitor recycling programs	-	4	4	4	12
3B Prepare public education and outreach materials	-	2	-	8	10
Subtotal: Task 3 Hours	-	6	4	12	22
Task 3 Fees	\$ -	\$ 1,740	\$ 900	\$ 2,028	\$ 4,668
4. Analyze Monthly & Quarterly Reports; Conduct Biennial Audit					
4A Receive and analyze contractor's reports	-	-	4	16	20
4B Track submittal of contractor reports	-	-	-	4	4
4C Review mathematical accuracy of gross receipts reports	-	-	2	4	6
4D Maintain excel document summarizing reports to City	-	-	-	4	4
4E Calculate ratio of gross receipts to tonnage	-	-	-	4	4
Subtotal: Task 4 Hours	-	-	6	32	38
Task 4 Fees	\$ -	\$ -	\$ 1,350	\$ 5,408	\$ 6,758
5. Mandatory Commercial Recycling and Organics Regulation Compliance					
5A Prepare public education and outreach materials	-	2	2	8	12
5B Review program participation	1	4	2	6	13
5C Brief City on program updates	-	4	-	-	4
Subtotal: Task 5 Hours	1	10	4	14	29
Task 5 Fees	\$ 315	\$ 2,900	\$ 900	\$ 2,366	\$ 6,481
6. SB 1383 Assistance					
6A Develop public education and outreach to Tier 1 and Tier edible food generators	-	-	6	16	22
6B Prepare annual compliance report	-	4	8	40	52
6C Maintain implementation records	-	2	8	32	42
6D Provide organics and edible food capacity to County	-	4	-	16	20
Subtotal: Task 6 Hours	-	10	22	104	136
Task 6 Fees	\$ -	\$ 2,900	\$ 4,950	\$ 17,576	\$ 25,426
7 Disposal Report Reconciliation					
7A Compare contractor's tonnage to RDRS	-	-	16	4	20
7B Identify haulers from RDRS not authorized to collect in City	-	-	-	4	4
7C Prepare disposal report reconciliation correspondence	-	2	-	8	10
7D Prepare Disposal Modification Forms and submit to CalRecycle	-	2	-	4	6
Subtotal: Task 7 Hours	-	4	16	20	40
Task 7 Fees	\$ -	\$ 1,160	\$ 3,600	\$ 3,380	\$ 8,140
8 CalRecycle Assistance					
8A Respond to questions from CalRecycle and prepare for and participate in annual meetings	-	4	-	16	20
Subtotal: Task 8 Hours	-	4	-	16	20
Task 8 Fees	\$ -	\$ 1,160	\$ -	\$ 2,704	\$ 3,864
Total Hours	9	86	76	266	437
Hourly Rate	\$ 315	\$ 290	\$ 225	\$ 169	
Subtotal	\$ 2,835	\$ 24,940	\$ 17,100	\$ 44,954	\$ 89,829
Expenses					\$ 171
Total Fees and Expenses					\$ 90,000

* Hours may be shifted among tasks

Table 3: Contract Year 2 – July 1, 2023 – June 30, 2024

Task Description	Sr. Vice President	Sr. Project Manager	Sr. Associate	Associate	Total Hours
1. Franchise Management					
1A Monitor contractor compliance	2	6	8	16	32
1B Gather, review and analyze contractor's reports		Time included in Task 4			
1C Review and verify contractor's annual rate adjustment	2	2	8	-	12
1D Review public education developed by contractor	-	-	-	8	8
1E Schedule and attend monthly meetings	2	24	8	24	58
1F Maintain and update action items	-	4	-	12	16
Subtotal: Task 1 Hours	6	36	24	60	126
Task 1 Fees	1,938	10,692	5,544	10,380	28,554
2. Maintenance Activities					
2A Track solid waste legislation, and policy decisions	-	8	-	-	8
2B Provide regulatory updates	-	4	-	-	4
2C Prepare reports and documents	2	4	-	8	14
Subtotal: Task 2 Hours	2	16	-	8	26
Task 2 Fees	\$ 646	\$ 4,752	\$ -	\$ 1,384	\$ 6,782
3. Coordinate, Promote and Monitor Recycling Programs					
3A Monitor recycling programs	-	6	4	4	14
3B Prepare public education and outreach materials	-	2	-	8	10
Subtotal: Task 3 Hours	-	8	4	12	24
Task 3 Fees	\$ -	\$ 2,376	\$ 924	\$ 2,076	\$ 5,376
4. Analyze Monthly & Quarterly Reports; Conduct Biennial Audit					
4A Receive and analyze contractor's reports	-	-	4	16	20
4B Track submittal of contractor reports	-	-	-	4	4
4C Review mathematical accuracy of gross receipts reports	-	-	2	4	6
4D Maintain excel document summarizing reports to City	-	-	-	4	4
4E Calculate ratio of gross receipts to tonnage	-	-	-	4	4
Subtotal: Task 4 Hours	-	-	6	32	38
Task 4 Fees	\$ -	\$ -	\$ 1,386	\$ 5,536	\$ 6,922
5. Mandatory Commercial Recycling and Organics Regulation Compliance					
5A Prepare public education and outreach materials	-	2	2	8	12
5B Review program participation	1	4	2	6	13
5C Brief City on program updates	-	4	-	-	4
Subtotal: Task 5 Hours	1	10	4	14	29
Task 5 Fees	\$ 323	\$ 2,970	\$ 924	\$ 2,422	\$ 6,639
6. SB 1383 Assistance					
6A Develop public education and outreach to Tier 1 and Tier edible food generators	-	-	4	16	20
6B Prepare annual compliance report	1	2	8	36	47
6C Maintain implementation records	-	2	4	32	38
6D Provide organics and edible food capacity to County	-	2	-	16	18
Subtotal: Task 6 Hours	1	6	16	100	123
Task 6 Fees	\$ 323	\$ 1,782	\$ 3,696	\$ 17,300	\$ 23,101
7 Disposal Report Reconciliation					
7A Compare contractor's tonnage to RDRS	-	-	16	4	20
7B Identify haulers from RDRS not authorized to collect in City	-	-	-	4	4
7C Prepare disposal report reconciliation coorespondence	-	2	-	8	10
7D Prepare Disposal Modification Forms and submit to CalRecycle	-	2	-	4	6
Subtotal: Task 7 Hours	-	4	16	20	40
Task 7 Fees	\$ -	\$ 1,188	\$ 3,696	\$ 3,460	\$ 8,344
8 CalRecycle Annual Report					
8A Respond to questions from CalRecycle and prepare for and participate in annual meetings	-	4	-	16	20
Subtotal: Task 8 Hours	-	4	-	16	20
Task 8 Fees	\$ -	\$ 1,188	\$ -	\$ 2,768	\$ 3,956
Total Hours	10	84	70	262	426
Hourly Rate	\$ 323	\$ 297	\$ 231	\$ 173	
Subtotal	\$ 3,230	\$ 24,948	\$ 16,170	\$ 45,326	\$ 89,674
Expenses					\$ 326
Total Fees and Expenses					\$ 90,000

* Hours may be shifted among tasks

CITY OF GARDENA CONSULTANT AGREEMENT WITH HF&H CONSULTANTS, LLC

This Agreement is entered into this _____ day of _____, 2022, by and between the **City of Gardena**, a municipal corporation ("City") and **HF&H Consultants, LLC**, a California LLC ("Consultant"). Based on the mutual promises and covenants contained herein, the Parties hereto agree, as follows.

1. **RECITALS.** This Agreement is made and entered into with respect to the following facts:
 - A. Whereas, City is desirous of obtaining professional consultant services to monitor the solid waste contract and manage the Senate Bill 1383 requirements;
 - B. Whereas, Consultant has represented that it is qualified by virtue of experience, training, education and expertise to accomplish these services; and
 - C. Whereas, City has determined that the public interest, convenience and necessity require the execution of this Agreement; and
 - D. Whereas, no official or employee of City has a financial interest, within the provisions of sections 1090-1092 of the California Government Code, in the subject matter of this Agreement.

NOW, THEREFORE, for and in consideration of the mutual covenants and conditions contained herein, the parties hereby agree as follows:

2. **TERM OF AGREEMENT.** This Agreement shall commence upon execution and shall continue until completion, unless earlier terminated as provided below.
 - A. Either party may terminate this Agreement, without cause, by giving thirty (30) days written notice to the other party.
 - B. City may terminate this Agreement for cause by giving thirty (30) days written notice to Consultant. Lack of funding shall be considered cause for terminating this Agreement.
 - C. Upon termination, Consultant shall: (1) promptly discontinue all services affected, unless the notice directs otherwise; and (2) promptly deliver to City all data, reports, estimates, summaries, and such other information and materials as may have been accumulated or prepared to date by Consultant in performing the services under this Agreement, whether completed or in progress. Consultant shall be entitled to reasonable compensation for the

services it performs up to the date of termination; however, if the Agreement is terminated by City for cause, other than lack of funding, or by Consultant without cause, City shall be entitled to deduct any costs it incurs payment to another consultant for Services, which duplicate Consultant's Services to date. In the event of termination for other than cause attributable to Consultant, Consultant shall be deemed released for liability for any work assigned but not completed as of the effective date of termination.

3. **SERVICES.** Consultant agrees to provide the services as specified in the Consultant's Proposal, Exhibit A, attached hereto and incorporated herein by this reference ("services"). Unless otherwise specified herein, Consultant shall, at its sole cost and expense, furnish all facilities, equipment and personnel which may be required for providing the Services pursuant to this Agreement.
4. **ADDITIONAL SERVICES.** If City determines that additional services are required to be provided by Consultant in addition to the Services set forth above, City shall authorize Consultant to perform such additional services in writing ("Additional Services"). Such Additional Services shall be specifically described and approved by City in writing prior to the performance thereof. Consultant shall be compensated for such Additional Services in accordance with the agreed upon charges therefore as set forth in the written authorization. No compensation shall be paid to Consultant for Additional Services which are not specifically approved by City in writing.
5. **CONSULTANT'S PROPOSAL.** This Agreement shall include Consultant's proposal or bid which is incorporated herein as Exhibit A. In the event of any inconsistency between the terms of the proposal and this Agreement, this Agreement shall govern.
6. **PERSONNEL.** City has relied upon the professional training and ability of Consultant to perform the services hereunder as a material inducement to enter into this Agreement. Consultant shall provide properly skilled professional and technical personnel to perform all services under this Agreement. In the event that City, in its sole discretion, at any time during the term of this Agreement, desires the removal of any person or persons assigned by Consultant to perform Services pursuant to this Agreement, Consultant shall remove any such person immediately upon receiving notice from City. During the term of this Agreement, Consultant shall provide the services specified in the proposal. Such individual(s) shall not be replaced without the prior written consent of City.
7. **PERFORMANCE BY CONSULTANT.** Consultant shall maintain or exceed the level of competency presently maintained by other similar practitioners in the State of California, for professional and technical soundness, accuracy and adequacy of all work, advice and material furnished under this Agreement.
8. **TIMING OF PERFORMANCE.** Time is of the essence with respect to Consultant's performance of the Services required by this Agreement. Consultant shall diligently and timely pursue and complete the performance of the Services required of it by this Agreement. City, in its sole discretion, may extend the time for performance of any Service.

9. **MONITORING OF CONSULTANT.** Consultant's performance of this Agreement shall be continuously monitored by the General Services Director/City Engineer. Consultant shall be notified in writing of any deficiency in the performance of this Agreement in a timely manner by the General Services Director/City Engineer. Consultant shall have five (5) business days from receipt of the notification to cure any deficiency to the reasonable satisfaction of the General Services Director/City Engineer. All costs for such corrections shall be borne by Consultant and shall not increase Consultant's fees due hereunder. Should the General Services Director/City Engineer determine that Consultant has not performed its obligation as stated in this Agreement in a satisfactory manner, City may terminate this Agreement for cause as specified in Section 2 above.

10. **COMPENSATION.** Consultant shall be compensated as follows:

- A. Amount. City shall compensate Consultant for the Services rendered pursuant to this Agreement at the rate specified in Exhibit A. In no event shall compensation under this Agreement exceed two-hundred ten-thousand **and 00/00 (\$210,000.00)** without the prior written authorization of the City Council. The Compensation is inclusive of all costs that may be incurred by Consultant in performance of the Services, including but not limited to such items as travel, copies, delivery charges, phone charges, and facsimile charges, unless otherwise noted.
- B. Invoices and Payment. Payment by City to Consultant shall be made upon receipt and approval of invoices for Services rendered. For payment to be made, Consultant's invoice must include an itemization as to the services rendered, date(s) of service, direct and/or subcontract costs and be submitted on an official letterhead or invoice with Consultant's name, address, and telephone number referenced. City shall review the invoices to determine whether services performed, and documents submitted are consistent with this Agreement. Payment shall be made within forty-five (45) days following receipt of the invoice or City shall provide Consultant with a written statement objecting to the charges and stating the reasons therefor. Payment by City under this Agreement shall not be deemed a waiver of defects, even if such defects were known to City at the time of payment.
- C. Expenses. Consultant shall not be entitled to any additional compensation for expenses.

11. **INSURANCE REQUIREMENTS.**

- A. Commencement of Work. Consultant shall not commence work under this Agreement until it has obtained City approved insurance. Before beginning work hereunder, during the entire period of this Agreement, for any extensions hereto, and for periods after the end of this Agreement as may be indicated below, Consultant must have and maintain in place all of the insurance coverages required in this Section. Consultant's insurance shall

comply with all items specified by this Agreement. Any subcontractors shall be subject to all the requirements of this Section and Consultant shall be responsible to obtain evidence of insurance from each subcontractor and provide it to City before the subcontractor commences work. Alternatively, Consultant's insurance may cover all subcontractors.

- B. Insurance Company Requirements. All insurance policies used to satisfy the requirements imposed hereunder shall be issued by insurers admitted to do business in the State of California. Insurers shall have a current Best's rating of not less than A-VII, unless otherwise approved by City.
- C. Coverages, Limits and Policy Requirements. Consultant shall maintain the types of coverages and limits indicated below:
1. Commercial General Liability Insurance – a policy for occurrence coverage for bodily injury, personal injury and property damage, including all coverages provided by and to the extent afforded by Insurance Services Office Form CG 2010 ed. 10/93 or 11/85, with no special limitations affecting City. The limit for all coverages under this policy shall be no less than one million dollars (\$1,000,000.00) per occurrence.
 2. Commercial Auto Liability Insurance – a policy including all coverages provided by and to the extent afforded by Insurance Services Office form CA 0001, ed. 12/93, including Symbol 1 (any auto) with no special limitations affecting City. The limit for bodily injury and property damage liability shall be no less than one million dollars (\$1,000,000.00) per accident.
 3. Worker's Compensation and Employers Liability Insurance – a policy which meets all statutory benefit requirements of the Labor Code, or other applicable law, of the State of California. The minimum coverage limits for said insurance shall be no less than one million dollars per claim. The policy shall be issued by an insurance company which is admitted to do business in the State of California and shall contain a clause that the policy may not be canceled without thirty (30) days prior written notice, return receipt requested, is mailed to City.
 4. Professional Errors & Omissions ("E&O") – a policy with minimum limits of not less than One Million Dollars (\$1,000,000.00), combined single limits, per occurrence and aggregate. Architects' and engineers' coverage shall be endorsed to include contractual liability. If the policy is written as a "claims made" policy, the retro date shall be prior to the start of the contract work. Consultant shall obtain and maintain, said E&O liability insurance during the life of this Agreement and for three years after completion of the work hereunder. This policy shall be issued by an insurance company which is admitted to do business in the State of California.

5. Policy Requirements. The policies set forth above shall comply with the following, as evidenced by the policies or endorsements to the policies:

- a. Additional insureds: "The City Gardena and its elected and appointed boards, officers, officials, agents, employees, and volunteers are additional insureds with respect to: liability arising out of activities performed by or on behalf of the Consultant pursuant to its contract with the City; products and completed operations of the Consultant; premises owned, occupied or used by the Consultant; automobiles owned, leased, hired, or borrowed by the Consultant."
- b. Notice: "Said policy shall not terminate, be suspended, or voided, nor shall it be cancelled, nor the coverage or limits reduced, until thirty (30) days after written notice is given to City."
- c. Other insurance: "The Consultant's insurance coverage shall be primary insurance as respects the City of Gardena, its officers, officials, agents, employees, and volunteers. Any other insurance maintained by the City of Gardena shall be excess and not contributing with the insurance provided by this policy."
- d. Any failure to comply with the reporting provisions of the policies shall not affect coverage provided to the City of Gardena, its officers, officials, agents, employees, and volunteers.
- e. The Consultant's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.

D. Additional Requirements. The procuring of such required policies of insurance shall not be construed to limit Consultant's liability hereunder nor to fulfill the indemnification provisions and requirements of this Agreement. There shall be no recourse against City for payment of premiums or other amounts with respect thereto. City shall notify Consultant in writing of changes in the insurance requirements. If Consultant does not deposit copies of acceptable insurance policies or endorsements with City incorporating such changes within sixty (60) days of receipt of such notice, Consultant shall be deemed in default hereunder.

E. Deductibles. Any deductible or self-insured retentions over \$25,000 per occurrence must be declared to and approved by City. Any deductible exceeding an amount acceptable to City shall be subject to the following changes: either the insurer shall eliminate or reduce such deductibles or self-insured retentions with respect to City, its officers, employees, agents and volunteers (with additional premium, if any, to be paid by Consultant); or

Consultant shall provide satisfactory financial guarantee for payment of losses and related investigations, claim administration and defense expenses.

- F. Verification of Compliance. Consultant shall furnish City with original policies or certificates and endorsements effecting coverage required by this Agreement. The endorsements are to be signed by a person authorized by the insurer to bind coverage on its behalf. All endorsements are to be received and approved by City before work commences. Not less than fifteen (15) days prior to the expiration date of any policy of insurance required by this Agreement, Consultant shall deliver to City a binder or certificate of insurance with respect to each renewal policy, bearing a notation evidencing payment of the premium therefor, or accompanied by other proof of payment satisfactory to City. Consultant shall provide full copies of any requested policies to City within three (3) days of any such request by City.
- G. Termination for Lack of Required Coverage. If Consultant, for any reason, fails to have in place, at all times during the term of this Agreement, including any extension hereto, all required insurance and coverage, City may immediately obtain such coverage at Consultant's expense and/or terminate this Agreement.
- H. Non-Limiting. Nothing in this Section shall be construed as limiting in any way, the indemnification provision contained in this Agreement, or the extent to which Consultant may be held responsible for payments of damages to persons or property.

12. INDEMNIFICATION. Consultant agrees to defend, indemnify, hold free and harmless the City, its elected officials, officers, agents, employees and volunteers, at Consultant's sole expense, from and against any and all claims, actions, suits or other legal proceedings brought against the City, its elected officials, officers, agents, employees and volunteers arising out of the performance of the Consultant, its employees, and/or authorized subcontractors, of the work undertaken pursuant to this Agreement. The defense obligation provided for hereunder shall apply without any advance showing of negligence or wrongdoing by the Consultant, its employees, and/or authorized subconsultants, but shall be required whenever any claim, action, complaint, or suit asserts as its basis the negligence, errors, omissions or misconduct of the Consultant, its employees, and/or authorized subconsultants, and/or whenever any claim, action, complaint or suit asserts liability against the City, its elected officials, officers, agents, employees and volunteers based upon the work performed by the Consultant, its employees, and/or authorized subconsultants under this Agreement, whether or not the Consultant, its employees, and/or authorized subconsultants are specifically named or otherwise asserted to be liable. Notwithstanding the foregoing, the Consultant shall not be liable for the defense or indemnification of the City for claims, actions, complaints or suits arising out of the sole negligence or willful misconduct of the City. This provision shall supersede and replace all other indemnity provisions contained either in the City's specifications or Consultant's Proposal, which shall be of no force and effect.

13. **COOPERATION.** In the event any claim or action is brought against City relating to Consultant's performance or services rendered under this Agreement, Consultant shall render any reasonable assistance and cooperation which City might require.
14. **INDEPENDENT CONTRACTOR.** Consultant is and shall be acting at all times as an independent contractor and not as an employee of City. Consultant shall have no power to incur any debt, obligation, or liability on behalf of City or otherwise act on behalf of City as an agent. Neither City nor any of its agents shall have control over the conduct of Consultant or any of Consultant's employees, except as set forth in this Agreement. Consultant shall not, at any time, or in any manner, represent that it or any of its agents or employees are in any manner agents or employees of City. Consultant shall secure, at its sole expense, and be responsible for any and all payment of Income Tax, Social Security, State Disability Insurance Compensation, Unemployment Compensation, and other payroll deductions for Consultant and its officers, agents, and employees, and all business licenses, if any are required, in connection with the services to be performed hereunder. Consultant shall indemnify and hold City harmless from any and all taxes, assessments, penalties, and interest asserted against City by reason of the independent contractor relationship created by this Agreement. Consultant further agrees to indemnify and hold City harmless from any failure of Consultant to comply with the applicable worker's compensation laws. City shall have the right to offset against the amount of any fees due to Consultant under this Agreement any amount due to City from Consultant as a result of Consultant's failure to promptly pay to City any reimbursement or indemnification arising under this paragraph.
15. **PERS ELIGIBILITY INDEMNIFICATION.** In the event that Consultant or any employee, agent, or subcontractor of Consultant providing services under this Agreement claims or is determined by a court of competent jurisdiction or the California Public Employees Retirement System (PERS) to be eligible for enrollment in PERS as an employee of the City, Consultant shall indemnify, defend, and hold harmless City for the payment of any employee and/or employer contributions for PERS benefits on behalf of Consultant or its employees, agents, or subcontractors, as well as for the payment of any penalties and interest on such contributions, which would otherwise be the responsibility of City.

Notwithstanding any other agency, state or federal policy, rule, regulation, law or ordinance to the contrary, Consultant and any of its employees, agents, and subcontractors providing service under this Agreement shall not qualify for or become entitled to, and hereby agree to waive any claims to, any compensation, benefit, or any incident of employment by City, including but not limited to eligibility to enroll in PERS as an employee of City and entitlement to any contribution to be paid by City for employer contribution and/or employee contributions for PERS benefits.

16. **NON-LIABILITY OF CITY.** No official, employee, agent or volunteer of City shall be personally liable for any default or liability under this Agreement.

17. **OWNERSHIP OF WORK PRODUCT.** All documents or other information created, developed, or received by Consultant shall, for purposes of copyright law, be deemed works made for hire for City by Consultant as City employee(s) for hire and shall be the sole property of City. Consultant shall provide City with copies of these items upon demand, and in any event, upon termination or expiration of this Agreement.
18. **CONFIDENTIALITY CLAUSE.** Consultant acknowledges that some of the material and information that may come into its possession or knowledge in connection with this Agreement or its performance may consist of information that is exempt from disclosure to the public or other unauthorized persons under either state or federal ("Confidential Information"). Confidential Information includes, but is not limited to, names, addresses, Social Security numbers, e-mail addresses, telephone numbers, financial profiles, credit card information, driver's license numbers, medical data, law enforcement records, agency source code or object code, agency security data, or information identifiable to an individual that relates to any of these types of information. Consultant agrees to hold Confidential Information in strictest confidence and not to make use of Confidential Information for any purpose other than the performance of this Agreement, to release it only to authorized employees or Sub-consultants requiring such information for the purposes of carrying out this Agreement, and not to release, divulge, publish, transfer, sell, disclose, or otherwise make the information known to any other party without City's express written consent or as provided by law. Consultant agrees to release such information or material only to employees or Sub-consultants who have signed a nondisclosure agreement, the terms of which have been previously approved by City. Consultant agrees to implement physical, electronic, and managerial safeguards to prevent unauthorized access to Confidential Information.

"Personal information" including, but not limited to, "Protected Health Information" (PHI) under Health Insurance Portability And Accountability Act (HIPAA), individuals' names, addresses, phone numbers, birth dates, and social security numbers collected, used, or acquired in connection with this Agreement shall be protected against unauthorized use, disclosure, modification or loss.

HIPAA establishes national minimum standards for the use and disclosure of certain health information. The Consultant must comply with all HIPAA requirements and rules when determined applicable by the City. If City determines that (1) City is a "covered entity" under HIPAA, and that (2) Consultant will perform "business associate" services and activities covered under HIPAA, then at City's request, Consultant agrees to execute City's Agreement in compliance with HIPAA.

Consultant shall ensure its directors, officers, employees, Sub-consultants or agents use personal information solely for the purposes of accomplishing the services set forth herein. Consultant and its Sub-consultants agree not to release, divulge, publish, transfer, sell or otherwise make known to unauthorized persons personal information without the express written consent of the City or as otherwise required by law.

Any breach of this provision may result in termination of the Agreement and demand for return of all personal information. Moreover, Consultant will indemnify and hold the City harmless from and against all losses and damages resulting from any unauthorized or improper disclosure, dissemination or use of the information as a result, in whole or in part, of Consultant's action or inaction.

19. **NONUSE OF INTELLECTUAL PROPERTY OF THIRD PARTIES.** Contractor shall not use, disclose or copy any intellectual property of any third parties in connection with work carried out under this Agreement, except for intellectual property for which Contractor has a license. Contractor shall indemnify and hold City harmless against all claims raised against City based upon allegations that Contractor has wrongfully used intellectual property of others in performing work for City, or that City has wrongfully used intellectual property developed by Contractor pursuant to this Agreement.
20. **WAIVER OR BREACH.** No waiver of any provision of this Agreement shall be deemed, or shall constitute, a waiver of any other provision, whether or not similar, nor shall any such waiver constitute a continuing or subsequent waiver of the same provision. No waiver shall be binding, unless executed in writing by the party making the waiver.
21. **COMPLIANCE WITH LAWS.** Consultant warrants that it shall perform the services required by this Agreement in compliance with all applicable Federal and California employment laws, including, but not limited to, those laws related to minimum hours and wages; occupational health and safety; fair employment and employment practices; workers' compensation insurance and safety in employment; and all other Federal, State and local laws and ordinances applicable to the services required under this Agreement. Consultant shall indemnify and hold harmless City from and against all claims, demands, payments, suits, actions, proceedings, and judgments of every nature and description including attorneys' fees and costs, presented, brought, or recovered against City for, or on account of any liability under any of the above-mentioned laws, which may be incurred by reason of Consultant's performance under this Agreement.
22. **CONFLICT OF INTEREST AND REPORTING.** Consultant shall at all times avoid conflicts of interest or the appearance of a conflict of interest in the performance of this Agreement. If required, Consultant shall comply with the City's Conflict of Interest reporting requirements. Consultant understands that pursuant to Gardena Municipal Code sections 2.24.020H and 2.24.025G, it is forbidden to make any contribution to a candidate or committee of a candidate for a municipal office of the City, or to an officeholder, until the completion of services to be performed under this Agreement.
23. **NON-DISCRIMINATION.** Consultant covenants there shall be no discrimination based upon race, color, creed, religion, sex, marital status, age, handicap, national origin, or ancestry, in activity pursuant to this Agreement.

24. **FORCE MAJEURE.** Consultant shall not be in default for failing to perform in accordance with the terms of this Agreement if such failure arises out of causes beyond the control and without the fault or negligence of Consultant.

25. **ASSIGNMENT.** Consultant shall not assign or subcontract any of its obligations pursuant to this Agreement, nor any part thereof, except for any monies due the Consultant, without the prior written consent of City. Such consent by City shall not be unreasonably withheld. Consultant shall be fully responsible to City for all work performed by assignees or subcontractors.

26. **NOTICES.** Whenever it shall be necessary for either party to serve notice on the other respecting this Agreement, such notice shall be in writing and shall be given by personal service upon the party to be notified, or by deposit of the same in the custody of the United States Postal Service, postage prepaid, addressed to the party to be notified as follows:

To City: City of Gardena
 1700 West 162nd Street
 Gardena, California 90247
 Attn: Allan Rigg
 Director of Public Works

To Consultant: HF&H Consultants, LLC
 2081 Business Center Dr., Suite 265
 Irvine, CA 92612
 Attn: Laith Ezzet, CMC
 Senior Vice President

Notices shall be deemed to have been served upon the date of personal service or three (3) working days after the same has been deposited in the United States Postal Service. Either party may change the information to which notice or communication is to be sent by providing advance written notice to the other party.

27. **LICENSED STATUS.** Consultant shall, at all times during the term of this Agreement, have in full force and effect, all licenses required of it by law, including, but not limited to, a City Business License.

28. **FAMILIARITY WITH WORK.** By executing this Agreement, Consultant warrants that: (1) it has investigated the work to be performed; (2) it has investigated the site of the work and is aware of all conditions there; and (3) it understands the difficulties and restrictions of the work under this Agreement. Should Consultant discover any conditions materially differing from those inherent in the work or as represented by City, it shall immediately inform City and shall not proceed, except at Consultant's own risk, until written instructions are received from City.

29. **PUBLIC RECORD ACT DISCLOSURE.** Consultant has been advised and is aware that this Agreement and all reports, documents, information and data, including, but

not limited to, computer tapes, discs or files furnished or prepared by Consultant, or any of its subcontractors, pursuant to this Agreement and provided to City may be subject to public disclosure as required by the California Public Records Act (California Government Code section 6250 *et seq.*). Exceptions to public disclosure may be those documents or information that qualify as trade secrets, as that term is defined in the California Government Code section 6254.7, and of which Consultant informs City of such trade secret. The City will endeavor to maintain as confidential all information obtained by it that is designated as a trade secret. The City shall not, in any way, be liable or responsible for the disclosure of any trade secret including, without limitation, those records so marked if disclosure is deemed to be required by law or by order of the Court.

30. **MAINTENANCE OF RECORDS.** Consultant shall maintain for a minimum of three (3) years from the completion date of the Services under this Agreement, the following records:

- A. All accounts and records, including personnel, property and financial, adequate to identify and account for all costs pertaining to this Agreement and assume proper accounting for all funds;
- B. Records which establish that Consultant and all subcontractors who render Services under this Agreement are in full compliance with the requirements of this Agreement and all federal, state and local laws and regulations;
- C. Any additional records deemed necessary by City to assume verification of full compliance with this Agreement.
- D. The aforementioned records shall be made available to City or any authorized representative thereof upon request for audit.

31. **BINDING EFFECT.** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

32. **GOVERNING LAW.** This Agreement shall be interpreted and construed according to the laws of the State of California. Any action commenced about this Agreement shall be filed in the appropriate branch of the Los Angeles County Municipal or Superior Court.

33. **SECTION HEADINGS.** The Section headings used in this Agreement are for reference purposes only and shall have no binding effect.

34. **AUTHORITY TO EXECUTE.** The persons executing this Agreement on behalf of the parties warrant that they are duly authorized to execute this Agreement.

35. **ATTORNEY'S FEES.** In the event that legal action is necessary to enforce the provisions of this Agreement, or to declare the rights of the parties hereunder, the parties agree that the prevailing party in the legal action shall be entitled to recover attorney's fees and court costs from the opposing party.

36. **PREPARATION OF AGREEMENT.** Each party acknowledges that it has had an adequate opportunity to review each and every provision in this Agreement and to submit the same to counsel and other consultants for review and comment and that the parties jointly drafted this Agreement. No provision of this Agreement or any Assignment shall be construed more strictly against one party than the other party by reason that one or the other party proposed, drafted or modified such provision or any other existing or proposed provision.
37. **SEVERABILITY.** If any term or portion of this Agreement is held to be invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions of this Agreement shall continue in full force and effect.
38. **ENTIRE AGREEMENT.** This Agreement contains the entire understanding between City and Consultant. Any prior agreement, promises, negotiations or representations not expressly set forth herein are of no force or effect. Subsequent modifications to this Agreement shall be effective only if in writing and signed by both parties. This Agreement may be signed by the parties hereto in separate counterparts, including both counterparts that are executed on paper and counterparts that are in the form of electronic signatures. Electronic signatures include facsimile or email electronic signatures. Each executed counterpart shall be deemed an original. All counterparts, taken together, constitute the executed Agreement. If any term, condition or covenant of this Agreement is held by a court of competent jurisdiction to be invalid, void or unenforceable, the remaining provisions of this Agreement shall be valid and binding.

The parties hereby acknowledge and agree that electronic records and electronic signatures, as well as facsimile signatures, used in connection with the execution of this Agreement and electronic signatures, facsimile signatures or signatures transmitted by electronic mail in so-called pdf format shall be legal and binding and shall have the same full force and effect as if a paper original of this Agreement had been delivered and had been signed using a handwritten signature. City and Consultant (i) agree that an electronic signature, whether digital or encrypted, of a party to this Agreement is intended to authenticate this writing and to have the same force and effect as a manual signature, (ii) intend to be bound by the signatures (whether original, faxed or electronic) on any document sent or delivered by facsimile or, electronic mail, or other electronic means, (iii) are aware that the other party will rely on such signatures, and (iv) hereby waive any defenses to the enforcement of the terms of this Agreement based on the foregoing forms of signature. If this Agreement has been executed by electronic signature, all parties executing this document are expressly consenting under the United States Federal Electronic Signatures in Global and National Commerce Act of 2000 ("E-SIGN") and California Uniform Electronic Transactions Act ("UETA")(Cal. Civ. Code § 1633.1, et seq.), that a signature by fax, email or other electronic means shall constitute an Electronic Signature to an Electronic Record under both E-SIGN and UETA with respect to this specific transaction.

IN WITNESS WHEREOF, City and Consultant have executed this Agreement as of the date first hereinabove set forth.

CITY OF GARDENA

CONSULTANT – HF&H Consultants, LLC

Tasha Cerda, Mayor

Rob Hilton, President

Rob Hilton

ATTEST:

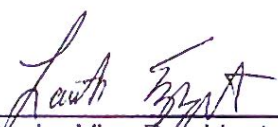
Sign: 
Title: President

Mina Semenza, City Clerk

Laith Ezzet, Senior Vice President

Laith Ezzet

APPROVED AS TO FORM:

Sign: 
Title: Senior Vice President

Carmen Vasquez, City Attorney



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Irvine, California 92612
Telephone: (949) 251-8628
Fax: (949) 251-9741
www.hfh-consultants.com

Robert D. Hilton, Emeritus
John W. Farnkopf, PE
Laith B. Ezzet, CMC
Richard J. Simonson, CMC
Marva M. Sheehan, CPA
Robert C. Hilton, CMC

April 13, 2022

Mr. Allan Rigg, P.E., AICP
Director of Public Works
City of Gardena
1700 West 162nd Street
Gardena, California 92047

Re: Proposal to Provide Solid Waste Consultant Services

Dear Mr. Rigg:

HF&H Consultants (HF&H) is pleased to submit this proposal to the City of Gardena (City) to provide solid waste consultant services. HF&H has a long history of successfully providing these services to jurisdictions throughout California since 1989.

We believe that HF&H brings the following qualifications and benefits to the City:

- 1. We are an industry recognized thought-leader in environmental strategic planning, goal setting, policy development and program implementation.*** Clients of HF&H receive innovative and pragmatic solid waste and recycling plans that have been developed with decade's worth of diverse experience. Our pioneer role in the zero-waste planning field, assisting communities such as the cities of San Diego, Santa Monica, and Livermore, and the County of San Diego, has provided us with an unmatched menu of services and programs, as well as unrivaled implementation experience. This range of experience allows us to develop both short and long-term goals that meet the specific needs of our clients, while maintaining a realistic understanding of the impacts on client costs and diversion.
- 2. HF&H is regarded as the industry expert for SB 1383 compliance.*** In 2019, CalRecycle engaged HF&H to develop a stakeholder input group and create Model SB 1383 Implementation Tools and Guidance. These model tools were developed to support jurisdictions and other regulated entities across the state with implementing programs and policies to reach compliance with SB 1383 regulations. The model tools include a Model Enforcement Ordinance, Model Procurement Policy, Model Franchise Agreement, and Model Food Recovery Agreement. In total, HF&H has worked with over 70 communities throughout California, representing over 7 million residents, continuously adapting compliance to fit a variety of real-world conditions. Our range of experience supporting California jurisdictions with SB 1383 includes, but is not limited to, strategic planning, cost modeling, sole source and competitive procurements, ordinance development, and engagement in the regulatory process.
- 3. We identify the individual needs of our clients.*** At HF&H we partner with key stakeholders, including City Council, City staff, residents, and other applicable parties, to set measurable, achievable goals.


Mr. Allan Rigg
April 13, 2022
Page 2

The purpose of these goals is to meet the specific needs of the community and achieve regulatory compliance while minimizing the financial impact on ratepayers. Again, our experience has helped us develop a vast array of facilitation methods, including online surveys, webinars, live streams, and council workshops. HF&H staff includes SWANA and CRRA certified zero waste instructors.

4. ***HF&H does not provide solid waste consulting services to waste haulers.*** HF&H exclusively provides consulting services to municipalities for the better interest of our clients and to avoid potential conflicts of interest that may arise in firms that attempt to serve public agencies and haulers. We believe this independence is particularly important for objective proposal evaluation and effective negotiations during the procurement of a solid waste services agreement. Additionally, our municipal focus ensures that we are aware of the unique requirements of public officials.

Thank you for the opportunity to provide you with this information. We look forward to an opportunity to continue our partnership with the City. If you have any questions, please contact Debbie Morris at (949) 251-1106 or dmorris@hfh-consultants.com.

Very truly yours,
HF&H CONSULTANTS, LLC



Laith Ezzet, CMC
Senior Vice President



Debbie Morris
Senior Manager

SECTION 1: SCOPE OF WORK

Task 1: Franchise Management

HF&H has developed hauler report monitoring mechanisms to assess increases/decreases in residential curbside recycling and organics diversion, and commercial/multi-family diversion on a monthly basis. Under this contract, HF&H will monitor these programs closely and measure the success of recycling efforts implemented by Waste Resources of Gardena (WRG).

Public education is vital to ensuring the success of the City's diversion programs. The City's pending franchise agreement with WRG contains specific public education and outreach requirements. HF&H will monitor the quantity and quality of public education pieces prepared by WRG, suggest topics for public education pieces, and will review public education pieces for accuracy.

The franchise management task will also include our review of WRG's annual rate increase request. We will review the accuracy of the WRG's calculations, in accordance with the allowable annual increase in the franchise agreement, and document recommended adjustments to the submittal, if applicable.

HF&H shall attend virtual monthly meetings with City staff and WRG to monitor WRG's compliance with contractual requirements and discuss the success of recycling programs and plans to improve waste diversion.

Task 2: Maintenance Activities

HF&H will assist with various waste management-related inquiries and miscellaneous tasks that arise from time to time. These tasks will include legislative research and reporting, monitoring the activities and objectives of the Los Angeles County Integrated Waste Management Task Force ("Task Force"), and providing general solid waste and recycling liaison assistance.

To perform this task, HF&H will:

- Track solid waste legislation, regulations, CalRecycle policy decisions, and other solid waste issues pertinent to the City;
- Provide legislative and regulatory updates and discuss significant items at face-to-face meetings; and,
- Monitor Task Force meetings and initiatives.

This task will also include communication with the City's CalRecycle representative to ensure ongoing compliance with state regulations such as CalGreen, AB 341, AB 827, AB 939, AB 2176 and SB 1383. Additionally, this task may require the development of new programs or the enhancement of existing diversion programs.

Task 3: Coordinate, Promote and Monitor Recycling Programs

HF&H will provide public education support for the commercial, multi-family, and single-family curbside recycling programs to increase the diversion rates in these sectors.

To perform this task, HF&H will:

- Monitor both the commercial/multi-family and the single-family recycling programs throughout the year, including review of monthly tonnage and customer count reports submitted by the contractor, and attendance at monthly meetings with the City and the contractor.
- Prepare public education and outreach materials.

Task 4: Analyze Monthly and Quarterly Reports

HF&H has developed an excel-based program which analyzes the monthly and quarterly reports to be submitted by WRG. Through the use of this program, HF&H can identify potential irregularities and/or inaccuracies of the data submitted via WRG's reports. The program also tracks the progress of AB 939, AB 341, and SB 1383 compliance.

Part 5: Mandatory Commercial Recycling and Organics Regulation Compliance

In 2021, HF&H assisted the City in developing the ordinances required by SB 1383, including the mandatory organics and recycling ordinance. HF&H will track the progress of customer compliance with the mandatory programs. Additionally, HF&H will:

- Assist the City by preparing and submitting, for City approval, public education and outreach materials to encourage participation in the source separated recyclables and organics collection programs.
- Review program participation levels and WRG's outreach and discuss findings during the monthly franchise management meetings with WRG and the City.
- Prepare documentation to be included with the City's Electronic Annual Report (EAR) submitted to CalRecycle and assist the City in responding to other inquiries by CalRecycle.
- Brief the City on new updates to key recycling legislation.

Part 6: SB 1383 Assistance

In addition to the SB 1383 compliance tasks included in previous tasks, HF&H will perform the following to assist the City in complying with SB 1383:

- Review information provided by WRG to confirm that they provide their customers with information on properly separating materials, organic waste prevention, on-site recycling, methane reduction benefits, how to recycle organic waste, self-haul requirements, and edible food donation.
- Develop drafts for review by the City of public education and outreach information for edible food generators. This information will be distributed by the City to the Tier One and Tier Two Edible Food Generator lists provided by WRG.
- HF&H will prepare, for the City's review, the annual SB 1383 compliance report required by 14 CCR 18994.2 based on information available to us. HF&H will submit this electronic report to CalRecycle on behalf of the City by October 1, 2022, and August 1 annually, thereafter.
- On an ongoing basis, maintain all electronic implementation records provided to us in Sharepoint so that they may be accessed by CalRecycle within ten business days of request (14 CCR 18995.2).
- HF&H will utilize CalRecycle's organic waste and edible food recovery capacity planning tools to provide the information to the County on behalf of the City. The initial data is due to the County on June 15, 2022. This will be conducted in accordance with 14 CCR 18992.1, 18992.2, 18992.3 and is due to CalRecycle from the County on August 1, 2022, and August 1, 2024.

Part 7: Recycling and Disposal Reporting System Reconciliation

Governor Brown signed AB 901 (Gordon, Chapter 746, Statutes of 2015) into law to change how organics, recyclable material, and solid waste are reported to CalRecycle. The Recycling and Disposal Facility Reporting System (RDRS) law requires the following businesses to report directly to CalRecycle on a quarterly basis on types, quantities, and destinations of materials that are disposed of, sold, or transferred inside or outside of the state:

- Recycling facilities
- Composting facilities
- Disposal facilities including landfills
- Transformation facilities
- Engineered municipal solid waste conversion facilities
- Transfer/processor facilities
- Contract haulers
- Food waste self-haulers
- Brokers
- Transporters

The RDRS will provide greater transparency of materials reported as originating from the City by these entities.

HF&H will perform the following tasks to review the tonnage and facilities reported on the RDRS:

1. Compare WRG's tonnage reports to the RDRS, identify differences, and request that WRG make the appropriate revisions to their reports.
2. Review facility reports which allocate tonnages to the City.
3. Identify haulers from facility reports that do not have the authority to provide collection services in the City.
4. Prepare letters for the City to send to illegal haulers, requesting them to cease operations in the City.
5. Prepare documentation listing inaccuracies or inconsistencies identified, forward the form and all reference information to CalRecycle and include this information in the EAR.

Part 8: CalRecycle Assistance

1. HF&H will review the City's Electronic Annual Report to CalRecycle prepared by WRG.
2. HF&H will assist the City by responding to questions from CalRecycle and prepare for and participate in the annual conference calls and meetings with CalRecycle.

SECTION 2: FEE PROPOSAL

The City can compensate HF&H for its consulting services through the SB 1383 grant and the AB 939/SB 1383 Regulatory Reimbursement paid by WRG. Section 3.2 of the pending agreement with WRG includes an AB 939/SB 1383 Regulatory Reimbursement of 1.5% of gross revenues collected by WRG. The contract value in 2020 was approximately \$14 million which would equate to over \$200,000 in the Regulatory Reimbursement, and the contract value may increase once the new agreement is implemented.

We will perform the scope of work based on time and materials. Estimated costs for the three proposed periods are as follows:

- April 27, 2022 through June 30, 2022 - \$30,000;
- July 1, 2022 to June 30, 2023 - \$90,000; and,
- July 1, 2023 to June 30, 2024) - \$90,000

The workplans on the following pages itemize hours by task and staff classification. Hours may be shifted among tasks.

We will bill the City once per month based on the number of hours worked and expenses incurred. Payment is due within 30 days of invoicing. Hourly rates are shown below.

Professional Fees

Hourly rates for professional and administrative personnel through December 31, 2022, are as follows and will adjust by 3% each January 1 thereafter:

<u>Position</u>	<u>Rate</u>
Executive	\$300 - \$315
Senior Project Manager	\$285 - \$295
Project Manager	\$240 - \$250
Senior Associate	\$210 - \$225
Associate Analyst	\$160 - \$170
Assistant Analyst	\$145 - \$150
Administrative Staff	\$110 - \$120

Direct Expenses

Standard charges for common direct expenses are as follows:

Automobile Travel	Prevailing IRS mileage rate
Airfare and Public Transit	Actual Cost

Table 1: April 27, 2022 through June 30, 2022

Task Description	Sr. Vice President	Sr. Project Manager	Sr. Associate	Associate	Total Hours
1. Franchise Management					
1A Monitor contractor compliance	2	2	2	4	10
1B Gather, review and analyze contractor's reports		Time included in Task 4			
1C Review public education developed by contractor	-	4	-	8	12
1D Schedule and attend monthly meetings	-	2	2	4	8
1E Maintain and update action items	-	-	-	2	2
Subtotal: Task 1 Hours	2	8	4	18	32
Task 1 Fees	630	2,320	900	3,042	6,892
2. Maintenance Activities					
2A Track solid waste legislation, and policy decisions	-	2	-	-	2
2B Provide regulatory updates	-	2	-	-	2
Subtotal: Task 2 Hours	-	4	-	-	4
Task 2 Fees	\$ -	\$ 1,160	\$ -	\$ -	\$ 1,160
3. Coordinate, Promote and Monitor Recycling Programs					
3A Monitor recycling programs	-	4	4	4	12
3B Prepare public education and outreach materials	-	2	-	3	5
Subtotal: Task 3 Hours	-	6	4	7	17
Task 3 Fees	\$ -	\$ 1,740	\$ 900	\$ 1,183	\$ 3,823
4. Analyze Monthly & Quarterly Reports; Conduct Biennial Audit					
4A Receive and analyze contractor's reports	-	4	4	4	12
4B Track submittal of contractor reports	-	-	-	2	2
4C Review mathematical accuracy of gross receipts reports	-	-	-	3	3
4D Prepare excel document summarizing reports to City	-	12	2	6	20
4E Calculate ratio of gross receipts to tonnage	-	-	-	2	2
Subtotal: Task 4 Hours	-	16	6	17	39
Task 4 Fees	\$ -	\$ 4,640	\$ 1,350	\$ 2,873	\$ 8,863
5. Mandatory Commercial Recycling and Organics Regulation Compliance					
5A Prepare public education and outreach materials	-	-	2	4	6
5B Review program participation	-	-	-	2	2
Subtotal: Task 5 Hours	-	-	2	6	8
Task 5 Fees	\$ -	\$ -	\$ 450	\$ 1,014	\$ 1,464
6. SB 1383 Assistance					
6A Develop public education and outreach to Tier 1 and Tier edible food generators	-	-	1	2	3
6B Maintain implementation records	-	-	2	8	10
6C Provide organics and edible food capacity to County	-	-	4	16	20
Subtotal: Task 6 Hours	-	-	7	26	33
Task 6 Fees	\$ -	\$ -	\$ 1,575	\$ 4,394	\$ 5,969
7 CalRecycle Assistance					
7A Respond to questions from CalRecycle	-	2	-	6	8
Subtotal: Task 7 Hours	-	2	-	6	8
Task 7 Fees	\$ -	\$ 580	\$ -	\$ 1,014	\$ 1,594
Total Hours	2	36	23	80	141
Hourly Rate	\$ 315	\$ 290	\$ 225	\$ 169	
Subtotal	\$ 630	\$ 10,440	\$ 5,175	\$ 13,520	\$ 29,765
Expenses					\$ 235
Total Fees and Expenses					\$ 30,000

* Hours may be shifted among tasks

Table 2: Contract Year 1: July 1, 2022 to June 30, 2023

Task Description	Sr. Vice President	Sr. Project Manager	Sr. Associate	Associate	Total Hours
1. Franchise Management					
1A Monitor contractor compliance	2	6	8	16	32
1B Gather, review and analyze contractor's reports		Time included in Task 4			
1C Review and verify contractor's annual rate adjustment	2	2	8	-	12
1D Review public education developed by contractor	-	-	-	8	8
1E Schedule and attend monthly meetings	2	24	8	24	58
1F Maintain and update action items	-	4	-	12	16
Subtotal: Task 1 Hours	6	36	24	60	126
Task 1 Fees	1,890	10,440	5,400	10,140	27,870
2. Maintenance Activities					
2A Track solid waste legislation, and policy decisions	-	8	-	-	8
2B Provide regulatory updates	-	4	-	-	4
2C Prepare reports and documents	2	4	-	8	14
Subtotal: Task 2 Hours	2	16	-	8	26
Task 2 Fees	\$ 630	\$ 4,640	\$ -	\$ 1,352	\$ 6,622
3. Coordinate, Promote and Monitor Recycling Programs					
3A Monitor recycling programs	-	4	4	4	12
3B Prepare public education and outreach materials	-	2	-	8	10
Subtotal: Task 3 Hours	-	6	4	12	22
Task 3 Fees	\$ -	\$ 1,740	\$ 900	\$ 2,028	\$ 4,668
4. Analyze Monthly & Quarterly Reports; Conduct Biennial Audit					
4A Receive and analyze contractor's reports	-	-	4	16	20
4B Track submittal of contractor reports	-	-	-	4	4
4C Review mathematical accuracy of gross receipts reports	-	-	2	4	6
4D Maintain excel document summarizing reports to City	-	-	-	4	4
4E Calculate ratio of gross receipts to tonnage	-	-	-	4	4
Subtotal: Task 4 Hours	-	-	6	32	38
Task 4 Fees	\$ -	\$ -	\$ 1,350	\$ 5,408	\$ 6,758
5. Mandatory Commercial Recycling and Organics Regulation Compliance					
5A Prepare public education and outreach materials	-	2	2	8	12
5B Review program participation	1	4	2	6	13
5C Brief City on program updates	-	4	-	-	4
Subtotal: Task 5 Hours	1	10	4	14	29
Task 5 Fees	\$ 315	\$ 2,900	\$ 900	\$ 2,366	\$ 6,481
6. SB 1383 Assistance					
6A Develop public education and outreach to Tier 1 and Tier edible food generators	-	-	6	16	22
6B Prepare annual compliance report	-	4	8	40	52
6C Maintain implementation records	-	2	8	32	42
6D Provide organics and edible food capacity to County	-	4	-	16	20
Subtotal: Task 6 Hours	-	10	22	104	136
Task 6 Fees	\$ -	\$ 2,900	\$ 4,950	\$ 17,576	\$ 25,426
7 Disposal Report Reconciliation					
7A Compare contractor's tonnage to RDRS	-	-	16	4	20
7B Identify haulers from RDRS not authorized to collect in City	-	-	-	4	4
7C Prepare disposal report reconciliation correspondence	-	2	-	8	10
7D Prepare Disposal Modification Forms and submit to CalRecycle	-	2	-	4	6
Subtotal: Task 7 Hours	-	4	16	20	40
Task 7 Fees	\$ -	\$ 1,160	\$ 3,600	\$ 3,380	\$ 8,140
8 CalRecycle Assistance					
8A Respond to questions from CalRecycle and prepare for and participate in annual meetings	-	4	-	16	20
Subtotal: Task 8 Hours	-	4	-	16	20
Task 8 Fees	\$ -	\$ 1,160	\$ -	\$ 2,704	\$ 3,864
Total Hours	9	86	76	266	437
Hourly Rate	\$ 315	\$ 290	\$ 225	\$ 169	
Subtotal	\$ 2,835	\$ 24,940	\$ 17,100	\$ 44,954	\$ 89,829
Expenses					\$ 171
Total Fees and Expenses					\$ 90,000

* Hours may be shifted among tasks

Table 3: Contract Year 2 – July 1, 2023 – June 30, 2024

Task Description	Sr. Vice President	Sr. Project Manager	Sr. Associate	Associate	Total Hours
1. Franchise Management					
1A Monitor contractor compliance	2	6	8	16	32
1B Gather, review and analyze contractor's reports		Time included in Task 4			
1C Review and verify contractor's annual rate adjustment	2	2	8	-	12
1D Review public education developed by contractor	-	-	-	8	8
1E Schedule and attend monthly meetings	2	24	8	24	58
1F Maintain and update action items	-	4	-	12	16
Subtotal: Task 1 Hours	6	36	24	60	126
Task 1 Fees	1,938	10,692	5,544	10,380	28,554
2. Maintenance Activities					
2A Track solid waste legislation, and policy decisions	-	8	-	-	8
2B Provide regulatory updates	-	4	-	-	4
2C Prepare reports and documents	2	4	-	8	14
Subtotal: Task 2 Hours	2	16	-	8	26
Task 2 Fees	\$ 646	\$ 4,752	\$ -	\$ 1,384	\$ 6,782
3. Coordinate, Promote and Monitor Recycling Programs					
3A Monitor recycling programs	-	6	4	4	14
3B Prepare public education and outreach materials	-	2	-	8	10
Subtotal: Task 3 Hours	-	8	4	12	24
Task 3 Fees	\$ -	\$ 2,376	\$ 924	\$ 2,076	\$ 5,376
4. Analyze Monthly & Quarterly Reports; Conduct Biennial Audit					
4A Receive and analyze contractor's reports	-	-	4	16	20
4B Track submittal of contractor reports	-	-	-	4	4
4C Review mathematical accuracy of gross receipts reports	-	-	2	4	6
4D Maintain excel document summarizing reports to City	-	-	-	4	4
4E Calculate ratio of gross receipts to tonnage	-	-	-	4	4
Subtotal: Task 4 Hours	-	-	6	32	38
Task 4 Fees	\$ -	\$ -	\$ 1,386	\$ 5,536	\$ 6,922
5. Mandatory Commercial Recycling and Organics Regulation Compliance					
5A Prepare public education and outreach materials	-	2	2	8	12
5B Review program participation	1	4	2	6	13
5C Brief City on program updates	-	4	-	-	4
Subtotal: Task 5 Hours	1	10	4	14	29
Task 5 Fees	\$ 323	\$ 2,970	\$ 924	\$ 2,422	\$ 6,639
6. SB 1383 Assistance					
6A Develop public education and outreach to Tier 1 and Tier edible food generators	-	-	4	16	20
6B Prepare annual compliance report	1	2	8	36	47
6C Maintain implementation records	-	2	4	32	38
6D Provide organics and edible food capacity to County	-	2	-	16	18
Subtotal: Task 6 Hours	1	6	16	100	123
Task 6 Fees	\$ 323	\$ 1,782	\$ 3,696	\$ 17,300	\$ 23,101
7 Disposal Report Reconciliation					
7A Compare contractor's tonnage to RDRS	-	-	16	4	20
7B Identify haulers from RDRS not authorized to collect in City	-	-	-	4	4
7C Prepare disposal report reconciliation correspondence	-	2	-	8	10
7D Prepare Disposal Modification Forms and submit to CalRecycle	-	2	-	4	6
Subtotal: Task 7 Hours	-	4	16	20	40
Task 7 Fees	\$ -	\$ 1,188	\$ 3,696	\$ 3,460	\$ 8,344
8 CalRecycle Annual Report					
8A Respond to questions from CalRecycle and prepare for and participate in annual meetings	-	4	-	16	20
Subtotal: Task 8 Hours	-	4	-	16	20
Task 8 Fees	\$ -	\$ 1,188	\$ -	\$ 2,768	\$ 3,956
Total Hours	10	84	70	262	426
Hourly Rate	\$ 323	\$ 297	\$ 231	\$ 173	
Subtotal	\$ 3,230	\$ 24,948	\$ 16,170	\$ 45,326	\$ 89,674
Expenses					\$ 326
Total Fees and Expenses					\$ 90,000

* Hours may be shifted among tasks



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 15.B
Section: DEPARTMENTAL
ITEMS - PUBLIC WORKS
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: RESOLUTION NO. 6554, Approving the Engineer's Report for the Gardena Artesia Boulevard Landscaping Assessment District for fiscal year 2022-2023, declaring its intention to levy and collect assessments under the Gardena Artesia Boulevard Landscaping Assessment District for fiscal year 2022-2023, and setting a time and place for hearing protests in relation thereto (Public Hearing: May 24, 2022)

COUNCIL ACTION REQUIRED:

Staff Recommendation: Adopt Resolution No. 6554

RECOMMENDATION AND STAFF SUMMARY:

Staff respectfully recommends that Council adopt Resolution No. 6554 approving the Engineer's Report pursuant to the requirements of Resolution 6552, regarding the Gardena Artesia Boulevard Landscaping Assessment District for fiscal year 2022-2023, declaring its intention to levy and collect assessments under the Gardena Artesia Boulevard Landscaping Assessment District for the fiscal year 2022-2023, and appointing a time and place for hearing protests in relation thereto (Public Hearing: May 24, 2022).

Artesia Boulevard Landscaping Assessment District between Normandie Avenue and Dalton Avenue was established and commenced in fiscal year 1994-1995 and Artesia Boulevard Landscaping Assessment District between Denker Avenue and Western Avenue was established and commenced in fiscal year 2001-2002.

The assessment will pay for the servicing and maintenance costs of landscaping and appurtenant improvements within the median island on Artesia Boulevard between Western Avenue and Normandie Avenue.

FINANCIAL IMPACT/COST:

Budget Amount: \$21,662

Funding Source: Assessment District

ATTACHMENTS:

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio", is written on a light gray rectangular background.

Clint Osorio, City Manager

CITY OF GARDENA

GARDENA ARTESIA BOULEVARD LANDSCAPING ASSESSMENT DISTRICT

ENGINEER'S REPORT

2022-2023

April 26, 2022

CITY OF GARDENA

GARDENA ARTESIA BOULEVARD LANDSCAPING ASSESSMENT DISTRICT

ENGINEER'S REPORT

2022-2023

Prepared according to the provisions of the Landscaping and Lighting Act of 1972, Sections 22500 through 22679 of the California Streets and Highways Code.

According to Part 2 of Division 15 of the Streets and Highways Code of the State of California, and as directed by resolution of the City Council of the City of Gardena, the City Engineer of the City of Gardena has prepared and submits the Engineer's Report consisting of the following:

1. Vicinity Map
2. Diagram of District
3. Plans and Specifications
4. Estimate of Costs of Maintenance
5. Assessment of Estimated Cost

This report is prepared by:



NV5, INC.

JEFFREY M. COOPER, P.E.
R.C.E. No. 31572
ENGINEER OF WORK
CITY OF GARDENA
STATE OF CALIFORNIA

Dated: April 26, 2022

LOS ANGELES COUNTY

HAWTHORNE

EL
BLVD

SEGUNDO
AVE.

AVE.

AVE.

BLVD

AVE.

135 th

ST.

ROSECRANS

AVE.

CRENSHAW

MARINE

VAN NESS

AVE.

BERENDO
AVE.

VERMONT

CITY OF LOS ANGELES

MANHATTAN
BEACH BLVD.

BEACH

BLVD.

BLVD

REDONDO
AVE.

158 th ST.

MAGNOLIA
AVE.

161st ST.

AVE.

164th

162 nd
ST.

P.W.

F.D.

M.C.

F.D.

C.H.

GARDENA

BLVD

166 th

ST.

168th ST.

170 th ST.

TORRANCE

**DISTRICT
LOCATION**

ARTESIA

GRAMERCY

BLVD.

CRENSHAW

VAN NESS

WESTERN

DENKER AVE.

DALTON AVE.

NORMANDIE

ST.

VERMONT

182 nd

ELECTRIC ST.

TORRANCE

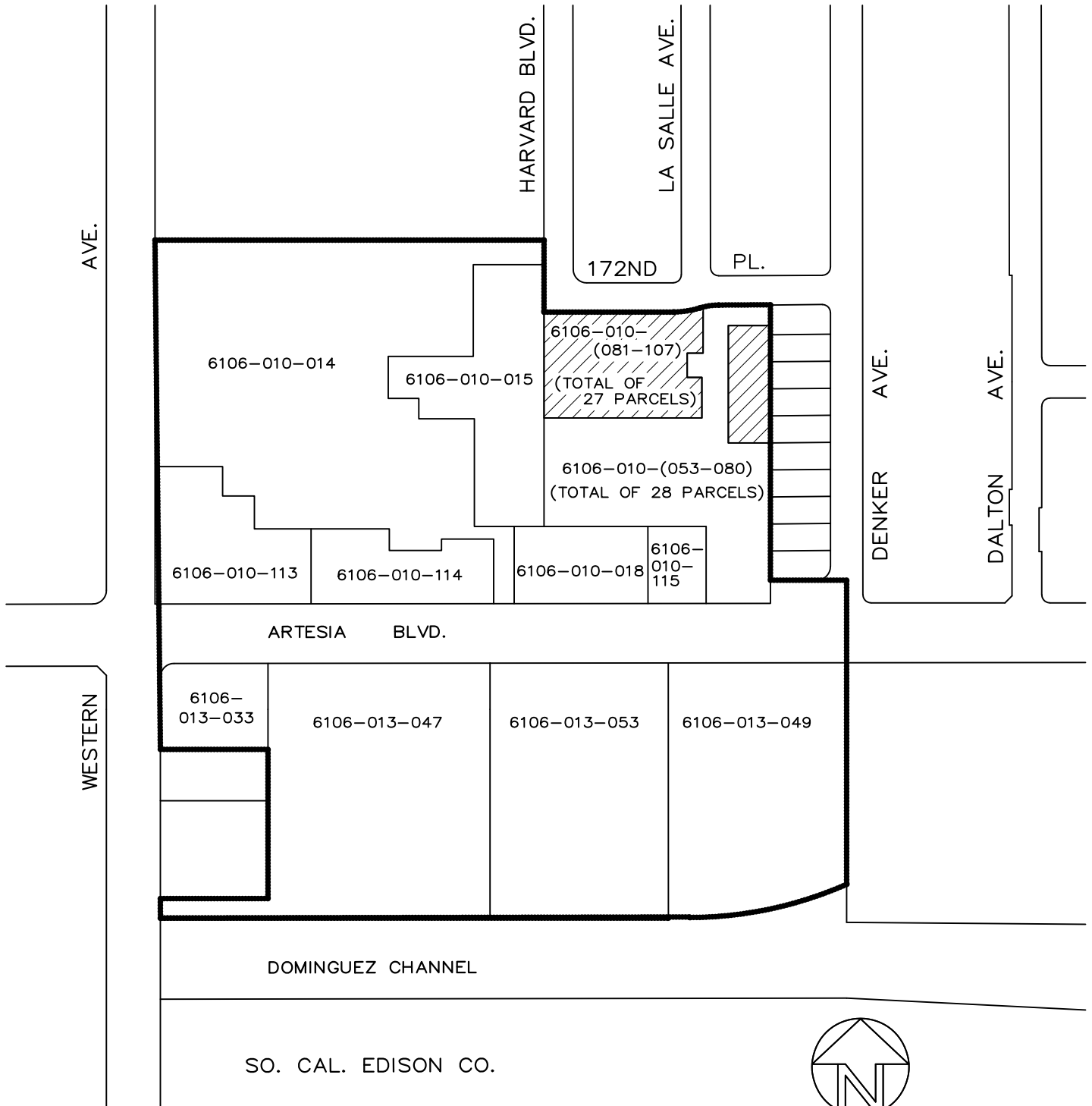
CITY OF LOS ANGELES

NTS

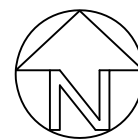
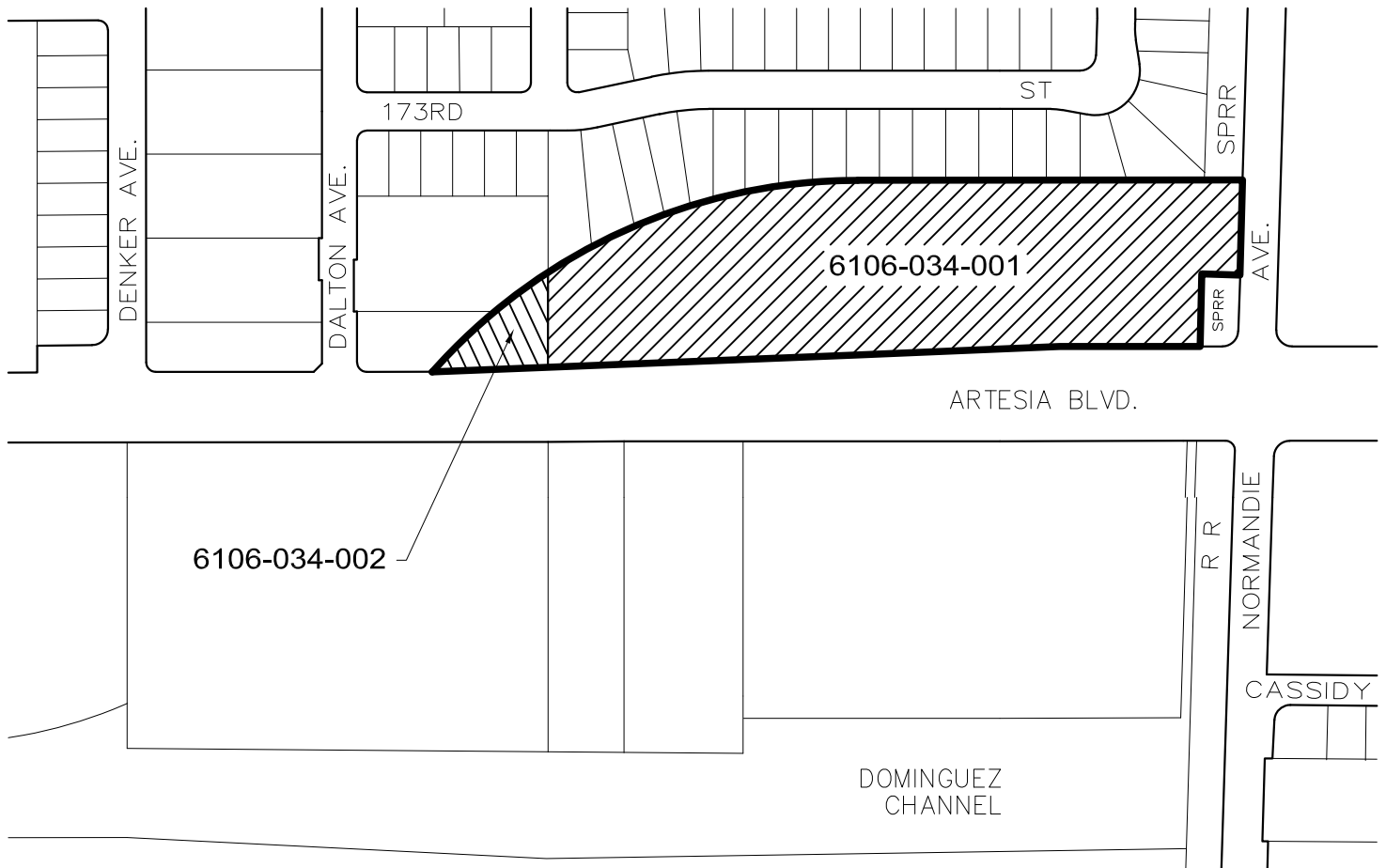
VICINITY MAP

ARTESIA BLVD LANDSCAPING DISTRICT
YEAR 2022 - 2023

ASSESSMENT DIAGRAM & BOUNDARY MAP
ARTESIA BOULEVARD LANDSCAPING ASSESSMENT DISTRICT
WESTERN AVE. - DENKER AVE.
FISCAL YEAR 2022 - 2023



ASSESSMENT DIAGRAM & BOUNDARY MAP
ARTESIA BOULEVARD LANDSCAPING ASSESSMENT DISTRICT
DALTON AVE. - NORMANDIE AVE.
FISCAL YEAR 2022 - 2023



PLANS AND SPECIFICATIONS 2022-2023

Plans and specifications for the improvements provided by the Gardena Artesia Boulevard Landscaping Assessment District are on file in the office of the Public Works Director/City Engineer and incorporated into this report by reference. The plans detail the improvement on Artesia Boulevard between Western Avenue and Denker Avenue, and between Dalton Avenue and Normandie Avenue. The improvements are the construction, servicing and maintenance of landscaping and appurtenant improvements within the median islands on Artesia Boulevard between Western Avenue and Denker Avenue, and between Dalton Avenue and Normandie Avenue. The maintenance and servicing for the improvements include, but are not limited to, personnel, electrical energy, and utilities such as water, materials, contracting services, and other items necessary for the satisfactory servicing and maintenance of these services.

ESTIMATE OF COSTS OF MAINTENANCE AND SERVICING

The cost of the maintenance and servicing of the improvement was determined by the costs of the annual contractual services for the landscaped median, including personnel, electrical energy, and utilities such as water, materials, and other items necessary for the satisfactory servicing and maintenance of the landscaped median.

**ESTIMATE OF COST
WESTERN AVENUE - DENKER AVENUE
FY 2022-2023**

The 1972 Act provides that the total cost of the maintenance and services, together with incidental expenses, may be financed from the assessments proceeds. The incidental expenses may include engineering fees, legal fees, printing, mailing, postage, publishing, and all other related costs identified with the district proceedings.

Item	Description	Estimated Costs	Prorated Incidental Costs	Estimated Total Costs
A.	Landscaping Construction, Western to Denker	\$63,643		
	Additional Median Design	\$ 3,600		\$76,791
	Construction Mgmt Costs @ 15%	\$ 9,548		
B.	1st Annual Payment @ 7% Interest over 5 years	\$18,728	\$26,138	\$44,866
C.	Annual Landscape Maintenance, Western to Denker	\$ 4,200	\$ 5,862	\$10,062
		\$99,719	\$32,000	\$131,719

Items A and B are shown for reference only. Item C is the annual landscape maintenance on Artesia Blvd. between Western Ave. and Denker Ave. in the amount of \$10,062.

The 1972 Act requires that a special fund be set-up for the revenues and expenditures of the District. Funds raised by assessment shall be used only for the purpose as stated herein. The City may advance funds to the District, if needed, to ensure adequate cash flow, and will be reimbursed for any such advances upon receipt of assessments. Any surplus or deficit remaining on July 1 must be carried over to the next fiscal year.

CITY OF GARDENA
ARTESIA BLVD.
LANDSCAPING
ASSESSMENT DISTRICT
FISCAL YEAR 2022-2023

CALCULATION OF ASSESSMENT
Western Ave. - Denker Ave.

ASSESSOR'S PARCEL NUMBER	ACREAGE	ASSESSMENT
6106010014	6.430	\$1,909.00
6106010015	1.300	\$386.00
6106010018	0.875	\$260.00
6106010053	0.096	\$28.42
6106010054	0.096	\$28.42
6106010055	0.096	\$28.42
6106010056	0.096	\$28.42
6106010057	0.096	\$28.42
6106010058	0.096	\$28.42
6106010059	0.096	\$28.42
6106010060	0.096	\$28.42
6106010061	0.096	\$28.42
6106010062	0.096	\$28.42
6106010063	0.096	\$28.42
6106010064	0.096	\$28.42
6106010065	0.096	\$28.42
6106010066	0.096	\$28.42
6106010067	0.096	\$28.42
6106010068	0.096	\$28.42
6106010069	0.096	\$28.42
6106010070	0.096	\$28.42
6106010071	0.096	\$28.42
6106010072	0.096	\$28.42
6106010073	0.096	\$28.42
6106010074	0.096	\$28.42
6106010075	0.096	\$28.42
6106010076	0.096	\$28.42
6106010077	0.096	\$28.42
6106010078	0.096	\$28.42
6106010079	0.096	\$28.42
6106010080	0.096	\$28.42
6106010081	0.096	\$28.42
SUB-TOTAL		\$3,379.18

CITY OF GARDENA
ARTESIA BLVD.
LANDSCAPING
ASSESSMENT DISTRICT
FISCAL YEAR 2022-2023

CALCULATION OF ASSESSMENT
Western Ave. - Denker Ave.

ASSESSOR'S PARCEL NUMBER	ACREAGE	ASSESSMENT
6106010082	0.096	\$28.42
6106010083	0.096	\$28.42
6106010084	0.096	\$28.42
6106010085	0.096	\$28.42
6106010086	0.096	\$28.42
6106010087	0.096	\$28.42
6106010088	0.096	\$28.42
6106010089	0.096	\$28.42
6106010090	0.096	\$28.42
6106010091	0.096	\$28.42
6106010092	0.096	\$28.42
6106010093	0.096	\$28.42
6106010094	0.096	\$28.42
6106010095	0.096	\$28.42
6106010096	0.096	\$28.42
6106010097	0.096	\$28.42
6106010098	0.096	\$28.42
6106010099	0.096	\$28.42
6106010100	0.096	\$28.42
6106010101	0.096	\$28.42
6106010102	0.096	\$28.42
6106010103	0.096	\$28.42
6106010104	0.096	\$28.42
6106010105	0.096	\$28.42
6106010106	0.096	\$28.42
6106010107	0.096	\$28.42
6106010113	0.854	\$253.45
6106010114	0.917	\$272.55
6106010115	0.384	\$113.68
SUB-TOTAL		\$1,378.60

CITY OF GARDENA

ARTESIA BLVD. LANDSCAPING
ASSESSMENT DISTRICT

FISCAL YEAR 2022-2023

CALCULATION OF ASSESSMENT

Western Ave. - Denker Ave.

ASSESSOR'S PARCEL NUMBER	FRONTAGE	ASSESSMENT
6106013033	199.000	\$831.00
6106013047	411.000	\$1,717.00
6106013049	330.000	\$1,378.00
6106013053	330.000	\$1,378.00
SUB-TOTAL		\$5,304.00
GRAND TOTAL		\$10,061.78

ESTIMATE OF COST
DALTON AVENUE - NORMANDIE AVENUE
FY 2022-2023

The estimated cost of the construction, operation, servicing and maintenance of the improvements are summarized below. Only construction costs for median landscaping between Normandie Avenue and Dalton Avenue have been included. All costs include administration and utilities where applicable.

A.	Median Landscaping Construction (see details next page)	\$ 127,400
	+ Contingencies ($\pm 10\%$)	12,700
	City Administration	<u>10,000</u>
		\$ 150,100
 B.	 Median Landscaping Maintenance	 \$ 11,600

Item A is shown for reference only. Item B is the annual landscape maintenance on Artesia Blvd. between Dalton Ave and Normandie Ave in the amount of \$11,600.

The 1972 Act requires that a special fund be set-up for the revenues and expenditures of the District. Funds raised by assessment shall be used only for the purpose as stated herein. A contribution to the District by the City may be made to reduce assessments, as the City Council deems appropriate. Any balance or deficit remaining on July 1 must be carried over to the next fiscal year.

CITY OF GARDENA
ARTESIA BLVD. LANDSCAPING
ASSESSMENT DISTRICT
FISCAL YEAR 2022-2023
ACCT. # 152.53

CALCULATION OF ASSESSMENT

Dalton Avenue - Normandie Avenue

ASSESSOR'S PARCEL NUMBER	FRONTAGE (FT)	ASSESSMENT
6106-034-001	1028.46	\$9,897.00
6106-034-002	176.94	\$1,703.00
TOTAL	1205.40	<u>\$11,600.00</u>

RESOLUTION NO. 6554

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, APPROVING THE ENGINEER'S REPORT FOR THE GARDENA ARTESIA BOULEVARD LANDSCAPING ASSESSMENT DISTRICT FOR FISCAL YEAR 2022-2023, DECLARING ITS INTENTION TO LEVY AND COLLECT ASSESSMENTS UNDER THE GARDENA ARTESIA BOULEVARD LANDSCAPING ASSESSMENT DISTRICT FOR THE FISCAL YEAR 2022-2023, AND SETTING A TIME AND PLACE FOR HEARING PROTESTS IN RELATION THERETO (PUBLIC HEARING: May 24, 2022)

WHEREAS, the City of Gardena, California, previously established the Gardena Artesia Boulevard Landscaping Assessment District and;

WHEREAS, on Feb. 22, 2022, the City Council of the City of Gardena, California, adopted Resolution No. 6552 that requires City Council to direct the City Engineer to prepare and file a report according to the provisions of the "Landscaping and Lighting Act of 1972" of the State of California Streets and Highways Code, Division 15, Part 2, for assessments to be levied upon and collected through the Gardena Artesia Boulevard Landscaping Assessment District for fiscal year 2022-2023, and;

WHEREAS, the Engineer's Report bearing the date of April 26, 2022, was prepared and was filed in the office of the City Clerk, and;

WHEREAS, the City Clerk has presented the Engineer's Report to the City Council, and said Council has examined and considered the Engineer's Report and is satisfied with all the items contained in Engineer's Report, and;

WHEREAS, the City Council of the City of Gardena, California, proposes to levy and collect annual assessments according to the "Landscaping and Lighting Act of 1972" of the State of California Streets and Highways Code, Division 15, Part 2, for Fiscal Year 2022-2023

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, DOES HEREBY FIND, DETERMINE, AND RESOLVE, AS FOLLOWS:

SECTION 1. That the Engineer's Report bearing the date of April 26, 2022, was prepared and filed with the City Clerk in conformity with the provisions of the State of California Streets and Highways Code, Division 15, Part 2, Landscaping and Lighting Act of 1972. The Engineer's Report contains the plans and specifications for the maintenance of the improvements, an estimate of the costs of the maintenance and servicing, a diagram for the assessment district and an assessment of the estimated costs of the maintenance and servicing of the improvements.

SECTION 2. The City Council approves the Engineer's Report as filed and sets a public hearing for Tuesday, May 24, 2022, at 7:30 p.m., in the Gardena City Council Chambers, 1700 West 162nd Street, in the City of Gardena, California, to consider the levy and collection of the assessment for the Gardena Artesia Boulevard Landscaping Assessment District for Fiscal Year 2022-2023.

SECTION 3. The City Clerk or designee is authorized and directed to give notice of the hearing in time, form, and manner as required by the California Streets and Highways Code, Division 15, Part 2, Landscaping and Lighting Act of 1972.

SECTION 4. That the City Council declares its intention to levy upon and collect assessments at the same rate as previously established through the Gardena Artesia Boulevard Landscaping Assessment District for Fiscal Year 2022-2023, except that no assessments shall be imposed upon property owned by the state or federal government or any local agency.

SECTION 5. That the boundaries of the Gardena Artesia Boulevard Landscaping Assessment District are as shown and described in the attached map and incorporated by reference.

SECTION 6. That the purposes of the District are those provided for in the Engineer's Report on file with the City Clerk.

SECTION 7. That this resolution shall be effective immediately.

BE IT FURTHER RESOLVED that the City Clerk shall certify to the passage and adoption of this Resolution; shall cause the same to be entered among the original Resolutions of said City; and shall make a minute of the passage and adoption thereof in the records of the proceedings of the City Council of said City in the minutes of the meeting at which the same is passed and adopted.


Passed, approved, and adopted this _____ day of _____, 2022.

TASHA CERDA, Mayor

ATTEST:

MINA SEMENZA, City Clerk

APPROVED AS TO FORM:



CARMEN VASQUEZ, City Attorney



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 15.C
Section: DEPARTMENTAL
ITEMS - PUBLIC WORKS
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: RESOLUTION NO. 6555, Approving the Engineer's Report for the Gardena Consolidated Street Lighting Assessment District for fiscal year 2022-2023, declaring its intention to levy and collect assessments under the Gardena Consolidated Street Lighting District for fiscal year 2022-2023, and setting a time and place for hearing protests in relation thereto (Public Hearing: May 24, 2022)

COUNCIL ACTION REQUIRED:

Staff Recommendation: Adopt Resolution No. 6555

RECOMMENDATION AND STAFF SUMMARY:

Staff respectfully recommends that Council adopt Resolution No. 6555 approving the Engineer's Report for the Gardena Consolidated Street Lighting Assessment District for fiscal year 2022-2023, declaring its intention to levy and collect assessments for fiscal year 2022-2023 and setting at time and place for a Public Hearing thereon (Public Hearing: May 24, 2022).

On July 28, 2009, the City Council approved and confirmed an increase in the assessment of the City of Gardena's Consolidated Street Lighting District through Proposition 218 proceedings, and as described in the attached Engineer's Report.

The Consolidated Street Lighting District pays for all energy costs, construction and maintenance costs of the street lighting.

FINANCIAL IMPACT/COST:

Budget Amount: \$836,545

Funding Source: Assessment District

ATTACHMENTS:

[Gardena SLD Engineer's Report 2022-23.pdf](#)
[Resolution No. 6555.pdf](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio", is centered within a light gray rectangular box.

Clint Osorio, City Manager

CITY OF GARDENA

CONSOLIDATED STREET LIGHTING ASSESSMENT DISTRICT

ENGINEER'S REPORT

2022-2023

April 26, 2022

ENGINEER'S REPORT

CITY OF GARDENA
CONSOLIDATED STREET LIGHTING DISTRICT
FISCAL YEAR 2022-2023

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Summary	5
Report	7
Part A: Description of Improvements	7
Part B: Estimate of Cost	8
Part C: Assessment District Diagram	10
Part D: Method of Apportionment of Assessment	11
Part E: Property Owner List & Assessment Poll	12
Part F: Financial Study	13
Appendix A: Financial Study Detail	15

ENGINEER'S REPORT

CITY OF GARDENA
CONSOLIDATED STREET LIGHTING ASSESSMENT DISTRICT

FISCAL YEAR 2022-2023

The undersigned acting on behalf of the City of Gardena, respectfully submits the enclosed Engineer's Report as directed by the Gardena City Council pursuant to the provisions of Article XIID, Section 4 of the California Constitution, provisions of the Landscaping and Lighting Act of 1972, and Section 22500 et al of the California Streets and Highways Code. The undersigned certifies that he is a Professional Engineer, registered in the State of California.

DATED:

April 26, 2022



BY:  Jeffrey M. Cooper, P.E.

P.E. No. 31572

I HEREBY CERTIFY that the enclosed Engineer's Report, together with Assessment Roll and Assessment Diagram was filed with me on the _____ day of _____, 2022.

Mina Semenza, City Clerk
City of Gardena, Los Angeles
County, California

By:

I HEREBY CERTIFY that the enclosed Engineer's Report, together with Assessment Roll and Assessment Diagram was approved and confirmed by the City Council of the City of Gardena, Los Angeles, California, on the _____ day of _____, 2022.

Mina Semenza, City Clerk, City of
Gardena, Los Angeles County,
California

By:

DEFINITION & GENERAL INFORMATION

Assessment District

An Assessment District is a financing mechanism under The California Streets and Highways Code, Division 10 and 12, which enables cities, counties, and special districts organized for the purpose of aiding in the development or improvement to, or within the district, to designate specific areas as Assessment Districts, with the approval of a majority of the landowners based on financial obligations, and allows these Districts to collect funds to finance maintenance efforts or construct improvements. Assessment Districts help each property owner pay a fair share of the costs of such improvements or maintenance obligations over a period of years at reasonable rates and insures that the cost will be spread to all properties that receive direct and special benefit by the improvements constructed or maintained. "Assessment" means any levy or charge by an agency upon real property that is based upon the special benefit conferred upon the real property by a public improvement or service that is imposed to pay the capital cost of the public improvement, the maintenance and operation expenses of the public improvement, or the cost of the service being provided. "Assessment" includes, but is not limited to, "Special Assessment," "Benefit Assessment," and "Maintenance Assessment."

Current Annual Administration

As required by the Landscaping and Lighting Act of 1972, this Engineer's Report describes the improvements to be operated, maintained, and serviced by the District, provides an estimated budget for the District, describes the properties and zones of benefit within the District, describes the method used to allocate the costs to the benefiting properties within the District, and lists the proposed assessments to be levied upon each assessable lot or parcel within the District.

Plans and specifications for the improvements provided by the District are on file in the office of the Public Works Engineering Division and are incorporated into this report by reference. The plans and specifications detail the location, class and type of each existing street lighting fixture. The fixtures are delineated on a plan of the City and the site of each fixture is detailed indicating attributes of the fixture. The attributes include the intensity of the lamp and type of light. A summary is also incorporated listing the number and totals for each type of luminaries.

Payment of the assessment is placed on each property owner's secured property tax roll bill. All funds collected through the assessment must be placed in a special fund and can only be used for the purposes stated in this report.

**ENGINEER'S REPORT PREPARED PURSUANT TO THE PROVISIONS OF THE
LANDSCAPING AND LIGHTING ACT OF 1972
SECTION 22500 THROUGH 22679
OF THE CALIFORNIA STREETS AND HIGHWAYS CODE**

Pursuant to Part 2 of Division 15 of the Streets and Highways Code of the State of California, and in accordance with the Resolution of Initiation adopted by the Council of the City of Gardena, County of Los Angeles, State of California, in connection with the proceedings for:

**CITY OF GARDENA
CONSOLIDATED STREET LIGHTING ASSESSMENT DISTRICT**

Herein after referred to as the "Assessment District" or "District", I, Jeffrey M. Cooper, P.E., the duly appointed ENGINEER OF WORK, submit herewith the "Report" consisting of six (6) parts as follows:

PART A: DESCRIPTION OF IMPROVEMENTS

Part A describes the improvements in the District. Plans and specifications for the improvements showing and describing the general nature, location, and extent of the improvements are on file in the Office of the City Clerk of the City of Gardena; and are incorporated herein by reference.

PART B: ESTIMATE OF COST

Part B contains an estimate of the cost of the proposed improvements for FY 2022-2023, including incidental costs and expenses in connection therewith.

PART C: ASSESSMENT DISTRICT DIAGRAM

The Diagram of the Assessment District Boundaries showing the exterior boundaries of the Assessment District, the boundaries of any zones within the Assessment District, and the lines and dimensions of each lot or parcel of land within the Assessment District.

The lines and dimensions of each lot or parcel within the Assessment District are those lines and dimensions shown on the maps of the Assessor of the County of Los Angeles for the year when this Report was prepared. The Assessor's maps and records are incorporated by reference herein and made part of this Report.

PART D: METHOD OF APPORTIONMENT OF ASSESSMENTS

The method of apportionment of assessments, indicating the proposed assessment of the total amount of the costs and expenses of the improvements upon the several lots and parcels of land within the Assessment District, in proportion to the estimated benefits to be received by such lots and parcels.

PART E: PROPERTY OWNER LIST & ASSESSMENT ROLL

Part E includes a list of the names and addresses of the owners of real property within the Assessment District, as shown on the last equalized roll of the Assessor of the County of Los Angeles are included in Part E. The list is keyed to the records of the County Assessor of the County of Los Angeles, which are incorporated herein by reference.

PART F: FINANCIAL STUDY AND PROPOSED RATE INCREASE

Part F includes the Financial Study performed for fiscal year 2022-2023 of the base year. This section includes detailed information regarding the proposed rate increase for the District for the fiscal year and provides estimates for future years.

PART A

DESCRIPTION OF IMPROVEMENTS

The facilities, which have been constructed within the boundaries of the City of Gardena District, and those which may be subsequently constructed, will be operated, maintained and serviced as generally described as follows:

**DESCRIPTION OF IMPROVEMENTS
FISCAL YEAR 2022-2023**

**CITY OF GARDENA
CONSOLIDATED STREET LIGHTING ASSESSMENT DISTRICT**

The facilities to be maintained and serviced include an annexed area called the West Gardena area in 1995. The costs for the street lighting were paid through the County of Los Angeles by an ad valorem tax and assessment. The lighting costs were transferred to the City of Gardena in 1997 after the removal of the County Lighting District and Assessment District. The ad valorem tax charge of the County for lighting was also transferred to the City of Gardena to fund the lighting costs in this area in 1997. The plans for lighting reflect the addition of the new lighting.

The plans and specifications for the improvements, showing and describing the general nature, location and the extent of the improvements, are on file in the office of Public Works, and are incorporated herein by reference.

PART B

ESTIMATE OF COST

The 1972 Act provides that the total cost of installation, construction, operation, maintenance and servicing of the improvements described in Part A can be recovered by the District. Maintenance can include the repair and replacement of existing facilities. Servicing can include electrical and associated costs from a public utility. Incidental expenses, including administration of the District, engineering fees, legal fees, printing, posting and mailing of notices, and all other costs associated with the annual assessment process can also be included.

The estimated costs of the operation, servicing and maintenance of the improvements for Fiscal Year 2022-2023, as described in Part A, are summarized herein, and described in the Proposed Budgets on the subsequent pages.

The significant increases in energy costs experienced in early 2001 are expected to continue through 2022-2023. The City had anticipated increases in energy costs for several years and had set aside reserves to pay for the increases. However, the depletion of this reserve has warranted an increase in assessments.

The City of Gardena, in 2009-2010 fiscal year increased the assessment by conducting an assessment ballot (Proposition 218) proceeding by mailed ballots for approval of the increase, in accordance with Section 53753 of the Government Code and Section 4000 of the Election's Code.

The increase in assessments in the FY2009-2010 did not allow the District to wipe out its negative reserve in the 2010-2011 and 2011-2012 fiscal years; however, for 2012-2013 fiscal year, with 2.09% increase, the reserve started a modest gain; and for 2021-2022 fiscal year, with projected 0.9% increase the District is also projected to build up reserves in the positive. The projected 7.5% increase for the District will further build up resources.

The 1972 Act requires that a special fund be set up for the revenues and expenditures of the District. Funds raised by assessment shall be used only for the purpose as stated herein. Any balance or deficit remaining on July 1 must be carried over to the next fiscal year.

The LED Street Light Conversion was completed in year 2019. However, savings will be minimal, if any, until the recouping cost period of 20 years is completed.

City of Gardena
Consolidated Street Lighting Districts FY 2018-2019

CITY OF GARDENA
 CONSOLIDATED STREET LIGHTING DISTRICT
 ACCT# 152.51

CALCULATION OF ASSESSMENT
 2022 - 2023

TOTAL ESTIMATED COSTS OF THE GARDENA CONSOLIDATED STREET LIGHTING **\$836,545.05**

DISTRICT REVENUE (7.5% Increase); per Consumer Price Index (CPI) on page 13

<u>ZONE</u>	<u>DESCRIPTION</u>	<u>\$/FRONT FOOT</u>	<u>TOTAL FRONTAGE</u>	<u>ASSESSMENT</u>
1	RESIDENTIAL	0.95	521,506 FT	\$497,829.63
2	COMMERCIAL	2.12	79,716 FT	\$168,647.17
3	MANUFACTURING	1.41	101,482 FT	\$143,130.21
4	GARDENA BOULEVARD	2.12	5,022 FT	\$10,624.55
2	UTILITIES	2.12	6,633 FT	\$14,032.77
	PUBLIC AGENCY	0.21	11,050 FT	\$2,280.72
TOTAL				<u>\$836,545.05</u>

PART C

ASSESSMENT DISTRICT DIAGRAM

Diagrams showing the exterior boundaries of the City of Gardena Consolidated Street Lighting Assessment District and the lines and dimensions of each lot or parcel of land within the District are in the Public Works Director's Office and referenced herein.

The lines and dimensions of each lot or parcel within the District are those lines and dimensions shown on the maps of the Assessor of the County of Los Angeles, for the year in which this report was prepared. The Assessor's maps and records are incorporated by reference herein and made part of this report.

PART D

METHOD OF APPORTIONMENT OF ASSESSMENT

GENERAL

Part 2 of Division 15 of the Streets and Highways Code, the Landscaping and Lighting Act of 1972, permits the establishment of assessment districts by public agencies for the purpose of providing certain public improvements, which include operation, maintenance and servicing of street lights, traffic signals, and landscaping.

Section 22573 of the Landscape and Lighting Act of 1972 requires that maintenance assessments be levied according to benefit rather than according to assessed value. This Section States:

"The net amount to be assessed upon lands within an assessment district may be apportioned by any formula or method which fairly distributes the net amount among all assessable lots or parcels in proportion to the estimated benefit to be received by each such lot or parcel from the improvements."

In addition, Article XIID, Section 4(a) of the California Constitution limits the amount of any assessment to the proportional special benefit conferred on the property.

The Act permits the designation of benefit zones within any individual assessment district if "by reasons or variations in the nature, location, and extent of the improvements, the various areas will receive different degrees of benefit from the improvement" (Sec. 22574). Thus, the 1972 Act requires the levy of a true "benefit assessment" rather than a "special tax."

ASSESSMENT METHODOLOGY

The total operation, maintenance, and servicing costs for the assessment district improvements are apportioned in accordance with the benefit spread described below.

General versus Special Benefit

The assessment cost for each parcel is determined by the front linear footage of the property, multiplied by the applicable rate for that parcel. If the property faces more than one street or alley, the cost is determined by the linear footage of the longest side facing a street/alley plus 10 percent of the rest of the sides facing a street/alley, multiplied by the rate. Rate of assessment is determined by zone. The rates are determined by the quantity of street lighting in each zone, spacing frequency being most intense in commercial zone and least intense in residential zones and near public properties. This method of apportionment ensures that properties are not assessed in excess of the proportional special benefit conferred.

PART E

PROPERTY OWNER LIST & ASSESSMENT ROLL

The total proposed assessment for Fiscal Year 2022-2023 and the amount of proposed assessment apportioned to each lot or parcel within the District, as shown on the latest roll at the County of Los Angeles Assessor's Office, are contained in the Assessment Rolls and the description of each lot or parcel is part of the records of the Assessor of the County of Los Angeles and these records are, by reference, made part of this Report.

The included tracts of land have been subdivided into four zones, with each of subject lots benefiting from the improvements being maintained. Therefore, the costs associated with the street lighting within and directly adjacent to each tract, as shown in Part B of this report will be apportioned to pay in accordance with the property frontage within each zone.

PART F

FINANCIAL STUDY

Staff has performed a financial study of the District for the 2022-2023 FY to ensure that the maintenance and improvement costs for the district were funded appropriately.

In FY 2009-2010, through Prop. 218, the City of Gardena approved increased assessments for the District as indicated in the summary below. Additionally, the study recommended adjustment of future annual assessments as needed, per the Consumer Price Index (CPI), All Urban Consumers, for the Los Angeles, Long Beach, and Anaheim Areas, not to exceed 50% of operating reserves. The actual assessments levied in any fiscal year will be approved by the City Council. Please see "Appendix A" for a copy of the detailed Financial Study for the District.

Since the increase in the assessments was approved, benefit areas within the District will continue to be maintained at the highest service levels. The proposed increase includes language to adjust assessments per the CPI, future votes regarding this annual increase will not be needed; however, each year staff will present the annual Engineer's Reports with the recommended assessment amount. For FY 2022-2023, an increase of 7.5% is recommended.

LIGHTING ASSESSMENT DISTRICT

	FY 08/09	FY 09/10	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15
CPI RATE INCREASE		N/A	Actual	Actual	Actual	Actual	Actual
PERCENTAGE ASSESSMENT RATE INCREASE		28.00%	1.8554%	1.4056%	2.09%	1.96%	.7737%
APPROXIMATE ASSESSMENT (ANNUAL) X 1,000	\$485	\$620	\$627	\$636	\$649	\$658	\$661

	FY 15/16	FY 16/17	FY 17/18	FY 18/19	FY 19/20	FY 20/21	FY 21/22	FY22-23
CPI RATE INCREASE	Actual	Actual	Actual	Actual	Actual	Actual	Actual	Actual
PERCENTAGE ASSESSMENT RATE INCREASE	.726%	3.1%	2.1%	3.5%	3.2%	3.4%	0.9%	7.5%
APPROXIMATE ASSESSMENT (ANNUAL) X 1,000	\$665	\$682	\$696	\$720	\$746	\$771	\$778	\$837

OPERATING EXPENDITURES

The following information describes the types of costs associated with maintaining the District, as well as information regarding the proposed rate increase. The financial study projects the expenditures and revenues through Fiscal Year 2022/2023.

CPI – Annual Increase According to Need

In FY 2009-2010, the City approved a recommended scaled increase in assessments to occur over a two year period for the District. After the initial scaled increase, the assessments are increased annually per the CPI on an as needed basis (0.9% per year for the study). Should the district reach a reserve level not-to-exceed 50% of operating revenues, the assessment will not be increased per the CPI for the year. Each year, the City will evaluate the reserves and the expenditures, and inform the residents whether or not an increase per the CPI will be necessary for the upcoming year.

Maintenance Upgrades/Projects

The line item in the proposed budget and financial study for "Maintenance Upgrades/Projects" includes any new projects such as new conduits, wiring, lights, or poles, etc. that can be scheduled for the upcoming year. Often, City staff receives input from residents on any projects that a district may like to see completed. The proposed budget includes an estimate for these projects, and if the amount actually spent each year is less than the estimate, the remaining balance returns to the District's reserve fund. Should the amount exceed the estimate, then the funds needed would be taken from the reserve fund.

Reserve Fund

Any remaining funds not used from the previous year are added to the District's reserve fund. The reserve fund should have sufficient funds available to lessen the fiscal impact of any unforeseen expenditures. Staff is recommending that the district maintain a healthy reserve balance of an amount not-to-exceed 50% of the total annual assessments.

APPENDIX A

FINANCIAL STUDY DETAIL

ESTIMATE OF COSTS***2022-2023**

UTILITY-OWNED SYSTEMS	
(LS-1) Energy Cost	\$621,433
CITY-OWNED SYSTEM	
(LS-2) Energy Cost	<u>\$22,265</u>
SUBTOTAL	\$643,698
FUEL CONTINGENCY (5%)	<u>\$32,185</u>
SUBTOTAL	\$675,883
OVERHEAD	\$41,015
OTHER PROGRAM EXPENSES	\$38,000
CAPITAL OUTLAY	\$50,000
CONTINGENCY	<u>\$31,647</u>
TOTAL ESTIMATED COST OF STREET LIGHTING DISTRICT	\$836,545

* Expenses are provided by the City of Gardena Finance Department

HAWTHORNE

EL SEGUNDO

LOS ANGELES COUNTY

BLVD.

LOS ANGELES
COUNTY

BLVD.

135th

AVE.

AVE.

AVE.

AVE.

ST.

HAWTHORNE

ROSECRANS

AVE.

MARINE

AVE.

COUNTY OF LOS ANGELES

MANHATTAN
BEACH BLVD.

BLVD.

CITY OF LOS ANGELES

REDONDO

BEACH

158th

ST.

CITY MAINTENANCE
YARD

162nd

CITY HALL

161st

ST.

ST.

GARDENA

BLVD.

166th

ST.

TORRANCE

GRAMERCY

NORMANDIE

170th

ST.

ARTESIA

BLVD

VERMONT

NORTH

CRENSHAW

VAN NESS

WESTERN

182nd

TORRANCE

ST.

ELECTRIC ST.

CITY OF LOS ANGELES

DISTRICT MAP

405

110

RESOLUTION NO. 6555

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, APPROVING THE ENGINEER'S REPORT FOR THE GARDENA CONSOLIDATED STREET LIGHTING ASSESSMENT DISTRICT FOR FISCAL YEAR 2022-2023, DECLARING ITS INTENTION TO LEVY AND COLLECT ASSESSMENTS UNDER THE GARDENA CONSOLIDATED STREET LIGHTING ASSESSMENT DISTRICT FOR FISCAL YEAR 2022-2023 AND SETTING A TIME AND PLACE FOR HEARING PROTESTS IN RELATION THERETO (PUBLIC HEARING: May 24, 2022)

WHEREAS, the City of Gardena, California previously established the Gardena Consolidated Street Lighting Assessment District, and;

WHEREAS, on Feb. 22, 2022, the City Council of the City of Gardena, California, adopted Resolution No. 6553 that requires City Council to direct the City Engineer to prepare and file a report according to the provisions of the "Landscaping and Lighting Act of 1972" of the California Streets and Highways Code, Division 15, Part 2, for assessments to be levied upon and collected through the Gardena Consolidated Street Lighting Assessment District for fiscal year 2022-2023, and;

WHEREAS, the Engineer's Report bearing the date of April 26, 2022, was prepared and filed with the City Clerk in conformity with the provisions of the California Streets and Highways Code, and contains an estimate of the revenues and costs of the improvements, a diagram for the assessment district, and an assessment of the estimated revenues and costs of the improvements, and;

WHEREAS, the City Clerk has presented the Engineer's Report to the City Council, and said Council has examined and considered the Engineer's Report and is satisfied with all the items contained in Engineer's Report, and;

WHEREAS, the Engineer's report further identifies the need for an annual cost of living adjustment for Fiscal Year 2022-2023 in order to meet that year's costs of operations and maintenance, said adjustment to be made in an amount not to exceed the annual increase over the previous year in the All Items Consumer Price Index (CPI) in the Los Angeles-Long Beach-Anaheim, CA area, and;

WHEREAS, the proposed assessment and the cost of living increase was authorized in fiscal year 2009-2010 through an assessment ballot (Prop. 218) proceeding by mailed ballots in accordance with Section 53753 of the Government Code and Section 4000 of the Elections Code

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF GARDENA, CALIFORNIA, DOES HEREBY FIND, DETERMINE, AND RESOLVE, AS FOLLOWS:

SECTION 1. The Engineer's Report bearing the date of April 26, 2022, was prepared and filed with the City Clerk in conformity with the provisions of the California Streets and Highways Code, Division 15, Part 2, Landscaping and Lighting Act of 1972.

SECTION 2. The City Council approves the Engineer's Report as filed and sets a public hearing for Tuesday, May 24, 2022 at 7:30 p.m. in the Gardena Council Chambers, 1700 West 162nd Street, in the City of Gardena, California to consider the levy and collection of the assessment for the Gardena Consolidated Street Lighting Assessment District for Fiscal Year 2022-2023 inclusive of an annual cost of living adjustment of 7.5%

SECTION 3. The City Clerk or designee is authorized and directed to give notice of the hearing in time, form and manner as required by the California Streets and Highways Code, Division 15, Part 2, Landscaping and Lighting Act of 1972.

SECTION 4. That this Resolution shall be effective immediately.

BE IT FURTHER RESOLVED that the City Clerk shall certify to the passage and adoption of this Resolution; shall cause the same to be entered among the original Resolutions of said City; and shall make a minute of the passage and adoption thereof in the records of the proceedings of the City Council of said City in the minutes of the meeting at which the same is passed and adopted.


Passed, approved, and adopted this _____ day of _____, 2022.

TASHA CERDA, Mayor

ATTEST:

MINA SEMENZA, City Clerk

APPROVED AS TO FORM:



CARMEN VASQUEZ, City Attorney



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 17.A
Section: DEPARTMENTAL
ITEMS - TRANSPORTATION
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: Approve Purchase of 14, 40-foot Compressed Natural Gas (CNG) Buses for \$11,763,501 and Authorize Program Total of \$12,351,676

COUNCIL ACTION REQUIRED:

Staff Recommendation: Approve Purchase and Program Total

RECOMMENDATION AND STAFF SUMMARY:

Between FY2017-2023, GTrans will be replacing its entire fleet of 40-foot gasoline electric hybrid buses that have reached the end of their useful lives. In order to guide the timely replacement of aging buses, Staff developed a FY2017-2023 Fleet Replacement Plan approved by Council in February 2017. The plan dictated that GTrans would immediately pursue a combination of both CNG and zero emission buses for the near-term replacement of its fleet, with an eventual conversion of the entire fleet to zero emission by 2034. In accordance with the plan, GTrans deployed its first order of 18 CNG buses in 2021, and is now ready to place the next CNG order to replace its 2009 gasoline hybrid electric buses. As you recall, Council approved the purchase of seven zero emission buses in March, and in accordance with the fleet plan, GTrans will be back with a recommendation on its final order of CNG buses.

GTrans is able to purchase CNG buses under an assignment clause through an existing contract by Los Angeles County Metropolitan Transportation Authority (Metro). Under the assignment clause GTrans has reserved up to 46 CNG buses under Metro's 2017 Contract No. OP28367-000 – Part A for up to 46, forty-foot (40') CNG buses from El Dorado National (California), Inc. CNG technology has a long-standing, proven history throughout the transit industry as having the reliability, range and lower greenhouse gas emission benefits necessary to operate in a variety of transit service environments. There will also be anticipated safety improvements for operating these new CNG buses in GTrans' bus fleet. These buses will incorporate the latest safety features and designs, including improved American with Disabilities Act (ADA) amenities and boarding ramps. New buses will provide a safer, cleaner operating environment for GTrans passengers and employees, improve fleet reliability and allow GTrans to remain in compliance with California Air Resources Board (CARB) and South Coast Air Quality Management District (SCAQMD) regulations.

Therefore staff respectfully recommends that Council authorize the purchase of fourteen (14)

CNG buses from El Dorado National (California), Inc. for a total price of \$11,763,501 and a five percent contingency of \$588,175 to account for any unforeseen changes, only to be approved in advance by GTrans staff for a not to exceed project total of \$12,351,676.

FINANCIAL IMPACT/COST:

GTrans has existing federal, state, and local funding available for the second phase of its bus replacement program, to purchase these CNG buses. There is no impact to the General Fund.

ATTACHMENTS:

[Assignment Agreement_Gardena_Executed.pdf](#)

[Gardena Option Quote - \(14\) Buses REV2.pdf](#)

[ENC Bus Breakdown.pdf](#)

[Contract OP28367_Volume I_Group A_ENC_Final_Signed.pdf](#)

[Complete Amendments to OPS28367-000 \(#1 to #20\).pdf](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio", is positioned above a horizontal line.

Clint Osorio, City Manager

ATTACHMENT C – ASSIGNMENT AGREEMENT

ASSIGNMENT TO PURCHASE AGREEMENT

Los Angeles County Metropolitan Transportation Authority of Los Angeles, California, "Assignor", hereby assigns to GTrans of the City of Gardena, California, "Assignee", to purchase from EI Dorado National (California), Inc. (ENC), "Seller", forty six (46) units of 40' low floor CNG transit Vehicles at a price and under the terms and conditions contained in Assignor's Contract No OP28367-000, dated August 15, 2017 with Seller ("Contract").

Contract OP28367-000 commenced, per terms of Contract, on September 1, 2017, and any unused buses may be assigned at any time on or before September 1, 2022.

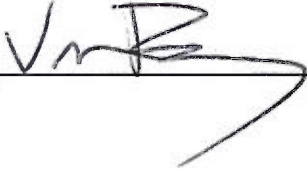
With respect to Vehicles assigned hereunder and this Assignment, Assignee agrees to perform all covenants, conditions and obligations required of Assignor under said Contract and agrees to defend, indemnify and hold Assignor harmless from any liability or obligation under said Contract. Assignee further agrees to hold Assignor harmless from any deficiency or defect in the legality or enforcement of the terms of said Contract or option to purchase thereunder. Assignee agrees and understands that Assignor is not acting as a broker or agent in this transaction and is not representing Seller or Assignee, but rather is acting as a principle in assigning its interest in the above-referenced option to purchase the Vehicles under the Contract to Assignee.

Assignee hereby unconditionally releases and covenants not to sue Assignor upon any claims, liabilities, damages, obligations or judgments whatsoever, in law or in equity, whether known or unknown, or claimed, which they or either of them have or claim to have or which they or either of them may have or claim to have in the future against Assignor, with respect to the Vehicles or any rights whatsoever assigned hereunder.

Dated this 17th day of April, 2018


**Los Angeles County Metropolitan
Transportation Authority**

**Phillip A. Washington
Chief Executive Officer**

BY: 
Assignor

**GTrans
City of Gardena**

**Ernie Crespo
Director of Transportation**

BY: 
Assignee

I hereby accept and approve the terms of this agreement and agree to hold Assignor harmless from any further liability or obligation under our agreement.

EI Dorado National (California), Inc. (ENC)

BY: 
Seller



QUOTATION

PREPARED FOR: City of Gardena

DATE: 11/18/2021
12/09/21 REV1
01/29/22 REV2

ITEM	DESCRIPTION	PRICE
1.0	Base bus price of previous (18) unit order without freight	\$ 640,369.82
2.0	Delete ferry riser	\$ (365.00)
3.0	Delete driver's protection system on last bus (price was divided over 18 buses)	\$ (169.84)
4.0	Delete GFI farebox for (6) buses divided over 18 buses	\$ (5,512.95)
5.0	Delete GFI farebox expedited delivery charge	\$ (166.67)
6.0	Delete CUBIC-DCU for (6) buses divided over (18) buses	\$ (2,146.64)
	Subtotal	\$ 632,008.72
NEW BUS CHARGES		
7.0	PPI calculation August 2017 to August 2021(P) per attached; 11.87% PPI on revised subtotal	\$ 75,019.44
9.0	Change from safefleet mirrors to ENC demo style mirror: low mounted streetside & use same head on both sides; use spacer on streetside mirror	\$ -
10.0	Change from Byk-Rak 3 position stl stl bike to black stainless steel	\$ 70.00
11.0	Changes to Luminator/Apollo system - updated antenna; add camera	\$ 774.00
12.0	Optional Luminator/Apollo equipment per attached Luminator quote; total is divided over 14 buses	\$ 604.00
13.0	Supply & install complete Clever Devices AVL & APC System	\$ 25,268.00
14.0	Use Hanover internal amps to separate front & rear speakers	\$ 101.00
15.0	Hanover WDM software, 1 year annual hosting server solution, Tycon switch and charge guard; costs divided over 14 buses	\$ 1,572.00
16.0	Driver's protection system - Arowguard with extra extended glass	\$ 6,063.00
17.0	GFI Farebox pre-wire only	\$ 108.00
18.0	Add ring collar to overhead grab straps	\$ 266.00
19.0	Rear passenger door Obstruction Detection System (sonic sensor)	\$ 1,527.00
20.0	Brake pedal E10 valve	\$ 158.00
21.0	Hinged door for emergency door release housing at both doors	\$ 34.00
	BASE SUBTOTAL PER BUS	\$ 743,573.16
	FREIGHT (NON-TAXABLE)	\$ 275.00
	SUBTOTAL	\$ 743,848.16
	TAX 10.25%	\$ 74,192.90
	BASE TOTAL PER BUS	\$ 818,041.06
	QTY	14
	TOTAL FOR 14 BUSES	\$ 11,452,574.84

BUS TAX		
BUS AMOUNT	\$	743,573.16
NON-TAXABLE ADA	\$	(19,740.00)
TAXABLE AMOUNT	\$	723,833.16
TAX 10.25%	\$	74,192.90

ADDITIONAL DELIVERABLES (NOT IN BUS PRICE)		
ITEM	DESCRIPTION	PRICE
1.0	Toughbook 55 laptop FZ-55C26DCVM - Qty 4 @ \$3,406 each	\$ 13,624.00 *
2.0	85 hours of training - \$175/HR LACMTA published option; non-taxable	\$ 14,875.00
3.0	Manuals - same as initial (18) bus order	\$ 1,295.00 *
4.0	Spare parts package - per attached listing	\$ 175,222.26 *
5.0	(2) Nexiq Technologies USB Link @ \$774 each	\$ 1,548.00 *
6.0	(1) A/C interface software and cable @\$585	\$ 585.00 *
7.0	Brake Lathe for rotors - WS-BL44-T (taller) - quantity 2	\$ 47,502.00 *
8.0	Brake Caliper Jack - quantity 2	\$ 5,998.00 *
9.0	A/C evacuation machine - quantity 2	\$ 17,784.00 *
10.0	Digital refrigerant analyzer - quantity 2	\$ 2,472.00 *
11.0	Accessory Power System (APS) software & adapter interface	\$ 2,497.00 *

* TAXABLE

PREPARED BY: Holly Piper, Sales Administration Manager

This quote is valid for 90 days

REV1 Add spare parts package & taxable note on deliverables
REV2 Add bus items 19, 20, 21; add deliverables 10 & 11; increase deliverables quantity on items 7, 8, 9

ENC Purchase of 14 Buses

Item	Quantity	Unit Price	Unit	Description	Total
1-6	14	\$ 612,268.72	Each	40 Ft.CNG Base Bus (\$632,008.72-ADA \$19,740)	\$ 8,571,762
7	14	\$ 75,019.44	Each	11.87% PPI on Base Bus	\$ 1,050,272
9-21	14	\$ 36,545.00		Additional Onboard Equipment	\$ 511,630
	14	\$ 19,740.00	Each	ADA Equipment (tax exempt)	\$ 276,360
	14	\$ 743,573.16		Total Bus	
	14	\$ 74,192.90	Each	10.25% California Sales Tax Buses	\$ 1,038,701
	14	\$ 275.00	Each	Delivery	\$ 3,850
					\$ 11,452,575

Additional

1	4	\$ 3,406	DL	Toughbooks	\$ 13,624
2	1	\$ 14,875	DL	85 hours of training (tax exempt)	\$ 14,875
3	1	\$ 1,295	DL	Manuals	\$ 1,295
4	1	\$ 175,222	DL	Spare Parts Package	\$ 175,222
5	2	\$ 774	DL	Nexiq USB Link	\$ 1,548
6	1	\$ 585	DL	A/C Interface Cables	\$ 585
7	2	\$ 23,751	DL	Brake Lathe	\$ 47,502
8	2	\$ 2,999	DL	Brake Caliper	\$ 5,998
9	2	\$ 8,892	DL	A/C Evacuation Machine	\$ 17,784
10	2	\$ 1,236	DL	Digital regrigerant analyzer	\$ 2,472
11	1	\$ 2,497	DL	Accessory Power System (APS) software & adapter interface	\$ 2,497
5			DL	10.25% Calif. Sales tax, Other (line 4)	\$ 27,524

\$ 11,763,501 Council Estimated Amount (not including 5% Contingency)
 \$ 588,175 5%
 \$ 12,351,676 Authorized with Contingency

Los Angeles County
Metropolitan Transportation Authority

FORTY-FOOT (40') LOW FLOOR CNG TRANSIT BUSES

Contract No.: OP28367-000
ELDORADO NATIONAL (CALIFORNIA), INC.

ISSUED: 08.10.17



Photo By: Chang Kim



Metro™

GROUP A – 40' CNG

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* All Articles, Subarticles, or portions of the Contract noted by an asterisk (*) shall be included in (flow-down to) all Subcontracts of any tier.

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LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO.: OP28367-000

FORTY-FOOT (40') LOW FLOOR CNG TRANSIT BUSES

FIRM FIXED PRICE CONTRACT

BETWEEN

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

AND

ELDORADO NATIONAL (CALIFORNIA), INC.

AUGUST 15, 2017

EFFECTIVE DATE

**LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
FIRM FIXED PRICE CONTRACT**

CONTRACT NO.: OP28367-000

Between

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION AUTHORITY
ONE GATEWAY PLAZA
LOS ANGELES, CA 90012-2952**

and

**ELDORADO NATIONAL (CALIFORNIA), INC.
9670 Galena Street
Riverside, CA 92509**

FORTY-FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract is entered into by and between the Los Angeles County Metropolitan Transportation Authority (LACMTA/Metro), and **ELDORADO NATIONAL (CALIFORNIA), INC.** (Contractor).

In consideration of the mutual covenants of the parties as set forth below, the parties hereby agree as follows:

ARTICLE I: CONTRACT DOCUMENTS ORDER OF PRECEDENCE

- A. This Contract includes this Form of Contract and the other following Contract Documents and Attachments, which are incorporated herein and made a part of this Contract.
- B. Except as otherwise specified herein, in the event of any conflict, the precedence of the Contract Documents shall be as follows:
 - 1. Form of Contract, (Pro Form 18, Dated 08/08/14)
 - 2. Regulatory Requirements, (Pro Form 039, Dated 02/03/16)
 - 3. Special Provisions, (Pro Form 089, Dated 01/11/16)
 - 4. General Conditions, (Pro Form 038, Dated 01/11/16)
 - 5. Compensation and Payment Provisions, Firm Fixed Price, (Pro Form 040, Dated 08/23/13)
 - 6. Technical Specifications, (Dated 08/10/17)
- C. An Amendment or Change to this Contract shall take its precedence from the term it amends. All other documents and terms and conditions shall remain unchanged.

ARTICLE II: DEFINITIONS

Capitalized terms, abbreviations and symbols used in this Contract are defined in the Article in the General Conditions entitled GLOSSARY OF TERMS. Additional terms may be defined in the Special Provisions or the Statement of Work.

ARTICLE III: WORK TO BE PERFORMED

Contractor shall furnish all necessary labor, materials, supplies, and transportation necessary to manufacture 295 Forty-Foot (40') Low Floor CNG Transit Buses, up to 305 Option vehicles, spare parts, special tools, diagnostic equipment, training, training aids and manuals as is more fully described in the Special Provisions and Technical Specifications.

ARTICLE IV: COMPENSATION

A. Contract Price

In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of \$199,067,748, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

B. Payment Schedule

The Contract Price shall be paid to the Contractor based upon the Milestone Payment Schedule, Form PF1-Contract Price Summary, and the Compensation and Payment Provisions.

All Applications for Milestone Payments shall be submitted in writing in accordance with the Contract Documents entitled COMPENSATION AND PAYMENT AND THE SPECIAL PROVISIONS, as applicable, and delivered or mailed to LACMTA as follows:

Los Angeles County Metropolitan Transportation Authority
Accounts Payable
P.O. Box 512296
Los Angeles, CA 90051-0296
Contract No.: OP28367-000

C. Final Payment

The Application for Final Payment shall be marked **FINAL** and a copy sent to Metro's Authorized Representative. LACMTA shall remit payment to the Contractor at the following address:

ELDORADO NATIONAL (CALIFORNIA), INC.
9670 Galena Street
Riverside, CA 92509

- D. Effective January 1, 2009, Metro started payment of invoices via Electronic Funds Transfer (EFT) which guarantees faster payments and is a more secure and efficient way to make payments. If you have not already done so, you will be required to sign up for EFT, unless you request a waiver in writing. Please call (213) 922-6811, then press option # 7 for EFT forms.

ARTICLE V: CONTRACT TERM AND PERIOD OF PERFORMANCE

The Effective Date of this Contract is **August 15, 2017**. The Period of Performance of this Contract shall begin on September 1, 2017 (hereinafter "Commencement Date"). Contractor shall complete delivery of the Base quantity of 295 vehicles no later than November 29, 2019, 117 weeks (819 calendar days) after the Commencement Date, unless this Contract is terminated earlier or extended by LACMTA, in writing, as provided in the Contract. Said complete delivery date of November 29, 2019 for Group A buses shall be automatically extended on a day-for-day basis if the Contract for the Base Buy is not executed by LACMTA on or before September 1, 2017.

The Base quantity for Group A is 295 Vehicles. The Base quantity delivery schedule is for a minimum of five (5) and a maximum of ten (10) vehicles per week. Any Group A vehicles delivered beyond that November 29, 2019 date may be subject to Liquidated Damages in accordance with Special Provisions SP – 10. If any Option for Group A vehicles is exercised, the Group A Option Vehicles shall be delivered in accordance with the schedule contained in the Modification to exercise the Option.

ARTICLE VI: TAX CREDITS

In the event Contractor is entitled to Federal or State tax credits or refunds conditioned on the sale of CNG/ZEB buses to a public agency, the Contractor agrees to rebate an amount equal to ninety (90) percent of the per bus credit or refund to LACMTA when the Contractor takes the credit and/or realizes the refund. The provision of such credits shall not affect any other responsibilities contained in the Contract

ARTICLE VII: INVOICES

Contractor shall submit invoices for all Vehicles including Option Vehicles, Spare Parts, equipment and other items purchased under this Contract to LACMTA 30 calendar days prior to each delivery. Payment shall be within 30 days after Acceptance of the item. Pro forma invoices will be acceptable. Contractor shall pay all Sales/Use Taxes, including spare parts, training, training aids, special tools, manuals or diagnostic equipment ordered under the Contract. LACMTA shall require the Contractor to remit all Sales/Use Taxes directly to State and

Federal Tax agencies, and to provide annual reports to LACMTA of such remittances.

A separate invoice shall be submitted for each Vehicle, including Option Vehicles. Each invoice shall include:

- Contract number
- Model and serial number of Vehicles invoiced
- Unit or total prices by line item number
- Total invoice amount.

A separate invoice shall be submitted for spare parts, special tools, training, training aids, and diagnostic equipment. Each invoice shall include:

- Contract number
- Description of the item
- Unit or total prices by line item number
- Total invoice amount.

ARTICLE VIII: LIMITATION OF FUNDS

Funding for this Contract is based upon the availability of funds determined by LACMTA's fiscal budget, which runs from July 1 through June 30 of each fiscal year. If funding is not approved for any subsequent fiscal year during which this Contract is in effect, LACMTA will issue a stop work notice.

ARTICLE IX: ENTIRE AGREEMENT

This Contract includes this Form of Contract, all other Contract Documents incorporated pursuant to Article I herein, and all Attachments and other documents incorporated herein by inclusion or by reference, and constitutes the complete and entire agreement between Metro and Contractor and supersedes any prior representations, understandings, communications, agreements or proposals, oral or written.

**ELDORADO NATIONAL (CALIFORNIA),
INC.**

9670 Galena Street
Riverside, CA 92509

tony.wayne@eldorado-ca.com **EMAIL ADDRESS**
(909) 591-9557 **PHONE NUMBER**



SIGNATURE OF AUTHORIZED OFFICIAL

BY: Tony Wayne
(PRINT OR TYPE NAME)

Vice President and General Manager

TITLE

August 14, 2017

DATE

TAX ID NO.: 33-0485436

**LOS ANGELES COUNTY
METROPOLITAN
TRANSPORTATION AUTHORITY**

PHILLIP A. WASHINGTON
CHIEF EXECUTIVE OFFICER

BY:  _____

8/21/17

DATE

APPROVED AS TO FORM
MARY C. WICKHAM
COUNTY COUNSEL

BY:  _____
DEPUTY

EXHIBIT A – INSURANCE REQUIREMENTS
(Reference Special Provisions SP-31)

REGULATORY REQUIREMENTS

RR-01 ADMINISTRATIVE CODE *

A. Applicability

This Article applies to all contracts.

B. Metro Administrative Code

Contractor warrants and represents that it has read and understands Title 4, Procurement, and Title 5, Ethics, of the [Metro Administrative Code](http://www.metro.net/images/MTA_Administrative_Code_Enactment.pdf) (hereinafter "Administrative Code" - available at [www.metro.net/images/MTA Administrative Code Enactment.pdf](http://www.metro.net/images/MTA_Administrative_Code_Enactment.pdf)), and will comply with each and every one of those requirements in accordance with their terms to the extent that they are applicable to contractors doing business with Metro. All definitions used in the Administrative Code are hereby incorporated herein as though fully set forth.

Without reducing or affecting its obligation to comply with any and all provision of the Administrative Code, as applicable, Contractor specifically warrants, represents and covenants that it will:

1. Comply with:
 - a. Chapter 5-20, Contractor Code of Conduct;
 - b. Chapter 5-25, Lobbying the Metro; and
 - c. Chapter 5-35, Metro Conflict of Interest Code, and
2. Not induce, attempt to induce, or solicit:
 - a. Board members to violate Chapter 5-10;
 - b. Metro employees to violate Chapter 5-15;
 - c. Metro Financial employees to violate Chapter 5-30: or
 - d. Either Board members, Metro employees or Metro Financial employees to violate any other provision of the Administrative Code.

C. Compliance with §§1090 et. seq. and §§87100 et. seq. of the California Government Code

Contractor shall comply with all applicable provisions of §§1090 et. seq. and §§87100 et. seq. of the California Government Code. Without reducing or affecting its obligation to comply with any and all of said provisions, Contractor specifically covenants:

1. Contractor shall not cause or permit any member, officer, or employee of Metro to have any financial interest in the Contract;
2. Contractor shall not enter into any Subcontract involving services or property with a person or business prohibited from transacting such business with Metro;
3. Contractor warrants and represents that to its knowledge no Board member, officer, or employee of Metro has any interest, whether contractual, non-contractual, financial or otherwise, in this Contract, or in the business or any other contract or transaction of the Contractor or any Subcontractor and that if any such interest comes to Contractor's knowledge at any time, Contractor shall make a full and complete disclosure of all such information in writing to Metro.

D. Campaign Contributions

Neither Contractor nor its Agents shall give or offer to give any campaign contribution to any member of Metro's Board of Directors in violation of California Public Utilities Code §130051.20, California Government Code §§84300 et seq., or the Administrative Code.

E. Environmental Management System (EMS) Policy

Contractor represents that during the performance of the Contract it will assist Metro in achieving the principles of Metro's EMS Policy, available at [Environmental Management System \(EMS\) Policy](#) and Contractor further commits that it shall adhere to the applicable EMS Policy principles in its choice of means and methods in the performance of the Work.

RR-02 DISCRIMINATION *

A. Applicability

This Article applies to all contracts.

- B.** In connection with the performance of Work provided for under this Contract, Contractor agrees that it will not, on the grounds of race, religious creed, color, national origin, ancestry, physical disability, medical condition, marital status, sex, sexual orientation, or age, discriminate or permit discrimination against any person or group of persons in any manner prohibited by Federal, State or local laws.

RR-03 WHISTLEBLOWER REQUIREMENTS *

A. Applicability

This Article applies to all contracts.

- B. Contractor shall not adopt any rule, regulation or policy preventing an employee from disclosing information to a government or law enforcement agency, where the employee believes the information discloses violation or noncompliance with a state or Federal regulation; nor shall Contractor retaliate against an employee for taking such actions as set forth in the California Labor Code §1101 et. seq.

RR-04 PUBLIC RECORDS ACT *

A. Applicability

This Article applies to all contracts.

- B. Except as otherwise provided herein, all records, documents, drawings, plans, specifications, and all other information relating to the conduct of Metro's business, including all information and documents submitted by Contractor ("**Records**"), shall become the exclusive property of Metro and shall be deemed public records. Said Records are subject to the provisions of the California Public Records Act (Government Code §6250 et. seq.). Metro's use and disclosure of its records are governed by this Act. Metro will use its best efforts to inform the Contractor of any request for any financial records or documents marked "Trade Secret", "Confidential" or "Proprietary" provided by Contractor to Metro. Metro will not advise as to the nature or content of documents entitled to protection from disclosure under the California Public Records Act.
- C. In the event of litigation concerning the disclosure of any Records, Metro's sole involvement will be as a stakeholder, retaining the Records until otherwise ordered by a court. The submitting party, at its sole expense and risk, shall be fully responsible for any and all fees for prosecuting or defending any action concerning the Records and shall indemnify and hold Metro harmless from all costs and expenses including attorney's fees in connection with any such action.

RR-05 ACCESS TO RECORDS

A. Applicability

This Article applies to all federally funded contracts.

- B. Contractor agrees to provide Metro, the FTA Administrator, the Comptroller General of the United States or any of their authorized representatives access to any books, documents, papers and records of the Contractor which are directly pertinent to this Contract for the purposes of making audits, examinations, excerpts and transcriptions. Contractor also agrees, pursuant to 49 C. F. R. 633.17 to provide the FTA Administrator or the FTA's authorized representatives, including any FTA Project Management Oversight Contractor, access to Contractor's records and construction sites pertaining to a major capital project, defined at 49 U.S.C. 5302(a)1, which is

receiving federal financial assistance through the programs described at 49 U.S.C. 5307, 5309 or 5311.

- C. If this Contract is for a capital project or improvement (defined at 49 U.S.C. 5302(a)1) and was entered in to through other than competitive bidding, the Contractor shall make records related to this Contract available to Metro, the Secretary of Transportation and the Comptroller General or any authorized officer or employee of any of them for the purposes of conducting an audit and inspection.
- D. Contractor shall permit any of the foregoing parties to reproduce without any cost by any means whatsoever or to copy excerpts and transcriptions as reasonably needed.
- E. Contractor shall maintain all books, records, accounts and reports required under this Contract for a period of not less than three years after the date of termination or expiration of this Contract, except in the event of litigation or settlement of claims arising from the performance of this Contract, in which case Contractor agrees to maintain same until Metro, the FTA Administrator, the Comptroller General, or any of their duly authorized representatives, have disposed of all such litigation, appeals, claims or exceptions related thereto.

RR-06

FEDERAL FUNDING, INCORPORATION OF FEDERAL TRANSIT ADMINISTRATION (FTA) TERMS, AND FEDERAL CHANGES*

A. Applicability

This Article applies to all federally funded contracts.

- B. This Contract includes, in part, certain Standard Terms and Conditions required by DOT, whether or not expressly set forth in the Contract provisions. All contractual provisions required by DOT, as set forth in FTA Circular 4220.1F, dated November 1, 2008 (including any changes, revisions or successor circulars) is automatically hereby incorporated by reference. Anything to the contrary herein notwithstanding, all FTA mandated terms shall be deemed to control in the event of a conflict with other provisions contained in this Contract. Contractor shall not perform any act, fail to perform any act, or refuse to comply with any Metro requests which would cause Metro to be in violation of the FTA terms and conditions.

This Contract is subject to a financial assistance agreement between Metro and the Federal Transit Administration of the US Department of Transportation and all laws, regulations, guidelines, and provisions of the financial assistance agreement apply to this Contract and are incorporated by reference as if fully set forth herein.

- C. Contractor shall at all times comply with all applicable federal laws and regulations, including without limitation FTA regulations, policies, procedures and directives, including those listed directly or by reference in Applicable Grant Agreements between Metro and FTA, as they may be amended or

promulgated from time to time during the term of this Contract collectively "Federal Requirements". These Federal Requirements may change and the changed Federal Requirements will apply to this Contract as required unless the Federal Government determines otherwise. Contractor's failure to so comply with the Federal Requirements shall constitute a material breach of this Contract.

RR-07 ENERGY CONSERVATION REQUIREMENTS

A. Applicability

This Article applies to all federally funded contracts.

- B.** Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act 42 USC §6321 et seq.

RR-08 CIVIL RIGHTS REQUIREMENTS *

A. Applicability

This Article applies to all federally funded contracts.

- B.** Nondiscrimination - In accordance with Title VI of the Civil Rights Act, as amended, 42 U.S.C. § 2000d, section 303 of the Age Discrimination Act of 1975, as amended, 42 U.S.C. § 6102, section 202 of the Americans with Disabilities Act of 1990, 42 U.S.C. § 12132, and Federal transit law at 49 U.S.C. § 5332, Contractor shall not discriminate against any employee or applicant for employment because of race, color, creed, national origin, sex, age, or disability. In addition, Contractor shall comply with applicable Federal implementing regulations and other implementing requirements FTA may issue.

In addition to any other remedies under this Contract, in the event of the Contractor's noncompliance with the nondiscrimination provisions of this agreement, the California Department of Transportation shall impose such sanctions as it or the FHWA may determine to be appropriate, including but not limited to:

1. Withholding of payments to Contractor under the Contract within a reasonable period of time, not to exceed 90 days; and/or
2. Cancellation, termination or suspension of the Contract, in whole or in part.

C. Equal Employment Opportunity

- (a) Race, Color, Creed, National Origin, Sex - In accordance with Title VII of the Civil Rights Act, as amended, 42 U.S.C. § 2000e, and Federal transit

laws at 49 U.S.C. § 5332, Contractor shall comply with all applicable equal employment opportunity requirements of U.S. Department of Labor (U.S. DOL) regulations, "Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor," 41 C.F.R. Parts 60 et seq. , (which implement Executive Order No. 11246, "Equal Employment Opportunity," as amended by Executive Order No. 11375, "Amending Executive Order 11246 Relating to Equal Employment Opportunity," 42 U.S.C. § 2000e note), and with any applicable Federal statutes, executive orders, regulations, and Federal policies that may in the future affect activities undertaken in the course of the Contract. Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, creed, national origin, sex, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. In addition, Contractor shall comply with any implementing requirements FTA may issue.

- (b) Age - In accordance with section 4 of the Age Discrimination in Employment Act of 1967, as amended, 29 U.S.C. § 623 and Federal transit law at 49 U.S.C. § 5332, Contractor shall refrain from discrimination against present and prospective employees for reason of age. In addition, Contractor shall comply with any implementing requirements FTA may issue.
- (c) Disabilities - In accordance with section 102 of the Americans with Disabilities Act, as amended, 42 U.S.C. § 12112, Contractor shall comply with the requirements of U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630, pertaining to employment of persons with disabilities. In addition, Contractor shall comply with any implementing requirements FTA may issue.

RR-09 NO GOVERNMENT OBLIGATION TO THIRD PARTIES *

A. Applicability

This Article applies to all federally funded contracts.

- B.** Notwithstanding any concurrence by the Federal Government in or approval of the solicitation or award this Contract, absent the express written consent by the Federal Government, the Federal Government is not a party to this Contract and shall not be subject to any obligations or liabilities to Metro, Contractor, or any other party (whether or not a party to that Contract) pertaining to any matter resulting from this Contract.

Contractor shall include this Article in each Subcontract and shall not modify the Article, except to identify the Subcontractor who will be subject to its provisions.

RR-10**PROGRAM FRAUD AND FALSE OR FRAUDULENT STATEMENTS OR RELATED ACTS *****A. Applicability**

This Article applies to all federally funded contracts.

- B.** The provisions of the Program Fraud Civil Remedies Act of 1986, as amended, 31 U.S.C. § 3801 et seq. and U.S. DOT regulations, "Program Fraud Civil Remedies," 49 C.F.R. Part 31, shall apply to actions pertaining to this Contract. Upon execution of this Contract, Contractor certifies or affirms the truthfulness and accuracy of any statement it has made, it makes, it may make, or causes to be made, pertaining this Contract or the FTA assisted project for which this Contract work is being performed. In addition to other penalties that may be applicable, Contractor further acknowledges that if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification, the Federal Government reserves the right to impose the penalties of the Program Fraud Civil Remedies Act of 1986 on Contractor to the extent the Federal Government deems appropriate.
- C.** Contractor also acknowledges that this Contract is connected with a project that is financed in whole or in part with Federal assistance originally awarded by FTA under the authority of 49 U.S.C. § 5307 and if it makes, or causes to be made, a false, fictitious, or fraudulent claim, statement, submission, or certification to the Federal Government, the Government reserves the right to impose the penalties of 18 U.S.C. § 1001 and 49 U.S.C. § 5307(n)(1) on Contractor, to the extent the Federal Government deems appropriate.
- D.** Contractor shall include this Article in each subcontract financed in whole or in part with Federal assistance provided by FTA. Contractor shall not modify the Article, except to identify the Subcontractor who will be subject to the provisions.

RR-11**SUSPENSION AND DEBARMENT*****A. Applicability**

This article applies to federally funded contracts and subcontracts at any level expected to equal or exceed \$25,000 as well as any contract or subcontract (at any level) for Federally required auditing services.

- B.** This Contract is a covered transaction for purposes of 49 CFR Part 29. As such, Contractor shall verify that none of the Contractor, its principals, as defined at 49 CFR 29.995, or affiliates, as defined at 49 CFR 29.905, are excluded or disqualified as defined at 49 CFR 29.940 and 29.945.

Contractor shall comply with 49 CFR 29, Subpart C and shall include the requirement to comply with 49 CFR 29, Subpart C in any lower tier covered transaction it enters into.

- C. By entering into this Contract, Contractor certifies that it shall comply with the requirements of 49 CFR 29, Subpart C throughout the period of this Contract.

This certification is a material representation of fact relied upon by Metro. If it is later determined that Contractor knowingly rendered an erroneous certification, in addition to remedies available to Metro, the Federal Government may pursue available remedies, including but not limited to suspension and/or debarment .

RR-12 RECYCLED PRODUCTS

A. Applicability

This Article applies to federally funded operations/management, construction, or materials & supplies contracts for items designated by the Environmental Protection Agency, when procuring \$10,000 or more per year.

- B. To the extent practicable and economically feasible, a competitive preference shall be given for products and services that conserve natural resources and protect the environment and are energy efficient.

RR-13 CLEAN WATER AND CLEAN AIR REQUIREMENTS*

A. Applicability

This Article applies to all federally funded contracts over \$100,000.

B. CLEAN WATER REQUIREMENTS

Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Federal Water Pollution Control Act, as amended, 33 U.S.C. 1251 et seq., and all applicable clean water standards of the State of California and any state or local agency having jurisdiction. Contractor shall report each violation to Metro. Metro will, in turn, report each violation as required to FTA and the appropriate EPA Regional Office, and all other agencies having jurisdiction.

C. CLEAN AIR

Contractor shall comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act, as amended, 42 U.S.C. §§ 7401 et seq. and all applicable Clean Air Standards of the State of California or any state or local agency having jurisdiction. Contractor shall report each violation to Metro. Metro will, in turn, report each violation as required to FTA, the appropriate EPA Regional Office and all other agencies having jurisdiction.

RR-14 COMPLIANCE WITH FEDERAL LOBBYING POLICY *

A. Applicability

The following Article applies to federally funded contracts over \$100,000.

- B.** The Byrd Anti-Lobbying Amendment, 31 U.S.C. 1352, requires that Contractors who apply or bid for an award of \$100,000 or more shall file the certification required by 49 CFR Part 20, attached hereto as the certification entitled, "Certification of Compliance with Federal Lobbying Requirements." As set forth in the certifications, each tier of subcontractors shall certify to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures shall be forwarded from tier to tier up to Metro.

RR-15 BUY AMERICA *

A. Applicability

The following Article applies to federally funded rolling stock purchase and construction contracts over \$100,000 and to contracts over \$100,000 for materials & supplies for steel, iron, or manufactured products.

- B.** Contractor shall comply with 49 U.S.C. 5323(j) and 49 CFR Part 661, which provide that Federal funds may not be obligated unless steel, iron, and manufactured products used in FTA-funded projects are produced in the United States, unless a waiver has been granted by FTA or the product is subject to a general waiver.

Metro may investigate Contractor's, any Subcontractor's, and any Supplier's compliance with this Article. If an investigation is initiated, Contractor, Subcontractor, or Supplier shall document its compliance, in accordance with 49 CFR 661.15, and cooperate with the investigation. Contractor shall incorporate the Buy America conditions set forth in this Article in every subcontract or purchase order and shall enforce such conditions.

RR-16 CARGO PREFERENCE*

A. Applicability

The following Article applies to federally funded contracts involving equipment, materials, or commodities which may be transported by ocean vessels

B. USE OF UNITED STATES FLAG VESSELS

Contractor shall use privately owned United States-Flag commercial vessels to ship at least 50 percent of the gross tonnage (computed separately for dry bulk carriers, dry cargo liners, and tankers) involved, whenever shipping any equipment, material, or commodities pursuant to this Contract to the extent such vessels are available at fair and reasonable rates for United States-Flag commercial vessels

Contractor shall furnish within 20 working days following the date of loading for shipments originating within the United States or within 30 working days following the date of leading for shipments originating outside the United States, a legible copy of a rated, "on-board" commercial ocean bill-of-lading in English for each shipment of cargo described in the preceding paragraph to the Division of National Cargo, Office of Market Development, Maritime Administration, Washington, DC 20590 and to the Metro (through Contractor in the case of a subcontractor's bill-of-lading.)

Contractor shall include these requirements in all subcontracts issued pursuant to this Contract when the subcontract may involve the transport of equipment, material, or commodities by ocean vessel.

RR-17 FLY AMERICA

A. Applicability

This Article applies to federally funded contracts if the contract or subcontracts may involve the international transportation of goods, equipment, or personnel by air.

- B.** Contractor agrees to comply with 49 U.S.C. 40118 (the "Fly America" Act) in accordance with the General Services Administration's regulations at 41 CFR Part 301-10, which provide that recipients and subrecipients of Federal funds and their contractors are required to use U.S. Flag air carriers for U.S. Government-financed international air travel and transportation of their personal effects or property, to the extent such service is available, unless travel by foreign air carrier is a matter of necessity, as defined by the Fly America Act. Contractor shall submit, if a foreign air carrier was used, an appropriate certification or memorandum adequately explaining why service by a U.S. flag air carrier was not available or why it was necessary to use a foreign air carrier and shall, in any event, provide a certificate of compliance with the Fly America requirements. Contractor agrees to include the requirements of this section in all subcontracts that may involve international air transportation.

A. Applicability

This Article applies to federally funded construction contracts over \$100,000 (including ferry vessels), rolling stock purchases over \$100,000 and to operations/management contracts over \$100,000 (except transportation services)

B. Pursuant to the Labor Standards Provisions Applicable to Non-construction Contracts subject to the Federal Contract Work Hours and Safety Standards Act, 40 U.S.C.A. § 327 through 332 as implemented by U.S. Department of Labor regulations, 29 CFR 5.5 (b) and (c) Contractor and Subcontractor's contracting for any part of the Contract work shall comply with the following:

- 1. Overtime requirements** – Neither Contractor nor any Subcontractor contracting for any part of the Contract work that requires or involves the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- 2. Violation; liability for unpaid wages; liquidated damages** – In the event of any violation of the Article set forth in paragraph 1 of this Section Contractor and any Subcontractor responsible therefore shall be liable for the unpaid wages. In addition, Contractor and Subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the Article set forth in paragraph 1 of this Section, in the sum of ten dollars (\$10) for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the Article set forth in paragraph 1 of this Section.
- 3. Withholding for unpaid wages and liquidated damages** – Metro shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any monies payable on account of work performed by Contractor or Subcontractor under the Contract or any other Federal contract with Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by Contractor, such sums as may be determined to be necessary to satisfy any liabilities of Contractor or Subcontractor for unpaid wages and liquidated damages as provided in the Article set forth in paragraph 2 of this Section.

4. **Subcontracts** – Contractor or Subcontractor shall insert in any Subcontracts the Articles set forth in this Section and also a Article requiring the Subcontractors to include these Articles in any lower tier Subcontracts. Contractor shall be responsible for compliance by any Subcontractor or lower tier Subcontractor with the Articles set forth in this Section.
5. **Payrolls and basic records** – The records to be maintained hereinabove shall be made available by Contractor or Subcontractor for inspection, copying, or transcription by Metro and U.S. Dept. of Labor. Contractor and Subcontractor shall maintain payrolls and basic records during the course of the work and shall preserve them for a period of three (3) years from the completion of the Contract for all laborers and mechanics, including guards and watchmen, working on the Contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made and actual wages paid.

RR-19 SEISMIC SAFETY

A. Applicability

This Article applies to federally funded Architect & Engineer contracts for the design of new buildings or additions to existing buildings and to contracts for the construction of new buildings or additions to existing buildings.

- B. Any new building or addition to an existing building shall be designed and constructed in accordance with the standards for Seismic Safety required in Department of Transportation Seismic Safety Regulations 49 CFR Part 41 and Contractor shall certify to compliance to the extent required by the regulation. Contractor shall ensure that all work performed under this Contract, including work performed by a Subcontractor, is in compliance with the standards required by the Seismic Safety Regulations and the certification of compliance issued on the project.

RR-20 ADA ACCESS

A. Applicability

This Article applies to federally funded Architect & Engineer, Operations/Management, Rolling Stock Purchase, and Construction contracts

B. Access Requirements for Persons with Disabilities

Contractor shall comply with:

1. The requirements of 49 U.S.C. § 5301(d), which states the Federal policy that elderly persons and persons with disabilities have the same right as other persons to use mass transportation service and facilities, and that

special efforts shall be made in planning and designing those services and facilities to implement that policy;

2. All applicable requirements of section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. § 794, which prohibits discrimination on the basis of handicaps;
3. The Americans with Disabilities Act of 1990 (ADA), as amended, 42 U.S.C. § 12101 *et seq.*, which requires that accessible facilities and services be made available to persons with disabilities, including any subsequent amendments to that Act;
4. The Architectural Barriers Act of 1968, as amended, 42 U.S.C. §§ 4151 *et seq.*, which requires that buildings and public accommodations be accessible to persons with disabilities, including any subsequent amendments to that Act; and
5. All applicable requirements of the following regulations and any subsequent amendments thereto:
 - (1) U.S. DOT regulations, "Transportation Services for Individuals with Disabilities (ADA)," 49 C.F.R. Part 37;
 - (2) U.S. DOT regulations, "Nondiscrimination on the Basis of Handicap in Programs and Activities Receiving or Benefiting from Federal Financial Assistance," 49 C.F.R. Part 27;
 - (3) Joint U.S. Architectural and Transportation Barriers Compliance Board (U.S. ATBCB)/U.S. DOT regulations, "Americans With Disabilities (ADA) Accessibility Specifications for Transportation Vehicles," 36 C.F.R. Part 1192 and 49 C.F.R. Part 38;
 - (4) U.S. DOJ regulations, "Nondiscrimination on the Basis of Disability in State and Local Government Services," 28 C.F.R. Part 35;
 - (5) U.S. DOJ regulations, "Nondiscrimination on the Basis of Disability by Public Accommodations and in Commercial Facilities," 28 C.F.R. Part 36;
 - (6) U.S. General Services Administration (U.S. GSA) regulations, "Accommodations for the Physically Handicapped," 41 C.F.R. Subpart 101-19;
 - (7) U.S. Equal Employment Opportunity Commission, "Regulations to Implement the Equal Employment Provisions of the Americans with Disabilities Act," 29 C.F.R. Part 1630;
 - (8) U.S. Federal Communications Commission regulations, "Telecommunications Relay Services and Related Customer Premises Equipment for the Hearing and Speech Disabled," 47 C.F.R. Part 64, Subpart F; and

- (9) U.S. ATBCB regulations, "Electronic and Information Technology Accessibility Standards," 36 C.F.R. Part 1194; and
- (10) FTA regulations, "Transportation for Elderly and Handicapped Persons," 49 C.F.R. Part 609;
- (11) Any implementing requirements FTA may issue.

RR-21 ALCOHOL AND DRUG-FREE WORKPLACE PROGRAM *

A. Applicability

This Article applies to federally funded contracts for transit operations.

B. FTA Prevention of Alcohol Misuse and Prohibited Drug Use in Transit Operations Regulations

Contractor and its Subcontractors shall comply with the FTA anti-drug and alcohol misuse regulations (49 CFR Part 655) and the U.S. Department of Transportation (DOT) Procedures for Transportation Workplace Drug and Alcohol Testing Programs (49 CFR Part 40) to the full extent that they are, by their terms, applicable to Contractor and its Subcontractors. The regulations apply to all "contractors" that have "covered employees" that perform "safety sensitive functions" as those terms are defined in the regulations.

C. Certificate of Compliance

The CERTIFICATE OF COMPLIANCE WITH 49 CFR PARTS 655, PREVENTION OF ALCOHOL MISUSE AND PROHIBITED DRUG USE IN TRANSIT, submitted by Contractor prior to award, is incorporated as part of the Contract Documents.

D. Drug and Alcohol Testing Program

In the event that any part of the Work under this Contract falls within the scope of 49 CFR Part 655, Contractor, and its Subcontractors (as applicable), shall implement all programs required under the regulations, including without limitation, a Drug and Alcohol Testing Program and an anti-drug use and alcohol misuse program, in full compliance with the regulations.

E. Alcohol and Drug Free Workplace Program

In addition to the above, for Work performed on Metro property, Contractor shall provide an Alcohol and Drug-free Workplace Program in accordance with FTA requirements found at <http://transit-safety.volpe.dot.gov/Safety/DATesting.asp>.

A. Applicability

Subject to the limitations in Sections B, C and D, this Article applies if this Contract involves transit operations to be performed by employees of a Contractor recognized by FTA to be a transit operator, and if FTA has determined that it is financed in whole or in part with Federal assistance.

B. General Transit Employee Protective Requirements

If FTA has determined that this Contract involves transit operations financed in whole or in part with Federal assistance (other than Federal assistance authorized by 49 U.S.C. § 5310(a)(2) or 49 U.S.C. § 5311), and if the U.S. Secretary of Transportation has determined that the employee protective requirements of 49 U.S.C. § 5333(b) are necessary or appropriate for Metro under this Contract, then Contractor shall perform the transit operations work under the Contract in compliance with terms and conditions, (a) determined by the U.S. Secretary of Labor to meet the employee protective requirements of 49 U.S.C. A 5333(b), and U.S. Department of Labor ("U. S. DOL") guidelines at 29 C.F.R. Part 215, and any amendments thereto, and (b) stated in a U. S. DOL letter of certification to FTA, the date of which is set forth in the applicable Grant Agreement or Cooperative Agreement with Metro, and which is incorporated in the Form of Contract as a Contract Document entitled "U. S. DOL Certification".

C. Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5310(a)(2) for Elderly Individuals and Individuals with Disabilities

If FTA has determined that this Contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5310(a)(2), and if the U.S. Secretary of Transportation has determined or determines in the future that the employee protective requirements of 49 U.S.C. § 5333(b) are necessary or appropriate for Metro under the Contract, Contractor shall perform the Work in compliance with the terms and conditions determined, (a) by the U.S. Secretary of Labor to meet the requirements of 49 U.S.C. § 5333(b), U.S. DOL guidelines at 29 C.F.R. Part 215, and any amendments thereto, and (b) stated in the U.S. DOL's letter of certification to FTA, the date of which is set forth in the applicable Grant Agreement or Cooperative Agreement with Metro, and which is incorporated in the Form of Contract as a Contract Document entitled "U. S. DOL Certification".

D. Transit Employee Protective Requirements for Projects Authorized by 49 U.S.C. § 5311 in Nonurbanized Areas

If FTA has determined that this Contract involves transit operations financed in whole or in part with Federal assistance authorized by 49 U.S.C. § 5311, Contractor shall comply with the terms and conditions of the Special Warranty for the Nonurbanized Area Program agreed to by the U.S. Secretaries of

Transportation and Labor, dated May 31, 1979, and the procedures implemented by U.S. DOL or any revision thereto.

E. Indemnity

Contractor shall defend, indemnify and hold harmless Metro, and its Board Members, employees and agents from and against all liability, claims, demands actions, costs, judgments, penalties, damages, losses and expenses arising out of or in connection with Contractor's failure to comply with or failure to carry out its responsibilities under all applicable provisions of Sections B, C and D of this Article.

RR-23 CHARTER SERVICE OPERATIONS

A. Applicability

This Article applies to federally funded Operational Service Contracts.

- B.** Contractor shall comply with 49 U.S.C. 5323(d) and 49 CFR Part 604, which provides that recipients and subrecipients of FTA assistance are prohibited from providing charter service using federally funded equipment or facilities if there is at least one private charter operator willing and able to provide the service, except under one of the exceptions at 49 CFR 604.9. Any charter service provided under one of the exceptions must be "incidental," i.e., it must not interfere with or detract from the provision of mass transportation.

RR-24 SCHOOL BUS REQUIREMENTS

A. Applicability

This Article applies to federally funded Operational Service Contracts

- B.** Pursuant to 49 U.S.C. 5323(f) and 49 CFR Part 605, recipients and subrecipients of FTA assistance may not engage in school bus operations exclusively for the transportation of students and school personnel in competition with private school bus operators unless qualified under specified exemptions. When operating exclusive school bus service under an allowable exemption, recipients and subrecipients may not use federally funded equipment, vehicles, or facilities.

RR-25 FEDERAL PATENT AND DATA RIGHTS*

A. Applicability

This Article applies to each contract involving experimental, developmental or research work and for which the purpose of the FTA grant is to finance the development of a product or information.

B. Subject Data

The term "Subject Data" used in this Article means recorded information, whether or not copyrighted, that is delivered or specified to be delivered under the Contract. The term includes graphic or pictorial delineation in media such as drawings or photographs; text in specifications or related performance or design-type documents; machine forms such as punched cards, magnetic tape, or computer memory printouts; and information retained in computer memory. Examples include, but are not limited to: computer software, engineering drawings and associated lists, specifications, standards, process sheets, manuals, technical reports, catalog item identifications, and related information. The term "Subject Data" does not include financial reports, cost analyses, and similar information incidental to contract administration.

C. Restrictions on Subject Data

The following restrictions apply to all Subject Data first produced in the performance of the Contract:

1. Except for its own internal use, metro or Contractor may not publish or reproduce Subject Data in whole or in part, or in any manner or form, nor may metro or Contractor authorize others to do so, without the written consent of the Federal Government, until such time as the Federal Government may have either released or approved the release of such data to the public; this restriction on publication, however, does not apply to any contract with an academic institution.
2. In accordance with 49 C.F.R. § 18.34 and 49 C.F.R. § 19.36, the Federal Government reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for "Federal Government purposes," any Subject Data or copyright described in subparagraphs C.2(a) and C.2(b) of this Paragraph C.2. As used in the previous sentence, "for Federal Government purposes," means use only for the direct purposes of the Federal Government. Without the copyright owner's consent, the Federal Government may not extend its Federal license to any other party.
 - (a) Any Subject Data developed under the Contract, whether or not a copyright has been obtained; and
 - (b) Any rights of copyright purchased by metro or Contractor using Federal assistance in whole or in part provided by FTA.
3. When FTA awards Federal assistance for experimental, developmental, or research work, it is FTA's general intention to increase transportation knowledge available to the public, rather than to restrict the benefits resulting from the work to participants in that work. Therefore, unless FTA determines otherwise, Metro and Contractor performing experimental, developmental, or research work required by the Contract shall permit FTA to make available to the public, either FTA's license in the copyright

to any Subject Data developed in the course of the Contract, or a copy of the Subject Data first produced under the Contract for which a copyright has not been obtained. If the experimental, developmental, or research work, which is the subject of the Contract, is not completed for any reason whatsoever, all data developed under the Contract shall become Subject Data and shall be delivered as the Federal Government may direct. This Paragraph C.3 shall not apply to adaptations of automatic data processing equipment or programs for Metro's or Contractor's use whose costs are financed in whole or in part with Federal assistance provided by FTA for transportation capital projects.

4. Unless prohibited by state law, upon request by the Federal Government, Metro and Contractor shall indemnify, save, and hold harmless the Federal Government, its officers, agents, and employees acting within the scope of their official duties against any liability, including costs and expenses, resulting from any willful or intentional violation by Metro or Contractor of proprietary rights, copyrights, or right of privacy, arising out of the publication, translation, reproduction, delivery, use, or disposition of any data furnished under the Contract. Neither Metro nor Contractor shall be required to indemnify the Federal Government for any such liability arising out of the wrongful act of any employee, official, or agent of the Federal Government
5. Nothing contained in this Article shall imply a license to the Federal Government under any patent or be construed as affecting the scope of any license or other right otherwise granted to the Federal Government under any patent.
6. Data developed by Metro or Contractor and financed entirely without using Federal assistance provided by the Federal Government that has been incorporated into work required by the Contract is exempt from the requirements of Paragraphs 2, 3, and 4 of this Article, provided that Metro or Contractor identifies that data in writing at the time of delivery of the Contract Work.

D. Patent Rights

If any invention, improvement, or discovery is conceived or first actually reduced to practice in the course of or under the Contract, and that invention, improvement, or discovery is patentable under the laws of the United States of America or any foreign country, Metro and Contractor shall take actions necessary to provide immediate notice and a detailed report to the party at a higher tier until FTA is ultimately notified.

E. Provision of Rights in Invention to Federal Government

Unless the Federal Government later makes a contrary determination in writing, irrespective of Contractor's status (a large business, small business, state government or state instrumentality, local government, nonprofit organization, institution of higher education, individual), Metro and Contractor shall take the necessary actions to provide, through FTA, those rights in that

invention due the Federal Government as described in U.S. Department of Commerce regulations, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," 37 C.F.R. Part 401.

RR-26

PUBLIC WORKS CONTRACT REGISTRATION LAW

This Contract is subject to the provision of California Law regarding Public Works, including, but not limited to California Labor Code. Among other things, the Legislature has established a public works contractor registration program to replace prior Compliance Monitoring Unit (CMU) and Labor Compliance Program (LCP) requirements for bond-funded and other specified public works projects.

Contractors seeking to perform work on Metro's state/local and federally funded public works contracts are now subject to registration requirements in order to bid or perform work on state and local public works projects (as defined under the Labor Code).

Contractors must meet a set of minimum qualifications to be registered as eligible to bid and work on state and local public works projects. Those qualifications are currently:

- Must have workers' compensation coverage for any employees and only use subcontractors who are registered public works contractors.
- Must have Contractors State License Board license if applicable to trade.
- Must have no delinquent unpaid wage or penalty assessments owed to any employee or enforcement agency.
- Must not be under federal or state debarment.
- Must not be in prior violation of this registration requirement once it becomes effective. However, for the first violation in a 12 month period, a contractor may still qualify for registration by paying an additional penalty (See L.C. Section 1725.5 for current requirements).

Metro shall not accept any bid nor award any contract without proof of the contractor's and subcontractor's current registration.

The California Department of Industrial Relations (DIR) will post a list of registered contractors and subcontractors on its website so that awarding bodies and contractors will be able to comply with requirements to only use registered contractors and subcontractors.

This Contract is subject to compliance monitoring and enforcement by the DIR.

Contractors and subcontractors on *all* public works projects will be required to submit electronic certified payroll records (CPRs) to the Labor Commissioner

unless excused from this requirement. Contractor and subcontractors are still required to submit CPRs directly to Metro, as well.

Prime contractors will be required to ensure that their subcontractors subject to this requirement are properly registered with the DIR.

RR-27

**COMPLIANCE WITH CALIFORNIA HEALTH AND SAFETY CODE
(HSC) §25250.51**

a. Applicability

This article applies to all contracts containing motor vehicle brake friction materials as listed in the sections in this regulatory requirement.

b. Contractor shall comply with California SB 346 adding §25250.51 to the California Health & Safety Code as follows:

1. On or after January 1, 2014, any motor vehicle brake friction materials containing any of the following constituents in an amount that exceeds the following concentrations shall not be sold in this state:

- i. Cadmium and its compounds: 0.01% by weight;
- ii. Chromium (VI)- salts: 0.1% by weight;
- iii. Lead and its compounds: 0.1% by weight;
- iv. Mercury and its compounds: 0.1% by weight; and
- v. Asbestiform fibers: 0.1% by weight

2. The brake constituents shall not contain any Lead or Asbestos.

END OF REGULATORY REQUIREMENTS

SPECIAL PROVISIONS

All Articles, Subarticles, or portions of the Contract noted by a asterisk (*) shall be included in all Subcontracts of any tier.

SP-01 DEFINITIONS

The following are definitions of special terms used in this Contract.

Auxiliary Power System	Provides single or three phase power for functions other than propulsion.
Bus or Buses	The entire Vehicle and all Units and parts thereof and shall include Base Order Vehicles and Option Vehicles. Also referred to as Equipment in the General Conditions.
Bus Fleet	Buses delivered and accepted of a like type, size and configuration are considered to be a Bus Fleet. For purposes of fleet defect and warranty claims a bus fleet consists of those buses that have been accepted and entered into service at the time of fleet defect or warranty claim notification and does not include incomplete or unfinished buses.
Business days	Monday through Friday excluding LACMTA holidays. As of 1/1/10, LACMTA holidays are New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas Day.
Charging/Fueling System	Any charging or fueling system or sub-system required to fuel or recharge the vehicle batteries whether installed or onboard the vehicle or installed at MTA facility.
CNG	Compressed natural gas. Mixtures of hydrocarbon gases and vapors consisting principally of methane in gaseous form that has been compressed for use as a vehicle fuel.
Configuration and Performance Approval	A determination by LACMTA, as described in the Section entitled CONFIGURATION AND PERFORMANCE APPROVAL, that the Pilot Vehicle Delivered and tendered for Acceptance conform to the Specification and has been Accepted by LACMTA.
Defect	Patent or latent flaw, in the design, material or workmanship of the Vehicle, or any Unit or part thereof, which causes a malfunction or failure, or Contractor's failure to meet the specifications and/or General Technical Requirements of this Contract that causes a Vehicle, or any Unit or part thereof to cease operating or causes it to operate in a degraded mode. The term Defect also refers to the failure that is caused by the Defect, and is sometimes also referred to as a Failure. See also Deficiency in the General Conditions.
Delivery, Delivering, or Delivered	Presentation of a Vehicle to LACMTA at the LACMTA Support Service Center for the purposes of inspection
First Article Inspection or "FAI"	Inspection by LACMTA of a Vehicle, Unit, system, subsystem, component to ascertain Contractor's

	engineering and manufacturing compliance with the Technical Specifications and drawings, or part.
First Article Vehicle (FAV)	Designation for one of the first ten (10) Vehicles produced on the production line. The First Article may be used as a reference point for resolving contractual issues between the Manufacturer and LACMTA.
Labor Rate	LACMTA's current straight time wage scale for a Warrant Equipment Mechanic (WEM) or an A Mechanic including fringe benefits and overhead calculated at 80% of the hourly rate. As of July 2016, the rate for an A Mechanic is \$60.77 per hr. Labor Rate adjusts each six months and the Contractor will pay the adjusted Labor Rate.
Liens	Any and every lien of any kind whatsoever against the Work, any monies due or to become due from LACMTA to Contractor, and/or any other property of LACMTA, for or on account of the Work, including any Public Lien.
Low Voltage Generation and Distribution	Provides 12 or 24 volt DC to properly charge and maintain the charge on low voltage batteries as well as provide power for a variety of bus systems including; lighting, multiplex and other control modules.
Major Systems	The engine, transmission, steering and axles, brakes, HVAC equipment, door systems including wheelchair ramp, lighting, electrical, Vehicle body, destination sign and air system.
Notice of Acceptance	Notice given by LACMTA to the Contractor that a Vehicle, including a Pilot Base or Option Vehicle, has passed all required tests and is being accepted by LACMTA into revenue service.
Notice of Exercise of Options	The Notice to the Contractor from LACMTA that LACMTA is exercising its option to purchase additional Vehicles under the provisions defined in the Section entitled Option Vehicles.
Operational Life	The intended engineered/design lifespan of equipment.
Original Equipment Manufacturer (OEM)	The manufacturer of the original equipment on a Vehicle or in any Unit or Part thereof. An OEM Standard is a standard, requirement, or recommendation of the OEM which shall apply to all similar equipment not manufactured by the OEM.
Pilot Vehicle	Vehicle manufactured following issuance of the Notice to Proceed, which after acceptance by LACMTA pursuant to the Section entitled, "PILOT VEHICLE" becomes the standard for production Vehicles that follow.

Propulsion Power Assembly (PPA) - CNG	<p>The Propulsion Power Assembly shall include but not be limited to the following:</p> <ul style="list-style-type: none"> a) Engine cradle (if applicable) b) Engine c) Transmission d) Turbocharger e) Electric Cooling System f) Power Generator (for HVAC and Electric Accessories) g) Starter h) Heat Exchanger (transmission and engine) i) Oil filters (bypass filter if used) j) Muffler / Catalyst unit k) Any other component not mentioned above but required for the satisfactory and legal operation of the engine.
Primary Propulsion Unit (PPU) - ZEB	<p>The Primary Power Unit shall include but not be limited to the following:</p> <ul style="list-style-type: none"> a) Traction Motor b) Transmission/Gearbox c) Radiator d) Electric System Controller e) A/C Compressor f) Charging Systems (Low/High Voltage) g) Cooling Systems h) Oil filter (bypass filter if used) i) Air Compressor j) Auxiliary Inverter <p>Any other component not mentioned above but required for the satisfactory and legal operation of the Bus.</p>
Preventive Maintenance Program	Preventive maintenance program as referenced throughout this specification with the abbreviation "PMP".
Project Manager	LACMTA's Authorized Representative designated to manage the project (except LACMTA's Authorized Representative for Contract administration), and includes the Project Manager's duly authorized representative and any successor or successors duly appointed or any deputy or substitute who shall be appointed as an Authorized Representative by LACMTA, provided Contractor shall have received Notice of such designation or appointment.
Related Defect	Damage inflicted on a Vehicle or any Unit, part, component or subsystem as a direct result of a Defect.
Subcontractor	An individual or organization that enters into a Contract to furnish materials, labor and services or any combination thereof in connection with the Work directly for or in behalf of the Contractor and whether or not in privity of Contract with the Contractor or another Subcontractor of any tier.
Supplier	Any manufacturer, company, or agency, providing Units, components, subassemblies or parts for inclusion in the

	Vehicle (supplier items shall require qualifications by type and acceptance tests in accordance with requirements defined in the Quality Assurance Section).
Traction Motor(s)	Any motor drive system(s) whether axle or chassis mounted.
Unit	A term sometimes used to either individually or collectively to refer to a system, subsystem, component, assembly, subassembly or part of a Vehicle. Where applicable, the specific terms Vehicle, system, subsystem, and part may be used to describe specific Units of the Vehicle. See also Lowest Level Replaceable Unit defined in Warranty Requirements.
Vehicle	Another term for the entire Bus and all Units and parts thereof and shall include Base Order Vehicles and Option Vehicles. Also referred to as Equipment in the General Conditions.
Working Drawings or Drawings	All drawings necessary or required for the prosecution of the Work
Work Program	A Work Program includes specific repair procedures and/or work instructions, and a schedule for completion of such repairs (e.g. Fleet Defects).

SP-02 DBE PARTICIPATION

The Contractor must have at all times an approved or not disapproved, Disadvantaged Business Enterprise (DBE) program on file as a Transit Vehicle Manufacturer (TVM) with U.S. Department of Transportation, Federal Transit Administration (FTA).

Prior to award of any Contract, the Contractor will be required to furnish and complete the certification of compliance with the provisions of 49 CFR Part 26 (Exhibit "C" DBE CERTIFICATION).

SP-03 ORGANIZATIONAL CONFLICTS OF INTEREST*

This Contract is subject to the restrictions against organizational conflicts of interest promulgated by the Federal Transit Administration in FTA Circular 4220.1F dated November 1, 2008 or successor circulars. Contractor and its Subcontractors shall at all times comply with such restriction in connection with the Services it provides to and on behalf of LACMTA. Without limiting the generality of the foregoing, Contractor shall not provide Services to LACMTA, under this Contract, which would constitute or create an organizational conflict of interest, including but not limited to any of the following that could result in a lack of impartiality or impaired objectivity, unequal access to information, and biased ground rules, for this Contract or any other contract for LACMTA:

A. Influenced Specifications or Statement of Work

The Contractor's prior work product, whether it is performed on behalf of LACMTA or another public or private entity, has been relied upon in

establishing, or significantly influenced, the specifications or Statement of Services under this Contract.

B. Opportunity to Create Contracting Opportunities

The Contractor's prior work product, whether it is performed on behalf of LACMTA or another public or private entity, afforded an opportunity for the Contractor to make or influence findings with respect to this Contract.

C. Evaluation of Prior Work Product

The Contractor would be in position to evaluate its own prior work product as part of this Contract, whether the prior work product is performed on behalf of LACMTA or another public or private entity; or as part of this Contract the Contractor would be in a position to assess its prior work product whether or not it was performed on behalf of LACMTA or another public or private entity.

D. Access to Information

The Contractor received confidential or other information as part of the services performed for LACMTA or another public or private entity which provides the Contractor with an unfair competitive advantage to obtain this Contract or another contract with LACMTA.

SP-04 NOTICES AND SERVICE THEREOF*

A. Any Notice legally required to be given by one party to another under the Contract, including but not limited to those regarding interpretation of the Contract or changes thereto, shall be in writing and dated. The Notice shall be signed by the party giving such Notice or by a duly authorized representative of such party.

B. Notices shall not be effective for any purpose whatever unless enclosed in a sealed envelope and transmitted by registered mail or any certifiable delivery service addressed to:

Los Angeles County Metropolitan Transportation Authority
One Gateway Plaza
Los Angeles, CA 90012-2952
Attention: Hernandez, Elizabeth
Contract No.: OP28367-000

C. All Notices to the Contractor will be enclosed in a sealed envelope and transmitted by personal delivery to the Contractor or its authorized representative or by registered mail or any certifiable delivery service addressed as follows:

ELDORADO NATIONAL (CALIFORNIA), INC.
9670 Galena Street
Riverside, CA 92509
Attention: Richard Himes, Contract Administration Manager

D. Any Notice of changes of address shall be given according to the provisions of this Special Provision.

SP-05 APPROVED SUBCONTRACTORS

Subcontractor	Services Performed	DBE/ MBE/ WBE
Six Robblees, Inc.	Alcoa Wheels	
Agility Fuel Systems	CNG Fuel Storage System	
Akzo Nobel Coatings, Inc.	Sikkens Exterior Paint	
Amerex	Methane Gas Detection System	
BAE Systems	High Voltage Belt-Driven Generator	
Berendsen Fluid Power, Inc.	Electric Power Steering	
Cummins, Inc.	CNG Engine	
Dura Automotive Systems	Side Windows	
Engineered Machine Products (EMP)	Electric Cooling Fan	
Firestone Industrial Products	Air Springs	
Freedman	Passenger Seats	
Hanover Displays	Destination Signs and Interior Information Signs	
Harris Battery	Odyssey Batteries	
I/O Controls	Multiplex, Event Data Logger, LED Interior Lighting, LED low beam headlights	
Lift-U, Division of Hogan Mfg, Inc.	Wheelchair Ramp	
Lucerix International Corp	Exterior Mirrors	
Meritor	Axles	
Mobile Climate Control	Electric HVAC	
PowerEx	Electric Air Compressor	
SafeFleet/Specialty Manufacturing, Inc.	Bumpers	
Sportworks Northwest, Inc.	Bike Rack	
UTC Fire & Security Americas Corporation, Inc - A subsidiary of United Technologies Corp (UTX)	MobileView Camera System	
Valley Power Systems, Inc.	Allison Transmission	
Vanner	Equalizer	
Ventura Systems	Electric Passenger Doors	

SP-06 PILOT VEHICLE

The Contractor shall produce **one Pilot Vehicle**. This Vehicle shall be one of the ultimate quantity of the Vehicle order. The Pilot Vehicle shall demonstrate that the Vehicles fully meet all requirements of the Contract. The Pilot Vehicle shall be produced and delivered to LACMTA for a minimum of ninety (90) days prior to the initiation of any production activities for the remaining vehicles unless otherwise authorized in writing by LACMTA. In

the event that non-compliance is identified, LACMTA shall to the extent practicable notify the Contractor of said non-compliance. No later than the end of the ninety-day period, LACMTA shall issue a written report to the Contractor that advises the Contractor of any non-compliance issues and/or any proposed Modifications or changes required on the remaining Vehicles. Contractor shall perform the necessary corrective actions to address the non-compliance issues prior to acceptance of the Pilot Vehicle. Upon LACMTA's acceptance of the Pilot Vehicle, a Notice to Proceed shall be issued for Contractor to proceed with the manufacturing of the production vehicles.

In the event that the Pilot Vehicle does not initially comply with all performance criteria contained in the Technical Specifications, LACMTA shall have the right to retain a portion of any Milestone Payment that may have been established for the Pilot Vehicle. The amount to be withheld shall be based on the lack of compliance and may equal up to the entire Milestone Payment amount for the Pilot Vehicle. This amount shall be withheld until compliance is demonstrated. In the event that the compliance is subsequently determined to be impossible to achieve, LACMTA may require all or a portion of the Milestone Payment for the Pilot Vehicle to be forfeited as a penalty for the non-compliance. The amount of the penalty shall be negotiated by the parties.

SP-07 CONFIGURATION AND PERFORMANCE APPROVAL

In order to assess the Contractor's compliance with the Technical Specifications, LACMTA and the Contractor shall jointly conduct a Configuration and Performance review of the Pilot Vehicle. In addition to the items listed below, the Pilot Vehicle review shall include any items identified for review during the Pre-Production Meeting (see SP-20 Pre-Production Meetings)

LACMTA, as a part of the Configuration and Performance Approval process, may permit certifications to be submitted in lieu of performance based on physical testing (see the Technical Contract Deliverables, in the Technical Specification TS 88.3).

At a minimum, the following dimensional/performance tests shall be included in the Configuration and Performance Approval:

- a. Complete electrical system audit.
- b. Dimensional requirements audit
- c. Seating capacity
- d. Water Test
- e. Water runoff test
- f. Function test of systems/subsystems and components
- g. Sound / noise level tests
- h. Vehicle top speed
- i. Acceleration tests
- j. Brake stop tests
- k. Airflow tests

- l. PA function tests
- m. Air/brake system audit
- n. Individual axle weight
- o. Standee capacity
- p. Body deflection tests
- q. Silent alarm function test
- r. Interior lighting
- s. Exterior lighting
- t. Gradability test
- u. Kneeling system function
- v. HVAC pull down/heat
- w. Speedometer
- x. Outside air infiltration (smoke)
- y. Wheelchair Ramps

Engine performance qualification – this test shall be jointly conducted by Contractor and engine manufacturer (including but not limited to: charge air cooler performance, air to boil test, loss of coolant, fuel system electrical inputs, engine protection system).

Transmission performance qualifications- this test shall be jointly conducted by Contractor and transmission manufacturer (including, but not limited to: retarder operation, heat exchanger, interface with ABS, electrical inputs).

SP-08 FIRST ARTICLE/PRE-DELIVERY TESTS AND INSPECTION

The purpose of a first article inspection is to confirm that any components, systems, subsystems, major assemblies, subassemblies, products, parts, apparatuses, articles and other materials comply with the Technical Specifications and other Contract documents.

LACMTA reserves the right to conduct a First Article Inspection (FAI) on one of the first ten (10) Vehicles (or LACMTA'S first order of vehicles) at the Contractor's plant to verify that the Vehicle complies with the terms of this Contract including any changes agreed to during the Pilot Bus acceptance. Vehicles will not be released for delivery to LACMTA pending LACMTA's completion and approval of the First Article Vehicle. At LACMTA's sole option, LACMTA may conduct an FAI on each lot of the base order and on any subsequent Option order. If an FAI is required for an Option order, the selected Vehicle may be required to successfully pass all performance tests as required in the Technical Specification.

The Contractor's pre-delivery tests and inspections of all Vehicles shall be performed at or near the Contractor's plant; they shall be performed in accordance with the procedures defined in Quality Assurance Provisions, and they may be witnessed by the Resident Inspector and/or LACMTA Project Staff (as designated by the Contracting Officer). When the Vehicle passes the pre-delivery tests and inspections, the Resident Inspector shall authorize the Contractor to Deliver the Vehicles to LACMTA's designated point of delivery.

If the Contractor is delayed in Delivering Vehicles as a result of failure to pass the FAI, the delay shall be the responsibility of the Contractor and shall not be an excusable delay.

SP-09 VEHICLE DELIVERY SCHEDULE

The Vehicles shall be delivered at a rate not to exceed 10 Vehicles per week, Monday through Friday. Hours of delivery shall be 6:00 a.m. through 2:00 p.m. LACMTA will consider allowing deliveries outside of normal business hours with prior approval and on a case-by-case basis.

During the Pre-Award Site Visit, the Contractor shall provide its production schedule and/or other material to LACMTA for the purpose of verifying available production capacity to comply with the above stated schedule.

SP-10 LIQUIDATED DAMAGES

It is mutually understood and agreed by and between the parties to the Contract that time is of the essence with respect to the completion of the Work and that in case of any failure on the part of the Contractor to deliver the buses within the time specified in SP-09 Vehicle Delivery Schedule, except for any excusable delays as provided in "Excusable Delays/Force Majeure" or any extension thereof, the LACMTA will be damaged thereby.

If Contractor does not deliver all of the Vehicles ordered by LACMTA under this Contract in a condition to be accepted by LACMTA within the time limit set forth in the Contract, damages will be sustained by LACMTA. It is, and will be, impracticable to determine the actual damages which LACMTA will sustain in the event of and by the reason of such delays. Therefore, pursuant to Government Code Section 53069.85 the Contractor shall pay LACMTA the sum of \$300.00 per Vehicle per day for each calendar day that each Vehicle is delayed beyond the scheduled delivery date set forth in the Contract. Liquidated damages for each Vehicle shall continue until that Vehicle is delivered, subject to extensions granted under the Changes section of this Contract, including changes for Unavoidable Delays. In case liquidated damages are not paid, LACMTA may deduct the amount thereof from any money due or to become due the Contractor under the Contract.

SP-11 ISSUANCE OF THE NOTICE TO PROCEED

LACMTA may issue multiple Notices to Proceed. A Limited Notice to Proceed may be issued following Contract execution to initiate the Pre-Production process and manufacture of the Pilot Vehicle.

All production work performed by Contractor prior to Acceptance of the Pilot Vehicle by LACMTA shall be subject to rework and correction at Contractor's cost, to correct any Defects discovered during the Pilot Vehicle Acceptance process.

SP-12 DELIVERY PROCEDURE

Delivery of a Vehicle or Unit shall be complete upon Acceptance in writing by LACMTA's Project Manager or his designee pursuant to the Section entitled, SP-25 ACCEPTANCE OF VEHICLE. Upon Contractor's tender of Delivery to a designated point, LACMTA will take possession of the Vehicle or Unit for the purpose of inspection and testing.

Delivery of the Vehicles and Units shall be F.O.B. destination, at the designated point of delivery listed herein. The designated point of delivery shall be LACMTA's Service Support Center located at: 900 Lyon Street, Los Angeles, CA 90012, or other location designated as such in writing by LACMTA.

SP-13 PERFORMANCE BOND/GUARANTEE

The Contractor shall furnish, at its own expense, a performance guarantee in the form of a cashier's check, a letter of credit in a form approved by LACMTA before Proposal submission, or a performance bond from a surety duly licensed to do business in the state of California having a financial rating from A.M. Best Company of "A VIII" or better, in the amount of **15% of the Contract Price** and shall remain in force until said obligations have been fulfilled. A separate Performance Bond shall be required for any Option Vehicles ordered under this Contract.

The bond amount may be reduced as follows for the Base Order and for any Option Orders:

1. To sixty-five (65) percent of the original Bond value when fifty (50) percent of the required number of buses are delivered and accepted;
2. To thirty (30) percent of the original Bond value when seventy-five (75) percent of the required number of buses are delivered and accepted; and
3. To zero (0) percent of the original Bond value when one hundred (100) percent of the required number of buses are delivered and accepted.

In the case that a surety becomes insolvent, its license is revoked or suspended, or in the case of a surety approved on the basis that it is listed as an approved federal surety and such federal approval is revoked or suspended, the Contractor, shall immediately notify LACMTA, and within five (5) days after notice, shall replace with an acceptable and sufficient surety or sureties. LACMTA may suspend payments on the Contract until a properly rated replacement performance bond is delivered by Contractor to LACMTA. The Contractor shall pay all costs of compliance with this Section. If the Contractor fails to do so, such failure shall be an event of default.

SP-14 MOTOR VEHICLE POLLUTION REQUIREMENTS

The Contractor shall furnish to LACMTA a certification in writing with each Vehicle delivered that:

- Vehicles will meet Federal and California pollution requirements.
- The horsepower of the Vehicle is adequate for the speed, range, and terrain in which it will be required to operate and meet the demands of all auxiliary power equipment.

SP-15 ENGINE EMISSIONS CERTIFICATE

The engine manufacturer shall certify to the lowest NOx level available for the engine being provided. Following the Notice of Intent to Award and prior to the completion of the Pilot Vehicle, the Contractor shall submit to LACMTA a signed copy of an Executive Order from the California Air Resources Board (CARB) which states the level to which the engine emissions are certified. This letter shall be in sufficient detail to be used by LACMTA to participate in the NOx trading program if said program is still in effect.

Maximum Emission Levels for Transit Fleets following Alternate Fuel Path

Year	Oxides of Nitrogen (NOx) Grams per brake horsepower- hour	Particulate Matter (PM) grams per brake horsepower- hour
2010	0.2	0.01
2013	0.2	0.01
2016	0.02	0.01

SP-16 DESIGN AND MANUFACTURING RESPONSIBILITY

The Contractor shall be responsible for the design and manufacture of the Vehicles. Any omission from or error in description in this contract, including without limitation the Technical Specifications, or LACMTA's approval of any Unit, or element of design or construction, of any Vehicle shall not in any way relieve the Contractor of responsibility for the adequacy of the design, manufacture or performance of a Vehicle. The Vehicle shall be fit for its intended purpose and use. The provision of any drawings, Technical Specifications, or other data by LACMTA shall be solely for the purpose of describing the product which is the subject matter of this Contract, and LACMTA does not thereby assume any responsibility whatsoever for the design or manufacture of any completed Vehicle or any Unit or portion thereof.

Notwithstanding any omission or misdescription from any specification:

- A. The Vehicle and any Unit thereof, and its associated equipment, must be of the best engineered design for the service intended and shall include an adequate margin of safety and durability into the design of Vehicle.
- B. The Contractor shall design and construct the Vehicles, and select the materials and equipment to obtain the strength and reliability required to achieve the maximum Operational Life for the Vehicles.

- C. The Contractor shall furnish adequate labor, tools and materials, parts and equipment necessary for manufacturing a complete Vehicle in accordance with the Contract.
- D. The Contractor shall have full responsibility for supplying all design, manufacturing, materials, parts and equipment required to make the Vehicle complete and ready for service. Unless required by the Technical Specification, fareboxes, radios, and other items that are installed by LACMTA shall not be the responsibility of the Contractor.

SP-17 INTERCHANGEABILITY

All Units delivered under this Contract, whether provided by a Subcontractor or Supplier, or manufactured by the Contractor, shall be duplicates in design, manufacture, and installed to assure Interchangeability among Vehicles in this Contract. This Interchangeability shall extend to the individual Units, components and parts as well as to their locations in the Vehicles. The requirement for interchangeability shall apply to the entire Contract.

For Option Vehicles, LACMTA will consider changes such as product improvements on a case-by-case basis. LACMTA's basic expectation for any such change is that the new product will perform at least as well if not better than the original. To that end, the Contractor shall be required to obtain and provide an extended warranty at no cost for any proposed change in components. The Contractor shall not be required to retrofit product improvements authorized for an Option Vehicle order to the Base Order. All such changes shall be processed pursuant to the Section entitled, CHANGES. The Contractor shall not modify any Unit approved on the Pilot Vehicles, including any of the listed Units contained on the Technical Submittal that was submitted with the Proposal, except by written Modification.

SP-18 MATERIALS AND WORKMANSHIP RESPONSIBILITY

The Contractor shall be responsible for all materials and workmanship in the manufacture of the Vehicles, any Unit and Parts thereof, whether the same are manufactured by the Contractor or Subcontractor or purchased from a Supplier. This provision excludes LACMTA furnished equipment such as fare boxes and radios if applicable, and/or tires leased or supplied by LACMTA, except to the extent that such equipment is damaged by the failure of any Unit for which the Contractor is responsible, and except to the extent that the damage to such equipment is caused by the Contractor during the manufacture, testing or repair of the Vehicles.

SP-19 SPARE AND REPLACEMENT PARTS

The Contractor guarantees the availability of spare and replacement parts for these Vehicles for a 15-year period (or the operational design life of the vehicle if greater than 15 years) after the date of the Acceptance of the final bus. Spare parts shall be of the latest configuration, interchangeable with the

original components and shall be manufactured in accordance with industry standards and the quality assurance provisions of this Contract. Contractor and its Subcontractors and Suppliers agree to provide LACMTA with all documents necessary to make or manufacture spare parts after the 15 year period.

Contractor shall provide LACMTA Contract Administrator with a detailed list of spare and replacement parts on an excel spreadsheet. Any parts referred to as “sets” or “kits” are unacceptable and must be broken down to the component level on the spreadsheet. LACMTA requires the following information for each spare or replacement part:

1. Item by Item Listing
2. Affected System (i.e. PPA)
3. Quantity Provided
4. Product Name/Description (starting with the appropriate key word, followed by key word modifiers)
5. Major Classifications: Illustrated Parts Catalog Section (IPS) Name
6. Manufacturer's Name, Address and Telephone Number
7. Manufacturer's Part Number and Model Number
8. Unit of Measure (each, feet, etc.)
9. Unit Cost
10. Local Distributor (Name, Address, federal ID & Phone Number)
11. Distributor's Part Number
12. Authorized OEM Rebuild Facility (Name, Address and Phone Number)
13. Confirmation of whether the part is hazardous or not. Include MSDS sheet if hazardous
14. Recommended stocking quantities
15. Alternate Vendor Sources

Contractor Shipment:

LACMTA will assign an internal purchase order number, item code and delivery location for the Contractor to use when creating packing slips for components on the Spare Part Package. The Contractor will provide copies of each packing slip before scheduling a spare parts delivery to LACMTA. Each pallet or crate, within a shipment, shall have a packing slip that identifies the material inside each pallet or crate. All sequentially numbered packing slips will include:

- LACMTA's assigned purchase order
- LACMTA's assigned item code
- Manufacturer's number
- Illustrated Parts Catalog description
- Quantity delivered and back ordered

SP-20 PRE-PRODUCTION MEETINGS

In order to assess the Contractor's compliance with the Technical Specifications, LACMTA and the Contractor shall conduct at least one formal

pre-production meeting. At the Pre-Production Meeting(s), Contractor and LACMTA shall jointly develop a configuration and performance review document for review of the Pilot Vehicle (also refer to SP-7 Configuration and Performance Approval). This document shall include appropriate performance standards for each test that is being required and the document shall become part of the official record of the pre-production meeting.

Unless otherwise agreed, one meeting shall be held at LACMTA's facility. At the first meeting, the Contractor shall make a formal presentation on their Quality Assurance Program for LACMTA'S review and comments. Contractor shall provide a formal production schedule at this meeting. The parties shall make best efforts to resolve all the issues/questions discussed at the pre-production meeting(s), to the satisfaction of LACMTA's Project Manager (or designee), within six (6) weeks after the date of the last Pre-Production meeting.

The Contractor shall prepare and issue formal minutes for each meeting no later than two (2) weeks following the meeting. The minutes shall be approved in writing by the representatives of the Contractor and LACMTA. Discrepancies noted in the minutes are to be reviewed further and every effort is to be made to resolve issues. The Project Manager will issue a written confirmation that all major open issues have been satisfactorily resolved.

SP-21 CONTRACT STATUS REPORTS

Contractor shall provide written, weekly status reports following the initial Pre-Production Meeting (report format to be determined by LACMTA during the Pre-Production Meeting). In addition to weekly status reports, the Contractor is also required to participate in weekly status meetings via teleconference beginning on the date of the Notice to Proceed through the end of the warranty period. LACMTA and Contractor shall attempt to mutually agree on who is to attend all meetings. If agreement cannot be reached, LACMTA may designate the attendees and time of meetings.

SP-22 PRODUCTION CONTINUITY

Contractor production gaps, if necessary, may occur during the production run. Production gaps shall be scheduled and approved in advance with LACMTA on a mutually acceptable schedule. Regardless of the production schedule, LACMTA Vehicle Series numbers, the Vehicle number located on the roof and other areas of the Vehicle, shall be sequential.

At LACMTA's sole option, LACMTA may conduct a FAI on each lot of the vehicle order or following any production gaps. If an FAI is required for any production gap, the selected Vehicles may be required to successfully pass all performance tests as required in the Technical Specification.

SP-23 ASSUMPTION OF RISK OF LOSS

LACMTA shall assume risk of loss of the Vehicle upon taking Delivery of the Vehicle for inspection and testing, as described in SP-10, DELIVERY PROCEDURE. Except for the period when LACMTA takes possession of the Vehicle for inspection and testing, the Contractor shall have risk of loss of the Vehicle, including any damages sustained during the delivery operation until the Vehicle is delivered to the LACMTA Support Service Center. If a Vehicle is driven to the location of Delivery, drivers shall keep a maintenance log of the Vehicle in route and it shall be delivered to LACMTA with the Vehicle. If the Vehicle is rejected pursuant to SP-23, NON-ACCEPTANCE OF VEHICLES, and the Vehicle is tendered back to Contractor for any reason, Contractor has the risk of loss upon such tender.

SP-24 CONDITIONAL ACCEPTANCE AND ACCEPTANCE OF PRODUCTION VEHICLES

Acceptance Testing of the Production Vehicles shall occur in accordance with all testing requirements set forth in SP-07 Configuration and Performance Approval of the Contract, including all submittals, corrective actions and retrofits. LACMTA will notify Contractor in writing of acceptance or rejection of each Bus, and in the case of rejection, the reasons therefore.

If, during Acceptance Testing, LACMTA determines that one or more Buses is suitable for operation in revenue service, but that it is not totally responsive to the Contract requirements, due to only readily correctable minor, non-safety critical discrepancies or open items, LACMTA may, at its discretion, issue a "Notice of Conditional Acceptance". The Notice of Conditional Acceptance shall define the corrective actions necessary to achieve Acceptance Test approval. Such conditionally accepted vehicles shall then be available to LACMTA for temporary use in revenue service to meet LACMTA's needs. Upon receipt of a Notice of Conditional Acceptance, Contractor shall immediately initiate and execute the necessary corrective action(s) for acceptance of such vehicle(s). Corrective actions shall not exceed 90 days for any Bus that has received a Notice of Conditional Acceptance. Failure to complete the corrective actions defined by the Notice of Conditional Acceptance shall result in LACMTA's issuance of Notice of Non-Acceptance pursuant to SP-26 Non-Acceptance of Production Vehicle. If a Notice of Non-Acceptance is issued to any Bus that was once Conditionally Accepted, the Bus shall be subject to Liquidated Damages defined in article SP-10.

Vehicles that receive a Notice of Conditional Acceptance shall be eligible for milestone payment, and warranty.

SP-25 ACCEPTANCE OF PRODUCTION VEHICLE

Upon Contractor's Delivery of the Production Vehicle at a point of delivery, LACMTA shall take possession of the Vehicle and shall perform the inspections and tests described in the Quality Assurance Requirements. If the

Vehicle passes the Acceptance Testing, LACMTA will accept the Vehicle and issue a Notice of Acceptance no later than the fifteenth day after Contractor delivers the Vehicle to the LACMTA Support Service Center. If LACMTA has not issued a Notice of Acceptance or Notice of Conditional Acceptance or Notice of Non-Acceptance, within the 16th day from Delivery, LACMTA will be deemed to have accepted the Vehicle on the date it places the Vehicle into revenue service.

SP-26 NON-ACCEPTANCE OF PRODUCTION VEHICLE

If the Contractor fails to complete the corrective actions defined by the Notice of Conditional Acceptance or if a Vehicle fails any inspection or test during Acceptance Testing, LACMTA shall provide Contractor with Notice of Non-Acceptance, which shall be effective until Contractor makes the repair or corrects the deficiency at its own cost and LACMTA accepts the Vehicle after retest and inspection.

If a Vehicle is not accepted or is conditionally accepted, the Contractor, or its designated representative shall be responsible for the correction of all deficiencies. The Contractor may request LACMTA to perform limited work related to correction of deficiencies. Such work shall be subject to full reimbursement of LACMTA's costs by the Contractor. If LACMTA agrees to perform such limited work, it shall remain the sole obligation of the Contractor to correct the deficiencies. LACMTA's responsibility will be strictly limited to competently performing the limited work designated by the Contractor in accordance with the contractor's instructions. The Contractor shall warrant all such LACMTA work in the same manner as it warrants its own work.

If a Vehicle is delivered but not accepted because of a deficiency, or the Contractor fails to correct and complete a conditionally accepted Vehicle, the Contractor shall have ten (10) days after LACMTA's Notice of Non-Acceptance to correct the deficiency. Liquidated Damages shall thereafter be assessed in accordance with Contract Article CP-08, until all deficiencies have been corrected and LACMTA has provided a Notice of Acceptance.

SP-27 REPAIRS BY LACMTA

If a Vehicle is delivered but not accepted by LACMTA, the Contractor may request LACMTA to correct deficiencies or perform repairs. LACMTA will only perform limited work or replace defective parts as instructed by Contractor. It is at LACMTA's sole discretion whether to agree to make any such corrective action or repairs. If LACMTA elects to perform the repairs the following conditions apply:

- 1) Parts Used. LACMTA shall make the repairs designated by the Contractor using Contractor specified parts available from LACMTA stock or those supplied by the Contractor specifically for this repair. LACMTA will provide reports of all repairs covered by this procedure to the Contractor for reimbursement or replacement of parts.

- 2) Contractor Supplied Parts. If the Contractor supplies parts for repairs being performed by LACMTA, these parts shall be shipped prepaid to LACMTA from any source selected by the Contractor within fourteen (14) days after receipt of the request for said parts.
- 3) Return of Defective Parts. The Contractor may request that parts covered by this provision be returned to the manufacturing plant. The total cost for this action shall be paid by the Contractor.
- 4) Reimbursement for Labor. Contractor shall reimburse LACMTA for labor in accordance with Warranty Requirements SP-38.11.5.
- 5) Reimbursement for Parts. Contractor shall reimburse LACMTA within 30 days after LACMTA submits a claim to Contractor for LACMTA owned parts that LACMTA used to effect repairs. The Contractor shall reimburse LACMTA using the parts costs provided in the Contractor's parts catalogue effective at the date of the repair and shall include taxes and a 25% markup for handling costs.

SP-28 OPTIONS

A. Option Vehicles

Contractor hereby grants LACMTA and any permissible assignee pursuant to Subsection B hereof, options ("Options") to purchase up to 305 additional Vehicles ("Option Vehicles"). The Options shall be valid for a period of five (5) years from the effective date of the Contract. Options that are exercised shall have a minimum quantity of 150 for CNG and 10 for ZEB Vehicles. There shall be no minimum order quantity for any permissible assignee pursuant to SP-29 ASSIGNMENT OF OPTIONS. Subject to LACMTA's right to order Modifications pursuant to the Article entitled Modifications in the General Conditions of this Contract, the Option Vehicles shall have the same specifications of the Vehicles purchased under this Contract. Metro may exercise the Options by written Notice to the Contractor ("Notice of Exercise of Option") at any time on or before five years following the Effective Date of Contract ("Option Date").

The Price of the Option Vehicles shall be the Unit Price of the base order Vehicles, ("Base Order Price") adjusted by multiplying the Base Order Price by the following fraction:

$$\frac{\text{Preliminary Index Number on Month Prior to Notice of Exercise of Option}}{\text{Index Number on Effective Date of the Contract}}$$

The Index shall be the Producer Price Index for Truck and Bus Bodies, Series No. 1413 published by the United States Department of Labor or if such Index is no longer in use, then such replacement which is most comparable to the Index as may be designated by the Bureau of Labor Statistics, or as agreed by the parties. However in no case shall the

annual increase in the cost of a Vehicle created by the application of the above referenced Index exceed four percent (4%) unless the Contractor provides written evidence, such as Invoices from its Suppliers that its cost of any Major Subsystem has increased at a rate exceeding four percent (4%) per annum. In that event, in addition to paying an increase in the cost of Vehicle up to a four percent (4%) per annum, LACMTA will pay one half of that portion of the increase in the cost of the Major Subsystem that exceeds four percent (4%) per annum. In the event that the decision to exercise an Option occurs mid year, the maximum allowable increase of four percent shall be prorated.

The calculated increase shall be established by the above formula and shall not increase unless LACMTA does not issue the Notice to Proceed for the Option Vehicles within 60 days of the LACMTA Board's formal approval to purchase the Option Vehicles. In such instance, the PPI increase may continue to accrue subject to the limitation stated. At the time LACMTA chooses to execute the required Contract Modification, the PPI shall be recalculated and incorporated into the Contract Modification.

Within thirty (30) days after delivery of LACMTA's Notice of Exercise of Option to Contractor, Contractor shall submit a proposed delivery schedule. Along with the proposed delivery schedule, Contractor will provide LACMTA with access to its production schedule for the purpose of the parties verifying available production capacity. The production schedule shall include a reasonable time for mobilization and for coordinating with other Vehicle orders, and shall be based upon a production rate at least equal to the production rate actually realized with respect to the Base Order Vehicles. If the parties are unable to agree on a production schedule, the maximum term for the production of the Option Vehicles shall not exceed a total of 36 months after the date of Notice to Proceed with Option Vehicle production. LACMTA or any permissible assignee pursuant to Subsection B hereof may issue a Notice to Proceed at any time after the Contractor submits its proposed delivery schedule. Contractor shall not commence production of the Option Vehicles prior to issuance of the Notice to Proceed by LACMTA or any permissible assignee of LACMTA for the Option Vehicles incorporating the agreed production delivery schedule or the 36 month maximum term.

Except as otherwise specially provided in this Contract, all other terms of the Contract shall apply to the Option Vehicles.

B. Options for Items such as Special Equipment, Training Aids, Diagnostic Equipment

Contractor hereby grants LACMTA Options to purchase other equipment listed as Options on the Proposal Forms. Pricing for each Option shall be valid for two years after the Effective Contract Date.

SP-29 ASSIGNMENT OF OPTIONS

LACMTA specifically reserves the right to assign part or all of its Options and Option Vehicles to any other public transportation agency or governmental entity under inter-governmental contracting procedures; pursuant to a form of assignment agreement attached hereto as Attachment C. LACMTA may assign any quantity of Options and Option Vehicles under an assignment. Any such assigned Options and Option Vehicles shall be produced in accordance with the terms of the Contract. The assignment shall be in writing, signed between LACMTA and the assignee, and acknowledged by the Contractor. Any assignment must be entered into within the effective period as defined in SP-28.

SP-30 TITLE

Contractor shall provide to LACMTA adequate documents for securing title to the Vehicles in LACMTA's jurisdiction at least 10 calendar days before Contractor releases each Vehicle for delivery to LACMTA. The required documents shall be printed with one of the following security features:

1. sensitive security paper without added optical brighteners that will not fluoresce under ultraviolet light.
2. engraved border and prismatic-rainbow printing with Copy Void Pantograph (the work "void" appears when the document is copied).
3. 2 complex colors (colors developed by using a mixture of two or more primary colors and back if required) and 2 security threads, with or without watermark, and/or intaglio print, with or without latent image, and/or security laminate.

The Contractor warrants that the title shall pass to LACMTA free and clear of all liens, mortgages and encumbrances, financing statements, security agreements, claims, and demands of any character following LACMTA's Acceptance of each Vehicle. The document to secure title shall clearly state the following: "This vehicle meets California Emissions Standards."

SP-31 INSURANCE REQUIREMENTS

Contractor shall procure and maintain insurance against claims for injuries to persons, or damages in property which may arise from or in connection with the performance of the work hereunder by the Contractor, their agents, representatives, employees or Subcontractors for the duration of the contract. The insurance provided hereunder shall be available for the benefit of LACMTA and Contractor with respect to covered claims, but shall not be interpreted to relieve Contractor of any obligations hereunder. Contractor shall require all Subcontractors to be covered by Insurance on the same terms as the Contractor itself. The LACMTA (and their respective directors, officers, employees and agents) and other Indemnified Parties (if any) will be an additional insured on all policies excepting workers' compensation. All of

the policies shall explicitly waive subrogation rights against indemnified parties and shall include "pay on behalf of" coverage for indemnified parties.

All insurance required hereunder shall be procured from insurance or indemnity companies with an A.M. Best and Company rating level of A- or better, Class VII or better or as otherwise approved by LACMTA and authorized or approved to do business in the State. All limits of liability set forth below are in U.S. dollars.

A. Commercial General Liability Insurance

The Contractor shall provide a policy or policies of commercial general liability insurance for bodily injury, property damage, personal injury and advertising injury and contractual liability that shall be as broad as Insurance Services Office Commercial General Liability coverage (occurrence form CG0001 or its equivalent). The coverage shall contain no special limitations on the scope of protection afforded to LACMTA et al. and is required to respond fully to all claims brought due to Contractor activities. Contractor and each of the Indemnified Parties (if any) shall be included, by endorsement, with a non-owned and hired automobile liability endorsement to the general liability policy.

The commercial general liability insurance coverage shall have a minimum limit of \$1 million combined single limit of liability for bodily injury, property damage and personal injury per occurrence, \$2 million general annual aggregate and \$2 million products/completed operations aggregate. Contractor shall maintain such insurance for the duration of the contract. LACMTA shall be an additional insured prior to the commencement of any work as to any insured loss or liability arising out of or in any way related to the Project.

B. Workers' Compensation and Employer's Liability Insurance

The Contractor shall provide a workers' compensation statutory limits policy in conformance with the laws of the State, and employer's liability insurance (for bodily injury or disease) with minimum limits of \$1 million per accident for bodily injury by accident, \$1 million per employee for bodily injury by disease, and \$1 million policy limit for bodily injury by disease.

C. Automobile Liability Insurance

The Contractor shall provide commercial automobile liability insurance covering the ownership, maintenance or use of all owned/leased, non-owned and hired vehicles used in the performance of the Work, with limits of not less than \$1 million, combined single limit for bodily injury and property damage liability. Coverage shall be provided on Insurance Services Office form number CA 0001 (Ed. 7/97) or equivalent.

D. Excess Liability Insurance

The Contractor shall provide umbrella or excess liability insurance with limits not less than \$20,000,000 which shall provide bodily injury, personal injury and property damage liability coverage at least as broad as the primary

coverages set forth above, including Employer's Liability, Commercial General Liability and Commercial Automobile Liability insurance, in excess of the amounts set forth herein above.

E. Subcontractor Insurance Requirements

Contractor shall include all Subcontractors as insured under its policies or shall ensure that each Subcontractor maintains separate coverage to provide appropriate coverage to LACMTA in the event of loss. Contractor is required to monitor and maintain records of such coverage and provide proof of compliance to LACMTA upon request. If requested by LACMTA, the Contractor shall submit copies of all required insurance policies, including endorsements affecting the coverage required by these specifications.

F. Other Insurance Provisions

1. Premiums, Deductibles and Self-Insured Retentions

The Contractor shall be responsible for payment of premiums for all insurance required under this Section. LACMTA shall have no obligation to pay any premium. The Contractor further agrees that for each claim, suit or action made against insurance provided hereunder, with respect to all matters for which the Contractor is responsible hereunder, the Contractor shall be solely responsible for all deductibles, self-insured retentions and amounts in excess of the coverage provided. Any deductibles or self-insured retentions over \$200,000 must be declared and approved by LACMTA.

2. Verification of Coverage

Concurrently with the Contractor's execution hereof or on such later date on which coverage is required to be provided hereunder, the Contractor shall deliver to LACMTA a certificate of insurance with respect to each policy required to be provided by the Contractor under this Section. LACMTA shall have no duty to pay or perform under the Contract until such certificate(s), in compliance with all requirements of this Section, have been provided. Upon request by LACMTA, copies of each of the insurance policies (including renewal policies) required under this Section shall be provided for review.

The Contractor shall promptly deliver to LACMTA a certificate of insurance with respect to each renewal policy, as necessary to demonstrate the maintenance of the required insurance coverages for the terms specified herein. Such certificate shall be delivered to LACMTA not less than 30 days prior to the expiration date or as soon as possible at the renewal period. If requested by certified duplicate copies of the renewal policy shall also be provided.

3. Endorsements and Waivers

All insurance policies required to be provided by the Contractor hereunder shall contain or be endorsed to comply with the following provisions, provided that, for the workers' compensation policy, only the following provisions (d) and (f) shall be applicable:

- (a) For claims covered by the insurance specified herein, said insurance coverage shall be primary insurance with respect to the insureds, additional insureds, and their respective directors, officers, employees, agents and consultants. Any insurance or self-insurance beyond that specified in the Contract that is maintained by an insured, additional insured, or their directors, officers, employees, agents and consultants shall be excess of such insurance and shall not contribute with it.
- (b) Any failure on the part of the Contractor to comply with reporting provisions or other conditions of the policies, any breach of warranty, any action or inaction of a named insured or others shall not affect coverage provided to the other insureds or additional insureds (and their respective members, directors, officers, employees, agents and consultants).
- (c) The insurance shall apply separately to each insured and additional insured against whom a claim is made or suit is brought, except with respect to the limits of the insurer's liability.
- (d) Each policy shall be endorsed to state that coverage shall not be suspended, voided, canceled, modified or reduced in coverage or in limits except after 30 days prior written notice has been provided to LACMTA. Such endorsement shall not include any limitation of liability of the insurer for failure to provide such notice.
- (e) The commercial general liability insurance policy shall be endorsed to state that coverage for Subcontractor employees shall not be excluded.
- (f) Each policy shall provide coverage on an "occurrence" basis and not a "claims made" basis and no policy issued on an occurrence basis shall have any sunset clause requiring reporting within a specified period of time.

4. Waivers of Subrogation

Contractor waives all rights of subrogation against LACMTA and each of their agents, employees, directors, officers and consultants for any claims to the extent covered by insurance obtained pursuant to this Section, except such rights as they may have to the proceeds of such insurance. The Contractor shall require all Subcontractors to provide similar waivers in writing each in favor of LACMTA et' al.. Each policy, including workers' compensation, shall include a waiver of any right of subrogation against

all insureds (and their respective members, directors, officers, employees, agents and consultants).

5. Changes in Insurance Requirements

LACMTA shall notify the Contractor in writing of any changes in the requirements applicable to insurance required to be provided by the Contractor. Any additional cost from such change shall be paid by LACMTA upon demonstrated evidence such as insurance carrier provided invoice or similar acceptable instrument that authenticates such cost.

6. No Recourse

There shall be no recourse against LACMTA for payment of premiums or other amounts with respect to the insurance required to be provided by the Contractor hereunder, except for deductibles payable by LACMTA as specified herein.

7. Support of Indemnifications

The insurance coverage provided hereunder by the Contractor shall support but is not intended to limit the Contractor's indemnification obligations, nor do the indemnity obligations limit the rights of the insured parties to the coverage afforded by their insured status.

8. Prosecution of Claim

Unless otherwise directed by LACMTA in writing, the Contractor shall be responsible for reporting and processing all potential claims by LACMTA or the Contractor against the insurance required to be provided under this Section. The Contractor agrees to report timely to the insurer(s) any and all matters which may give rise to an insurance claim and to promptly and diligently pursue any and all insurance claims on behalf of LACMTA, whether for defense or indemnity or both. LACMTA agrees to promptly notify the Contractor of LACMTA's incidents, potential claims, and matters which may give rise to an insurance claim by LACMTA, to tender its defense or the claim to the Contractor, and to cooperate with the Contractor as necessary for the Contractor to fulfill its duties hereunder.

9. Commencement of Work

The Contractor shall not commence work under the Contract until it has obtained the insurance required under this Section, has furnished original certificates of insurance evidencing the required coverage as required under this Section and such insurance has been approved by LACMTA, nor shall the Contractor allow any Subcontractor to commence work under its Subcontract until the Subcontractor has obtained insurance as required under this Section.

10. Contractors Failure to Comply

If the Contractor or any Subcontractor fails to provide and maintain insurance as required herein, then LACMTA shall have the right but not the obligation, to purchase such insurance or to suspend the Contractor's right to proceed until proper evidence of insurance is provided. Any amounts paid by LACMTA shall, at LACMTA's sole option, be deducted from amounts payable to the Contractor or reimbursed by the Contractor upon demand, plus interest thereon from the date of payment by LACMTA to the reimbursement date, at the lesser of (a) 10% per annum or (b) the maximum rate allowable under applicable Governmental Rules.

If on account of the Contractor's failure to comply with the provisions of this Section, LACMTA is adjudged to be a co-insurer or otherwise held responsible for all or any portion of a judgment, loss or settlement (through admission or stipulation by the Contractor or court decision) that would have been covered by insurance but for non-compliance with this Section, then any loss or damage it shall sustain by reason thereof shall be borne by the Contractor, and the Contractor shall immediately pay the same to LACMTA, upon receipt of written demand therefore and evidence of such loss or damage.

11. Disclaimer

The Contractor and each Subcontractor shall have the responsibility to make sure that their insurance programs fit their particular needs, and it is their responsibility to arrange for and secure any insurance coverage which they deem advisable, whether or not specified herein.

LACMTA makes no representation or warranty that the coverage, limits of liability or other terms specified for the Insurance Policies to be carried pursuant to this Section are adequate to protect the Contractor against its undertakings under the Contract Documents or its liability to any third party or preclude LACMTA from taking any actions as are available to it under the Contract or otherwise at law. LACMTA shall not be limited to the amount of the insurance premium not paid in the proof of any damages it may claim against the Contractor arising out of or by reason of failure of the Contractor to provide and keep in force the insurance policies required by and on the terms of this Section, but LACMTA shall instead be entitled to recover the full amount of damages available.

12. Due Care Required

Nothing contained in this Section shall relieve the Contractor or any Subcontractors of its obligation to exercise due care in the performance of the Work and to complete the Work in strict compliance with the Contract.

SP-32 THE CONTRACTOR'S INTERACTION WITH THE MEDIA AND THE PUBLIC

- A. LACMTA shall review and approve all LACMTA-related copy proposed to be used by the Contractor for advertising or public relations purposes prior to publication. The Contractor shall not allow LACMTA-related copy to be published in its advertisements and public relations programs prior to receiving such approval. The Contractor shall ensure that all published information is factual and that it does not in any way imply that LACMTA endorses the Contractor's firm, service, and/or product.
- B. The Contractor shall refer all inquiries from the news media to LACMTA, and shall comply with the procedures of LACMTA's Public Affairs staff regarding statements to the media relating to this Contract or the Services.
- C. If the Contractor receives a complaint from a citizen or the community, the Contractor shall inform LACMTA about what action was taken to alleviate the situation.

SP-33 ANTI-DUMPING PROHIBITIONS

The Contractor represents and warrants that its prices do not violate the anti-dumping or countervailing duty laws of the United States, including but not limited to 19 U.S.C. 1671 et. seq., as amended, and shall pay any duties or other penalties assessed under such laws. The Contractor shall indemnify and hold harmless LACMTA from any loss or expense, including but not limited to reasonable attorneys' fees that LACMTA may incur from any claim, demand, or investigation of alleged violation of said laws.

SP-34 NONRESTRICTIVE CLAUSES

Wherever brand, manufacturer or product names are indicated in these specifications, they are included for the purpose of establishing identification and a general description of the Unit. Wherever such names appear, the term "OR APPROVED EQUAL" is deemed to follow. The decision whether a proposed unit is an approved equal will be rendered by LACMTA.

Specifying a brand name of any Unit in this Contract shall not relieve the Contractor, or any Subcontractor or Supplier from its responsibility to design and produce the Unit to fully meet the performance specifications, the warranty and other contractual requirements. The Contractor shall provide written notice to LACMTA of any incorrect or inappropriate brand name or Unit that is listed or referred to in the specifications, and shall propose a suitable substitute for LACMTA's consideration and approval.

SP-35 APPROVALS

No review, acceptance, approval or failure to object or comment (collectively "Approval") shall impose any liability on LACMTA or release or relieve Contractor of its sole responsibility to Deliver a Vehicle and Units thereof meeting all of the requirements of this Contract, nor shall such Approval waive affect in any way any of the Contractor's obligations, or duties, obligations or liabilities imposed on it by this Contract.

No act by LACMTA, including without limitation any certification by a LACMTA Authorized Representative, payment of money, payment for or Acceptance of any Vehicle or Unit, or any extension of time, or the taking of possession or use shall be a waiver by LACMTA of any provision of this Contract or of any power herein reserved to LACMTA or of any right to damages herein provided. Any waiver by LACMTA of any breach of this Contract shall not constitute a waiver of any other or subsequent breach.

SP-36 DOCUMENT APPROVAL AND REVIEW

A. Document Approval

Unless otherwise noted, documents requiring LACMTA "Approval" will be approved, conditionally approved or disapproved in writing within thirty (30) calendar days after receipt of the documents. Documents that are disapproved must be corrected and resubmitted within fifteen (15) calendar days after notice of disapproval. Conditionally approved documents must be corrected and resubmitted as directed in the notice of conditional approval. If no response is received by the Contractor within the thirty-day period, approval of the document is granted unless LACMTA extends the review period in writing for the document prior to the expiration of the thirty (30) day period. Neither approval nor waiver of such approval shall relieve the Contractor of the obligation to meet the requirements of the Contract. Corrections or revisions to the original submittals will be subject to the provisions of the Contract. Corrections or revisions to original submittals will be subject to the same approval cycle in writing for the document prior to the expiration of the thirty (30) day period.

B. Document Review

All documents not requiring LACMTA approval but delivered and specified for LACMTA review shall be for information purposes only and the Contractor may proceed to work without delay.

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SP-37 OTHER CONTRACT DELIVERABLES (NON-TECHNICAL)

In addition to the Contract Deliverables found in the Technical Specification TS-88.3, the following items represent Contract Data Deliverables and/or documents/test results that must be provided by the Contractor as required in the listed Contract Documents. While intended to be a comprehensive list, the Contractor and LACMTA acknowledge that the specification may contain implicit or implied additional requirements not contained in this list. The Contractor shall comply with such implicit or implied requirements. Compliance Methods include: Test - Tested by Contractor, Demo - Demonstrated by Contractor, Certificate - Applicable Certification less than two years old, Inspection – Inspection by LACMTA, LACMTA representatives or other governmental agencies, Deliverable – deliverable from Contractor, or Documentation – Analysis, Documentation or Meeting minutes as required or implied by the specification. All tests and demonstrations are to be documented in writing with the results provided to LACMTA. Unless otherwise noted, the Contractor shall provide a quantity of one (1) of each listed item.

SECTION	DUE	REQUIREMENT	COMPLIANCE METHOD	DISPOSITION
		GENERAL CONDITIONS		
GC-08	Prior to starting work.	An organization chart showing the proposed organization established by the contractor for the performance of the work, including: Lines of authority, responsibility, and communication; Office organizations, if any; and Names, titles, and functions of all supervisory and other key personnel.	Documentation	
GC-09	Within 14 days of Contract Execution	Copy of all executed subcontracts	Documentation	
GC-38	Upon completion of work or termination of the Contract	All documents and materials pertaining to technical data, patents and copyrights found in gc-36	Documentation	
		REGULATORY REQUIREMENTS		
RR-16B	20 days of	Bills of lading for each shell (if	Documentation	

SECTION	DUE	REQUIREMENT	COMPLIANCE METHOD	DISPOSITION
	shipping	applicable)		
		SPECIAL PROVISIONS		
SP-07	Post pilot	Configuration and performance review of the pilot vehicle	Documentation	
SP-08	1st 10 vehicles	First article inspection	Documentation	
SP-13/SI-1	Within 10 days of Contract Execution	Performance bond	Documentation	
SP-14	With each vehicle	Motor vehicle pollution requirements	Certificate	
SP-15	Pre-Pilot vehicle	Engine emission certificate	Certificate	
SP-20	Pre-Pilot vehicle	Pre-production meetings including QA presentation, formal production schedule and minutes no later than two weeks following each meeting.	Documentation	
SP-21	Weekly	Contract status reports	Documentation	
SP-23	Each vehicle	Driver's log and incident report	Delivery of each Vehicle if Driveaway Service is used.	
SP-30	Each vehicle	Title Documentation	Documentation	
SP-31	At contract execution	Certificate of Insurance	Documentation	
		WARRANTY PROVISIONS		
SP-40.3	Delivery of each Vehicle	Electronic list of serial numbers for units installed on each Vehicle	Documentation	
SP-40.7	Pre- Pilot Vehicle	Additions to warranty offered by component suppliers	Documentation	
		QUALITY ASSURANCE		
SP-41.1.1	Pre-prod	ISO 9001 Certificate	Certificate	
SP-41.2.2	Pre-prod	Evidence of calibration of tools and	Certificate	

SECTION	DUE	REQUIREMENT	COMPLIANCE METHOD	DISPOSITION
		equipment		
SP-41.2.2	Delivery	The quality assurance organization shall document and certify in writing that each transit Vehicle is manufactured in accordance with these controlled drawings and documentation.	Certificate	
SP-41.2.3	Pre-prod	Copies of certification from major suppliers acknowledging receipt of specifications	Certificate	
SP-41.2.5	Production	Vehicle inspection record with each Vehicle	Documentation	
SP-41.4.4	Production	Office for Inspectors as specified		
SP- 41.5.1	Pre-delivery	Acceptance Tests and Completed Vehicle inspection with each Vehicle	Documentation	
SP-41.5.3	Pre-delivery	Initial lubrication certification	Certificate	
SP-41.5.7	Pre-delivery	Complete Vehicle Documentation Package for each Vehicle	Documentation	
		SUPPLEMENTAL INSTRUCTIONS TO PROPOSERS		
SI-3	Prior to	Copy of the final Altoona Vehicle Test Report for the Vehicle being provided.	Documentation	

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SP-38 LOCAL EMPLOYMENT PROGRAM

A. OBLIGATIONS OF CONTRACTOR

The Contractor shall implement the Local Employment Plan and Local Facility Capital Investments as approved by LACMTA and set forth in Exhibit C of the Contract. The Contractor's Local Employment Plan Commitment Value for Local Workers' Wages and Benefits is \$2,506,164. The Contractor's Local Employment Plan Commitment Value for Local Facility Capital Investments is \$3,470,000. The Contractor's Total Local Employment Plan Commitment Value is \$5,976,164.

B. STATE OF CALIFORNIA NEW FULL TIME EQUIVALENT (FTE) POSITIONS & LOCAL FACILITY CAPITAL INVESTMENTS

The State of California Resident FTE Positions included under the Contractor's Local Employment Plan shall:

1. Include only Contractor and Subcontractor/Supplier with State of California Resident employees who provide work hours directly allocable to the OP28367-000 program in the State of California. Local Employees that also work on other projects may only be counted to the extent they perform work allocable to the OP28367-000 Contract. A Local Employee may be expressed as a percentage of one FTE. To be considered eligible for California resident status, workers must maintain a physical presence in California, show intent to make California his or her permanent home, and be a U.S. Citizen or be granted and maintain an allowable immigration status prior to the Contract award date.

Evidence of intent to make California one's permanent home prior to Contract award may include, but is not limited to:

- California voter registration and voting in California elections
 - California driver's license
 - California automobile registration
 - California State income tax obligation on total income
 - Ownership of residential property or continuous occupancy or renting of an apartment on a lease basis where your personal belongings are kept
 - Active savings and/or checking accounts in a California bank
 - Immigration status with legal capacity to establish California residency
 - Maintaining a permanent military address and home of record in California
 - Military leave and earning statements showing California as legal residence.
2. Not include 1) current employees; 2) former, furloughed, and/or laid off employees who are separated from employment with the Contractor or Subcontractor/Supplier (if applicable) on or after the

date of LACMTA's Notice of Intent to Award Letter; 3) employees who will not be working on the project; 4) employees hired by the Contractor or Subcontractor to work on other projects to fill in or replace current employees reassigned to OP28367-000, 5) hours and costs that cannot be segregated and audited pursuant to internal Cost Accounting Systems of the Contractor or Subcontractors; 6) Work conducted outside of the State of California; 7) Work performed by Non-State of California residents.

The Local Facility Capital Investments included under the Contractor's Local Employment Plan shall:

1. Include only facility improvements, additions, upgrades, modifications, or major improvements (not ordinary repairs and maintenance) to existing facilities, leased facilities, or newly purchased facilities within the State of California. capital equipment investments may be included only if the equipment has an estimated useful life of at least two (2) years and is valued at \$5,000 or more for any individual item. Proposers may include lease costs in their local facility capital investments only if ownership is shifted from the lessor to the lessee by the end of the lease period.
2. Not include: lease costs without a lease to own agreement, utility costs, minor repair costs, capital equipment investments less than \$5,000 for any individual item, short term (less than 2 years) capital equipment investments or operating costs.

C. REPORTS

The Contractor shall submit quarterly progress reports to LACMTA detailing its adherence to the commitments made in the Local Employment Plan. The quarterly report shall summarize the major actions taken during the prior quarter in implementation of the Employment, and shall:

1. Specify the total number of Local Employee Full Time Equivalent (FTE) work performed in that quarter by type (trade or craft), duration, and location, and disadvantaged worker status, and the annual value of those jobs (expressed in direct OP28367-000 hours expended and people hired);
2. Describe the workforce development and training programs carried out during that quarter and the amount expended by the Contractor for such programs;
3. Describe the quarterly outreach and recruitments coordinated through workforce development and community groups that led to new local hires and;

4. Describe the extent to which the Local Employment Plans producing long-term employment in skilled or trade labor;
5. Describe the value of construction performed toward the Facility Investment Commitment; include copies of design and construction contracts.

If any such report indicates that the Contractor has failed to achieve the Total Local Employment Plan Commitment Value for local employee wages and benefits, Disadvantaged Worker wages and benefits or Facility Investments set forth in its Local Employment Plan for the time period involved, the report shall include a corrective action plan designed to achieve the Total Local Employment Plan Commitment Value, including a time frame within which such corrective actions will be achieved.

D. RELATION TO MILESTONE PAYMENTS

LACMTA reserves the right to review and audit the Contractor's records, books and financial ledgers and cost accounting system at any time during the Contract term for purposes of determining the Contractor's compliance with Total Local Employment Commitment Value. In the event LACMTA determines that there has been a material failure of the Contractor or its Subcontractors/Suppliers to comply with any requirement of its Local Employment Plan, LACMTA shall notify the Contractor in writing and shall provide the Contractor with thirty (30) days to correct such non-compliance. If such non-compliance is not corrected to the satisfaction of LACMTA within such 30-day period (or such longer period as LACMTA may in its discretion allow), LACMTA may withhold a portion of the next Milestone Payment due to the Contractor under CP-02, in an amount that LACMTA determines in its discretion to be reasonable and appropriate based on the nature and extent of the Contractor's non-compliance. Any amounts withheld by LACMTA under this subsection shall be repaid to the Contractor, as part of the next Milestone Payment due, when the Contractor demonstrates to the satisfaction of LACMTA that it has corrected the non-compliance. Any withholding under this subsection shall not affect the right of LACMTA to exercise other remedies available under this Contract for the Contractor's non-compliance with its Local Employment Plan, including the right to terminate for default in the event of repeated instances of such non-compliance.

SP-39 RELEASE OF INFORMATION*

The Contractor shall not publish information or technical data acquired or generated by the Contractor in performing the Contract until such time as such information or technical data is released in published reports by the Los Angeles County Metropolitan Transportation Authority (Metro).

SP-40 CONTRACTOR WARRANTY

Except where longer warranty periods are specified by the Contractor, the Contractor warrants all Buses furnished under this Contract, including all equipment and materials, and all labor performance, shall be in full accordance with the Contract requirements, and shall be fit for their intended purpose, and shall be free of all Defects in the design, materials, and workmanship for the time periods and mileage set forth below. In addition, the Contractor expressly warrants to LACMTA each complete Bus, Unit and Part as follows. All warranties hereunder are deemed and acknowledged to explicitly extend to the future performance of the Unit warranted. The warranty shall apply regardless of whether the equipment, materials or labor were furnished or performed by the Contractor or by any of its Subcontractors or Suppliers of any tier.

SP-40.1 COMPLETE BUS

The complete bus, propulsion system, components, major subsystems and body and chassis structure are warranted to be free from Defects and Related Defects for two years or 100,000 miles, whichever comes first, beginning on the date of revenue service but not longer than 15 days after acceptance under "Inspection, Testing and Acceptance." The warranty is based on regular operation of the bus under the operating conditions prevailing in LACMTA's locale.

SP-40.1.1 BODY AND CHASSIS STRUCTURE

Body, body structure, structural elements of the suspension and engine cradle are warranted to be free from Defects and Related Defects for three years or 150,000 miles, whichever comes first.

Primary load-carrying members of the bus structure, including structural elements of the suspension such as articulation joint and air ride beams, are warranted against corrosion failure and/or Fatigue Failure sufficient to cause a Class 1 or Class 2 Failure for a period of 12 years or 500,000 miles, whichever comes first.

SP-40.1.2 PROPULSION SYSTEM

40.1.2.1 CNG Propulsion System

Propulsion system components, specifically the engine, transmission and drive and non-drive axles shall be warranted to be free from Defects and Related Defects for five years or 300,000 miles, whichever comes first. The propulsion system manufacturers' standard warranties, delineating items excluded from the Warranty, submitted in accordance with the Request for Pre-Offer Change or Approved Equal or with the Form for Proposal Deviation.

40.1.2.2 Zero Emission Propulsion System

Propulsion system components, specifically the traction system, controllers/inverters, and gear box shall be warranted to be free from Defects and Related Defects for twelve years or 600,000 miles, whichever comes first.

Conventional drive train components, such as transmissions, and drive and non-drive axles, shall be warranted to be free from Defects and Related Defects for five years or 300,000 miles, whichever comes first. The propulsion system manufacturers' standard warranties, delineating items excluded from the Warranty, submitted in accordance with the Request for Pre-Offer Change or Approved Equal or with the Form for Proposal Deviation.

40.1.2.3 Zero Emission Energy Storage

Energy storage system components shall be warranted to be free from Defects and Related Defects for twelve years or 600,000 miles, whichever comes first. The energy storage system manufacturers' standard warranties, delineating items excluded from the Warranty, submitted in accordance with the Request for Pre-Offer Change or Approved Equal or with the Form for Proposal Deviation.

SP-40.1.3 MAJOR SUBSYSTEMS

Contractor warrants major subsystems to be free from Defects and Related Defects, for three years or 150,000 miles, whichever comes first. Documents delineating items the warranty coverage shall be submitted with the Proposal. Items included as Major Subsystems, as applicable, are listed below:

SUBSYSTEMS	YEAR(S)	MILEAGE
Brake system: Foundation brake components, including advancing mechanisms, as supplied with the axles, excluding friction surfaces.	3	150,000
Destination signs: All destination sign equipment for the front, side and rear signs, power modules and operator control.	3	150,000
HVAC System: Roof and/or rear main unit only, excluding floor heaters and front defroster. AC unit and compressor: Roof and/or rear main unit only, excluding floor heaters and front defroster.	3	150,000
Door systems: Door operating actuators and linkages.	3	150,000
Air compressor and dryer	3	150,000
Wheelchair ramp system: Ramp parts and mechanical only.	3	150,000
Starter	3	150,000
Alternator - Alternator only. Does not include drive	3	150,000

system.		
Fire Suppression system: Includes tank and extinguishing agent dispensing system.	3	150,000
Hydraulic Systems: Including power steering as applicable.	3	150,000
Cooling Systems: Radiator including core, tanks and related framework, including surge tank.	3	150,000
Multiplex system	3	150,000
Video Security System: including cameras and video recorder. Router.	3	150,000
Steering box	3	150,000
Auxiliary Power System	3	150,000
Low Voltage Generation and Distribution	3	150,000
On Route/Shop Charging Equipment	12	n/a
All on-Board charging equipment	5	300,000

SP-40.1.4 EMISSION CONTROL SYSTEM

Contractor warrants the Emission Control System (ECS) for five (5) years or 100,000 miles whichever comes first. The ECS shall include but is not limited to the following components:

- Complete exhaust system including Catalytic Converter, if required and/or diesel exhaust after treatment device
- Charge Air Cooler

SP-40.2 EXTENSION OF WARRANTY

If, during the warranty period, repairs or modifications on any Bus, made necessary by any Defect in design, materials or workmanship are not completed due to lack of material or inability to provide the proper repair for 30 (thirty) calendar days, the applicable warranty period shall be extended by the number of days equal to the delay period.

SP-40.3 SERIAL NUMBERS

Upon delivery of each bus, the Contractor shall provide a complete electronic list of serialized units installed on each bus to facilitate warranty tracking. The list shall include, but is not limited to:

- a. engine
- b. transmission
- c. alternator
- d. starter
- e. A/C compressor and condenser/evaporator unit
- f. drive axle
- g. power steering unit
- h. fuel cylinders (if applicable)
- i. air compressor
- j. wheelchair ramp (if applicable)
- k. DVR
- l. Router

The Contractor shall provide updated serial numbers resulting from warranty campaigns. The format of the list shall be approved by LACMTA prior to delivery of the first production bus.

SP-40.4 VOIDING OF WARRANTY

The warranty shall not apply to the failure of any part or component of the bus that directly results from misuse, negligence, accident or repairs not conducted in accordance with the Contractor-provided maintenance manuals and with workmanship performed by adequately trained personnel in accordance with recognized standards of the industry. The warranty also shall be void if LACMTA fails to conduct normal inspections and scheduled preventive maintenance procedures as recommended in the Contractor's maintenance manuals and if that omission caused the part or component failure. The LACMTA shall maintain documentation, auditable by the Contractor, verifying service activities in conformance with the Contractor's maintenance manuals.

SP-40.5 EXCEPTIONS AND ADDITIONS TO WARRANTY

The warranty shall not apply to the following items:

- a. scheduled maintenance items
- b. normal wear-out items
- c. items furnished by LACMTA

SP-40.6 PASS-THROUGH WARRANTY

Should the Contractor elect to not administer warranty claims on certain components and wish to transfer this responsibility to the sub-Suppliers, or to others, the Contractor shall request this waiver.

Contractor shall state in writing that the LACMTA's warranty reimbursements will not be impacted. The Contractor also shall state in writing any exceptions and reimbursement including all costs incurred in transport of vehicles and/or components. At any time during the warranty period, the Contractor may request approval from the LACMTA to assign its warranty obligations to others, but only on a case-by-case basis approved in writing by the LACMTA. Otherwise, the Contractor shall be solely responsible for the administration of the warranty as specified. Warranty administration by others does not eliminate the warranty liability and responsibility of the Contractor.

SP-40.7 SUPERIOR/SPECIAL WARRANTY

The Contractor shall pass on to the LACMTA any "Superior" or "Special" warranty offered by a component Supplier that is superior to that required herein. The Contractor shall provide a list to the LACMTA noting the conditions and limitations of the Superior Warranty not later than the start of production. The Superior Warranty shall not be administered by the Contractor.

SP-40.8 FLEET DEFECTS OCCURRENCE AND REMEDY

A Fleet Defect is defined as cumulative failures of twenty (20) percent of the same components (part number) within the Bus Fleet (see Special Provisions definition of Bus Fleet) where such items are covered by warranty. A Fleet Defect shall apply only to the base warranty period in sections entitled "Complete Bus," "Propulsion System" and "Major Subsystems." When a Fleet Defect is declared, the remaining warranty on that item/component stops. The warranty period does not restart until the Fleet Defect is corrected. In cases where there are multiple components/systems on each bus (e.g. passenger seats), a single failure found on 20% of the buses may be considered a fleet defect.

For the purposes of Fleet Defects, each Option Order shall be treated as a separate Bus Fleet. Should there be a change in a major Unit within either the Base Order or an Option Order, the Buses containing that new major Unit shall become a separate Bus Fleet for the purposes of Fleet Defect.

The Contractor shall correct a Fleet Defect under the warranty provisions defined in "Repair Procedures." After a Fleet Defect is declared, LACMTA and the Contractor shall mutually agree to and the Contractor shall promptly undertake and complete a work program reasonably designed to prevent the occurrence of the same Defect in all other buses and spare parts purchased under this Contract. Where the specific Defect can be solely attributed to particular identifiable part(s), the work program shall include redesign and/or replacement of only the defectively designed and/or manufactured part(s). In all other cases, the work program shall include inspection and/or correction of all of the buses in the fleet via a mutually agreed-to arrangement. The Contractor shall update, as necessary, technical support information (parts, service and operator's manuals) due to changes resulting from warranty repairs. LACMTA may immediately declare a Defect in design resulting in a safety hazard to be a Fleet Defect. The Contractor shall be responsible to furnish, install and replace all defective units.

SP-40.9 EXCEPTIONS TO FLEET DEFECT PROVISIONS

The Fleet Defect warranty provisions shall not apply to LACMTA-supplied items such as fareboxes, radio and fare collection equipment, communication systems, and tires.

The Fleet Defect provisions shall not apply to Fleet Defects caused by LACMTA's non-compliance with the Contractor's minimum recommended normal preventative maintenance practices and procedures as contained in then current maintenance manuals supplied by the Contractor to LACMTA; provided, however, the Contractor, in the denial of Fleet Defect status must demonstrate by adequate proof that LACMTA did not comply, and if adequate proof is not provided, the Fleet Defect provisions shall apply.

SP-40.10 REPAIR PERFORMANCE

The Contractor is responsible for all warranty-covered repair Work. To the extent practicable, LACMTA will allow the Contractor or its designated representative to perform such Work. At its discretion, LACMTA may perform such Work if it determines it needs to do so based on transit service or other requirements. Such Work shall be reimbursed by the Contractor. Repairs made by LACMTA will be to the Lowest Line Replacement Unit (LLRU). LLRU is defined as the minimum unit which must be removed from a bus to affect a repair.

SP-40.11 REPAIRS BY THE CONTRACTOR

SP-40.11.1 VENDOR FAILURE NOTIFICATION (VFN)

LACMTA may issue a VFN to the Contractor's designated local service representative via email to request a Contractor's response to a potential warrantable defect. Within two (2) working days after receipt of a Notice of Defect (VFN), LACMTA and the Contractor shall attempt to resolve the status of warranty coverage on the Unit. When a VFN is determined to be warrantable, the Contractor's shall initiate repairs within three (3) working days after receipt of VFN.

SP-40-11.2 REPAIR WORK BY CONTRACTOR

The Contractor shall provide at its own expense all spare parts, tools and space required to complete repairs. At LACMTA's option, the Contractor may be required to remove the bus from LACMTA's property while repairs are being affected. If the bus is removed from LACMTA's property, repair procedures must be diligently pursued by the Contractor's representative.

At the sole discretion of LACMTA, as determined on a case-by-case basis, parts used from its own stock, shall be replaced by the Contractor. The Contractor must replace each part used from LACMTA stock with a new part within thirty (30) calendar days from issuing a warranty claim to a LACMTA designated

location. All costs associated with replacing spare parts shall be borne by the Contractor.

SP-40-12 REPAIRS BY LACMTA

SP-40.12.1 PARTS USED

If LACMTA performs the warranty-covered repairs, it shall correct or repair the Defect and any Related Defects utilizing parts supplied by the Contractor specifically for this repair. At its discretion, LACMTA may use Contractor-specified parts available from its own stock if deemed in its best interests. Contractor is expected to maintain locally, a reasonable inventory of commonly used replacement parts when making warranty repairs.

SP-40.12.2 Contractor-Supplied Parts

LACMTA may require that the Contractor supply parts for warranty-covered repairs being performed by LACMTA. Those parts may be remanufactured but shall have the same form, fit and function, and warranty. The parts shall be shipped prepaid to LACMTA from any source selected by the Contractor within fourteen (14) days of receipt of the request for said parts and shall not be subject to an Agency handling and restocking charge.

SP-40.12.3 Defective Component Return

The Contractor may request that parts covered by the warranty be returned to the manufacturing plant. The total cost for this action shall be paid by the Contractor. Materials should be returned in accordance with the procedures outlined in "Warranty Processing Procedures."

SP-40.12.4 Failure Analysis

The Contractor shall, upon specific request by LACMTA, provide a failure analysis of Fleet Defect or safety-related parts, or major components, removed, including any rejected components from buses under the terms of the warranty that could affect fleet operation. Such reports shall be delivered within 60 days of the receipt of failed parts. All rejected claims shall have failure analysis.

SP-40.12.5 Reimbursement for Labor And Other Related Costs

The LACMTA shall be reimbursed by the Contractor for labor. The amount shall be determined by LACMTA for a qualified "A Mechanic" at their standard wage rate per hour, plus 80 percent for fringe benefits and overhead. Should a Contractor request LACMTA to transport vehicles to a vendor/subcontractor for repairs, the Contractor shall reimburse LACMTA for all expenses incurred.

If required, Contractor shall reimburse LACMTA for costs associated with towing or moving a bus if such action was necessary and if the bus was in the normal service area. Also, the Contractor shall assume all liability for damage from the time the vehicle is released from LACMTA's custody until it is returned.

SP-40.12.6 In Service Bus Delay, Change Or Bus Cancellation (ROADCALLS)

Any warranty defect requiring an in-service change or delay or a bus cancellation will be charged at \$250.00 per event plus towing costs assessed under this Contract other than for the cost of the in-service bus change. The LACMTA shall maintain documentation, auditable by the Contractor, verifying service activities related to in-service bus delays or cancellations.

SP-40.12.7 Reimbursement for Parts

LACMTA shall be reimbursed by the Contractor for defective parts and for parts that must be replaced to correct the Defect. The reimbursement shall be at the current price of the Contractor's parts catalogue effective at the time of repair and shall include taxes where applicable, plus twenty-five (25) percent handling costs. Handling costs shall not be paid if part is supplied by Contractor and returned to LACMTA storeroom it was taken from within 72 hours. If the Contractor does not provide a parts catalogue, the LACMTA's last purchase price shall prevail.

SP-40.12.8 Reimbursement Requirements

The Contractor shall respond to the warranty claim with an accept/reject decision including necessary failure analysis no later than sixty (60) days after LACMTA submits the claim and defective part(s), when requested. Reimbursement for all accepted claims shall occur no later than sixty (60) days from the date of acceptance of a valid claim. If approved warranty claims are not paid within 60 days, LACMTA reserves the right to charge interest on any such claims that exceed 60 days. LACMTA may dispute rejected claims or claims for which the Contractor did not reimburse the full amount. The parties agree to review disputed warranty claims during the following quarter to reach an equitable decision to permit the disputed claim to be resolved and closed. The parties also agree to review all claims at least once per quarter throughout the entire warranty period to ensure that open claims are being tracked and properly dispositioned.

SP-40.13 WARRANTY AFTER REPLACEMENT/REPAIRS

If any component, unit or subsystem is repaired, rebuilt or replaced by the Contractor or by LACMTA with the concurrence of the Contractor, the component, unit or subsystem shall have the unexpired warranty period of the original. Repairs shall not be warranted if the Contractor-provided or authorized parts are not used for the repair, unless the Contractor has failed to respond within five days, in accordance with "Repairs by the Contractor."

The warranty on items determined to be Fleet Defects shall be suspended at the time that a fleet defect status is established. Warranty on fleet defect units shall be as follows: if the unit is repaired by the Contractor, or by LACMTA with the concurrence of the Contractor, the Unit shall have the remaining warranty as required by this contract; if the unit is replaced by the Contractor, or by LACMTA

with the concurrence of the Contractor, the unit shall have the remaining warranty as required by this Contract or the OEM's standard warranty, which ever is greater. This suspended warranty shall again become effective on the repair/replacement date for corrected items on each Bus.

SP-40.13.1 Warranty Processing Procedures

The following list represents requirements by the Contractor to LACMTA for processing warranty claims. One failure per bus per claim is allowed.

- a. bus number and VIN
- b. total vehicle life mileage at time of repair
- c. date of failure/repair
- d. acceptance/in-service date
- e. Contractor part number and description
- f. component serial number
- g. description of failure
- h. all costs associated with each failure/repair (invoices may be required for third-party costs):
 - towing
 - road calls
 - labor
 - materials
 - parts
 - handling
 - troubleshooting time

SP-40.14 FORMS

LACMTA's forms will be accepted by the Contractor if all of the above information is included. Electronic submittal may be used if available between the Contractor and Agency.

SP-40.15 RETURN OF PARTS

When returning defective parts to the Contractor, LACMTA shall tag each part with the following:

- a. bus number and VIN
- b. claim number
- c. part number
- d. serial number (if available)

SP-40.16 TIMEFRAME

Each claim must be submitted no more than forty five (45) days from the date of failure and/or repair, whichever is later. All defective parts must be returned to the Contractor, when requested, no more than sixty (60) days from date of repair. Labor only claims (no parts were used and bus manufacturer is solely responsible for the failure) can be submitted up to 60 days from failure.

SP-40.17 REIMBURSEMENTS

The Contractor shall reimburse LACMTA for all costs associated with performing warranty work. Reimbursement checks shall be sent to:

Los Angeles County Metropolitan Transportation Authority
Cash Operations
One Gateway Plaza
Mail Stop 99-21
Los Angeles, Ca 90012

A copy of the reimbursement check including the listing of warranty claims covered by the check shall simultaneously be sent to:

Los Angeles County Metropolitan Transportation Authority
Warranty Processing Center
900 Lyon Street
Mail Stop 30-2-1
Los Angeles, Ca 90012

SP-40.18 LOCAL SERVICE SUPPORT

The Contractor shall provide local service support resources to perform "off-site" warranty repairs and bus acceptance work (make-ready) in accordance with SP-25 Acceptance of Vehicle. The Contractor shall have the ability to perform all bus acceptance and warranty repairs locally, including, but not limited to, complete repairs of any Unit. Warranty repair and bus acceptance work shall occur within 50 miles of LACMTA's Service Support Center located at 900 Lyon St., Los Angeles CA 90012. LACMTA may visit Contractor's repair and acceptance site to monitor and review repairs on LACMTA vehicles. The Contractor is responsible for towing costs and/or labor associated with bringing a bus to either the service center or a subcontractor facility. Weekly progress reports are to be provided for all repair work.

SP-40.19 SERVICE REPRESENTATIVE(S)

The Contractor shall submit with the Submittal a list containing the name, address, and telephone number of the representatives responsible for assisting LACMTA, as well as the location for off-site repair and maintenance of the buses to be supplied. The Contractor shall, at its own expense, provide a full-time dedicated LACMTA service representative to respond to technical support and warranty issues.

Unless previous arrangements are made with LACMTA, the individual must be available to respond to LACMTA technical or warranty issues via email or phone within a maximum of 8 hours on a 24-hour a day basis. This individual's principal point of contact at LACMTA shall be LACMTA's designated Project Manager or designee.

SP-40.20 LIQUIDATED DAMAGES (WARRANTY)

LACMTA reserves the right to assess liquidated damages when warranty repairs are not completed by the end of the initial 30 (thirty) calendar days. Warranty repairs that go beyond the 30 calendar day period will be assessed liquidated damages of \$300 per day, per bus.

SP-41 CONTRACTOR'S IN-PLANT QUALITY ASSURANCE REQUIREMENTS

SP-41.1 Quality Assurance Organization

SP-41.1.1 Organization Establishment

The Contractor shall establish and maintain an effective in-plant quality assurance organization. It shall be a specifically defined organization and should be directly responsible to the Contractor's top management. The organization shall be organized and function according to the procedures contained in the Contractor's ISO 9001 Certification. A copy of the certification shall be provided upon issuance of a Notice of Intent to Award Contract.

SP-41.1.2 Control

The quality assurance organization shall exercise quality control over all phases of production, from initiation of design through manufacture and preparation for delivery. The organization shall also control the quality of supplied articles.

SP-41.1.3 Authority and Responsibility

The quality assurance organization shall have the authority and responsibility for reliability, quality control, inspection planning, establishment of the quality control system, and acceptance/rejection of materials and manufactured articles in the production of the transit buses.

SP-41.2 QUALITY ASSURANCE ORGANIZATION FUNCTIONS

SP-41.2.1 Minimum Functions

The quality assurance organization shall include the following minimum functions:

- a. **Work instructions:** The quality assurance organization shall verify inspection operation instructions to ascertain that the manufactured product meets all prescribed requirements.
- b. **Records maintenance:** The quality assurance organization shall maintain and use records and data essential to the effective operation of its program. These records and data shall be available for review by the resident inspectors. Inspection and test records for this

procurement shall be available for a minimum of five (5) years after inspections and tests are completed.

- c. **Corrective actions:** The quality assurance organization shall detect and report to LACMTA significant quality issues, and promptly ensure correction of any conditions that may result in the production of defective transit buses. These conditions may occur in designs, purchases, manufacture, tests or operations that culminate in defective supplies, services, facilities, technical data or standards.

SP-41.2.2 Basic Standards And Facilities

The following standards and facilities shall be basic in the quality assurance process:

- a. **Configuration control:** The Contractor shall maintain drawings, assembly procedures, and other documentation that completely describe a qualified bus that meets all of the options and special requirements of this procurement. The quality assurance organization shall verify that each transit bus is manufactured in accordance with these controlled drawings, procedures, and documentation.
- b. **Measuring and testing facilities:** The Contractor shall provide and maintain the necessary gauges and other measuring and testing devices for use by the quality assurance organization to verify that the buses conform to all specification requirements. These devices shall be calibrated at established periods against certified measurement standards that have known, valid relationships to national standards. Contractor shall provide evidence of calibration of tools and equipment at the Pre-Production meeting.
- c. **Production tooling as media of inspection:** When production jigs, fixtures, tooling masters, templates, patterns, and other devices are used as media of inspection, they shall be proved for accuracy at formally established intervals and adjusted, replaced, or repaired as required to maintain quality. At a minimum, production tooling needs to be checked at least every 50 buses.
- d. **Equipment use by resident inspectors:** The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

SP-41.2.3 Maintenance of Control

The Contractor shall maintain quality control of purchases:

- a. **Supplier control:** The Contractor shall require that each Supplier maintains a quality control program for the services and supplies that it provides. The Contractor's quality assurance organization shall inspect and test materials provided by Suppliers for conformance to specification requirements. Materials that have been inspected, tested, and approved shall be identified as acceptable to the point of use in the manufacturing or assembly processes. Controls shall be established to prevent inadvertent use of nonconforming materials.
- b. **Purchasing data:** The Contractor shall verify that all applicable specification requirements are properly included or referenced in purchase orders of articles to be used on transit buses.
- c. **Vender Certifications:** Contractor shall provide LACMTA with copies of certifications from all major suppliers acknowledging receipt of the applicable Contract Specifications. Said certificates shall be presented within 30 days following the final Pre-Production meeting.

SP-41.2.4 Manufacturing Control

- a. **Controlled conditions:** The Contractor shall ensure that all basic production operations, as well as all other processing and fabricating, are performed under controlled conditions. Establishment of these controlled conditions shall be based on the documented Work instructions, adequate production equipment and special working environments if necessary.
- b. **Completed items:** A system for final inspection and test of completed transit buses shall be provided by the quality assurance organization. It shall measure the overall quality of each completed bus.
- c. **Nonconforming materials:** The quality assurance organization shall monitor the Contractor's system for controlling nonconforming materials. The system shall include procedures for identification, segregation and disposition of non-conforming materials.
- d. **Statistical techniques:** Statistical analysis, tests and other quality control procedures may be used when appropriate in the quality assurance processes.
- e. **Inspection status:** A system shall be maintained by the quality assurance organization for identifying the inspection status of components and completed transit buses. Identification may include cards, tags or other normal quality control devices.

SP-41.2.5 Inspection System

The quality assurance organization shall establish, maintain and periodically audit a fully documented inspection system. The system shall prescribe inspection and test of materials, Work in process and completed articles. As a minimum, it shall include the following controls:

- a. **Inspection personnel:** Sufficient trained inspectors shall be used to ensure that all materials, components and assemblies are inspected for conformance with the qualified bus design.
- b. **Inspection records:** Acceptance, rework or rejection identification shall be attached to inspected articles. Articles that have been accepted as a result of approved materials review actions shall be identified. Articles that have been reworked to specified drawing configurations shall not require special identification. Articles rejected as unsuitable or scrap shall be plainly marked and controlled to prevent installation on the bus. Articles that become obsolete as a result of engineering changes or other actions shall be controlled to prevent unauthorized assembly or installation. Unusable articles shall be isolated and then scrapped. Discrepancies noted by the Contractor or resident inspectors during assembly shall be entered by the inspection personnel on a record that accompanies the major component, subassembly, assembly, or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, then LACMTA shall approve the modification, repair or method of correction to the extent that the Contract specifications are affected.
- c. **Quality assurance audits:** The quality assurance organization shall establish and maintain a quality control audit program. Records of this program shall be subject to review by LACMTA.

SP-41.3 INSPECTION

SP-41.3.1 INSPECTION STATIONS

Inspection stations shall be at the best locations to provide for the Work content and characteristics to be inspected. Stations shall provide the facilities and equipment to inspect structural, electrical, hydraulic and other components and assemblies for compliance with the design requirements.

Stations shall also be at the best locations to inspect or test characteristics before they are concealed by subsequent fabrication or assembly operations. These locations shall minimally include underbody structure completion, body

framing completion, body prior to paint preparation, water test, engine installation completion, underbody dress-up and completion, bus prior to final paint touchup, bus prior to road test and bus final road test completion.

SP-41.4 RESIDENT INSPECTORS

SP-41.4.1 Resident Inspector's Role

LACMTA shall be represented at the Contractor's plant by resident inspectors, as required by FTA. Resident inspectors may be Agency employees or outside contractors. LACMTA shall provide the identity of each inspector and shall also identify their level of authority in writing. They shall monitor, in the Contractor's plant, the manufacture of transit buses built under the procurement. The presence of these resident inspectors in the plant shall not relieve the Contractor of its responsibility to meet all of the requirements of this procurement. LACMTA shall designate a primary resident inspector, whose duties and responsibilities are delineated in "Pre-Production Meetings," "Authority" and "Pre-Delivery Tests," below. Contractor and resident inspector relations shall be governed by the guidelines included as Attachment A to this Section.

SP-41.4.1.1 Inspection Memorandum

LACMTA's Resident Inspectors will express concerns pertaining to manufacturing issues or contract compliance using Inspection memoranda contained in a Master Resolution List (MRL). There shall be a separate MRL for the Pilot Bus and for the remaining production Buses. It is expected that the MRL shall be electronic and shall be regularly updated by both parties. The configuration of this document shall be agreed upon during the Pre-Production Meetings. The Contractor shall reply to all urgent matters in writing within 24 hours. It is expected that an electronic matrix of all production issues, speed memos and other correspondence will be developed and transmitted via email to expedite this process.

SP-41.4.2 Pre-Production Meetings

The primary resident inspector may participate in design review and pre-production meetings with LACMTA. At these meetings, the configuration of the buses and the manufacturing processes shall be finalized, and all Contract documentation provided to the inspector.

No less than thirty (30) days prior to the beginning of bus manufacture, the primary resident inspector may meet with the Contractor's quality assurance manager and may conduct a pre-production audit meeting. They shall review the inspection procedures and finalize inspection checklists. The resident inspectors may begin monitoring bus construction activities two weeks prior to the start of bus fabrication.

SP-41.4.3 Authority

Records and data maintained by the quality assurance organization shall be available for review by the resident inspectors. Inspection and test records for this procurement shall be available for a minimum of one year after inspections and tests are completed.

The Contractor's gauges and other measuring and testing devices shall be made available for use by the resident inspectors to verify that the buses conform to all specification requirements. If necessary, the Contractor's personnel shall be made available to operate the devices and to verify their condition and accuracy.

Discrepancies noted by the resident inspector during assembly shall be entered by the Contractor's inspection personnel on a record that accompanies the major component, subassembly, assembly or bus from start of assembly through final inspection. Actions shall be taken to correct discrepancies or deficiencies in the manufacturing processes, procedures or other conditions that cause articles to be in nonconformity with the requirements of the Contract specifications. The inspection personnel shall verify the corrective actions and mark the discrepancy record. If discrepancies cannot be corrected by replacing the nonconforming materials, LACMTA shall approve the modification, repair or method of correction to the extent that the Contract specifications are affected.

The primary resident inspector shall remain in the Contractor's plant for the duration of bus assembly Work under this Contract. Only the primary resident inspector or designee shall be authorized to release the buses for delivery. The resident inspectors shall be authorized to approve the pre-delivery acceptance tests. Upon request to the quality assurance supervisors, the resident inspectors shall have access to the Contractor's quality assurance files related to this procurement. These files shall include drawings, assembly procedures, material standards, parts lists, inspection processing and reports, and records of Defects.

SP-41.4.4 Support Provisions

The Contractor shall provide office space for the resident inspectors in close proximity to the final assembly area. This office space shall be equipped with desks, outside and interplant telephones, Internet access, file cabinet and chairs. As an alternative, Contractor may supply a combination plain paper fax, copier and printer. In addition, two (2) large erasable white board with markers, one bulletin board and one printing calculator shall be provided.

The Contractor shall provide access to the Contractor's LAN server to both send and receive email. The required email address shall be "TBD@METRO.net"

SP-41.4.5 Compliance with Safety Requirements

At the time of the Pre-Production meeting, the Contractor shall provide all safety and other operational restrictions that govern the Contractor's facilities. These issues will be discussed and the parties will agree which rules/restrictions will

govern LACMTA's inspector(s) and any other Agency representatives during the course of the Contract.

SP-41.5 ACCEPTANCE TESTS

SP-41.5.1 RESPONSIBILITY

Fully documented tests shall be conducted on each production bus following manufacture to determine its acceptance to LACMTA. These acceptance tests shall include pre-delivery inspections and testing by the Contractor and inspections and testing by LACMTA after the buses have been delivered. Acceptance Tests and Completed Vehicle inspection documentation shall be presented to LACMTA upon delivery of each Bus.

SP-41.5.2 INITIAL ENGINE START-UP

The fuel system shall be filled and pressure tested after installation of the engine in the Bus and before it is initially started. The pressure test shall ensure that the fuel system is free of leaks. This requirement shall be verified with the fuel system and lines at working pressure. Starting aids, such as ether, shall not be used to start engines.

SP-41.5.3 INITIAL LUBRICATION

All assemblies shall be lubricated in accordance with manufacturer recommendations before the Bus is operated on the road. This shall include, but not limited to proper engine oil, transmission fluid, hydraulic system oil levels, and grease applied to all zerk fittings. Initial lubrication certification shall be presented to LACMTA upon delivery of each Bus.

SP-41.5.4 PRE-DELIVERY TESTS

The Contractor shall conduct acceptance tests at its plant on each Bus following manufacture completion and before submittal to LACMTA for "Completed Bus" inspection. Contractor pre-delivery tests shall include visual and measured inspections, as well as testing the total Bus operation. The underfloor equipment shall be made available for inspection by the Resident Inspectors using a pit or Bus hoist provided by the Contractor. A hoist, scaffold, or elevated platform shall be provided by the Contractor to easily and safely inspect Bus roofs. The Contractor shall provide a driver for road test, water booths for water test, and personnel equipment and facilities for any other tests LACMTA requests.

Delivery of each Bus shall require written authorization of the Senior Resident Inspector or his designee. An executed copy of the authorization shall accompany the delivery of each Bus.

The Resident Inspector has the right to witness inspections and testing for all Buses prior to delivery including any additional tests conducted by or on behalf of the Contractor. The Contractor's pre-delivery test shall be scheduled and conducted with sufficient notice so that they may be witnessed by the Resident

Inspectors, who may accept or reject the results of the test. The tests shall be conducted and documented in accordance with written test plans which are to be provided to LACMTA. Additional tests may be conducted at the Contractor's discretion to ensure that the completed Buses have attained the desired quality and have met the requirements of the technical specifications. This additional testing shall be recorded on appropriate test forms provided by the Contractor.

SP-41.5.5 VISUAL AND MEASUREMENT INSPECTIONS

Visual and measurement inspections shall be conducted with the Bus in a static condition. The purpose of the inspection testing is to verify:

- a) Overall dimension and weight requirements
- b) Required components are included and ready for operation
- c) Components and subsystems functionally operate with the Bus as designed in a static condition.

SP-41.5.6 OVERALL BUS OPERATION

Overall Bus operation shall be evaluated during road tests. The purpose of the road test is to observe and verify the operation of the Bus as a system and to verify the functional operation of the sub-systems which can be operated only while the Bus is in motion.

Each Bus shall be driven for a minimum 35 miles during the road test. If requested, computerized diagnostic printouts showing the performance of each Bus shall be produced and provided to LACMTA. Observed defects shall be recorded on the test forms. The Bus shall be re-tested when defects are corrected and adjustments made. This process shall continue until defects are no longer detected. Results shall be pass/fail for these Bus operation tests.

SP-41.5.7 PRE-DELIVERY BUS DOCUMENTATION PACKAGE (BDP)

Prior to presenting each Bus for inspection, the Contractor's quality assurance organization shall be responsible for preparing a documentation package for each Bus. When completed following LACMTA inspection, the BDP shall be inserted into a manila envelope which shall be labeled with the LACMTA Bus number on the front of the envelope. This envelope shall be placed into the Bus and shall be presented to LACMTA upon delivery of the Bus in Los Angeles.

At a minimum, each BDP shall contain the following items:

- 1. BDP Check-off Sheet listing the following:
- 2. QA Certificate of Completion (signed by Contractor QC representative).
- 3. CNG pressure test certification.
- 4. Water test Certification.
- 5. Alignment and Steering Stop Adjustment Certification.
- 6. Smoke Opacity Test (Exhaust Emissions). Not applicable to CNG or Zero Emission buses; applicable only to diesel powered buses.
- 7. LACMTA "Completed Bus" Inspection document.

8. Copy of defects noted during LACMTA Completed Bus inspection.
9. List of "Open Items" .
10. VIN number (copy of bus data plate)
11. Certificate of Origin
12. Weight slip (curb weight)
13. Certificate of compliance for high voltage/energy storage protective devices, if applicable.
14. Component Serial Number List - List of serialized components installed on each Bus to include, but not limited to:
 - Engine
 - Transmission
 - Alternator
 - Starter
 - A/C Compressor
 - Drive Axle
 - Power Steering Unit
 - Air Compressor
 - CNG Fuel Cylinders with installation location diagram.
 - Other serialized components for which the Contractor will require serial numbers for the processing of warranty claims.

Open items may be considered and approved by LACMTA on a case-by-case basis only prior to bus shipment. They may include material which is missing, damaged, or non-compliant.

The BDP shall be well organized and be contained in a suitable binder clearly showing the LACMTA bus number on the outside. Item number 1 (above) shall be clearly visible and prominent when the BDP is opened.

SP-41.5.8 POST-DELIVERY TESTS

LACMTA may conduct acceptance tests on each delivered Bus. These tests shall be completed within 15 days after Bus delivery. The purpose of these tests is to identify defects that have become apparent between the time of Bus release and delivery to LACMTA. The post-delivery tests shall include visual inspection and Bus operations.

Buses which fail to pass the post-delivery tests are subject to non-acceptance. LACMTA shall record details of all defects on the appropriate test forms and shall notify the Contractor of the non-acceptance of each Bus within 5 days after completion of tests. The defects during these tests shall be repaired according to the procedures defined in this Contract. A Contractor's representative shall be present during post-delivery test days.

SP-41.6 POST DELIVERY INSPECTION

The post-delivery inspection is similar to the inspection at the Contractor's plant and shall be conducted with the Bus in a static condition. Any visual damage shall be identified and recorded during the post delivery inspection of each Bus.

SP-41.6.1 BUS OPERATION

The road tests for total Bus operation are similar to those conducted at the Contractor's plant. Operational deficiencies of each Bus shall be identified and recorded and shall be resolved as provided in this Contract.

SP-41.6.2 OIL DRAIN

If required by the OEM manufacturer, Buses that are driven from the Manufacturing site to LACMTA shall have engine and transmission oils and all filters, including fuel filters, changed by Contractor prior to acceptance by LACMTA.

SP-41.6.3 BOLT TORQUE

Upon a buses arrival in Los Angeles – Contractor shall be required to re-torque and mark any structural bolts and fasteners as recommended in the Contractors Maintenance Manual.

SP-42 PAYMENT OF PREVAILING AND LIVING WAGES / REPORTING (NOT APPLICABLE)

This Contract is subject to the provisions of California law regarding Public Works, including, but not limited to California Labor Code Sections 227, 1021, and 1720 through and including 1861, together with all applicable regulations (e.g. Title 8 California Code of Regulations, Section 16001 et. seq.). In addition to the requirements for payment of prevailing wages set forth in the Labor Compliance Manual, this Contract, if federally funded, is also subject to payment of prevailing wages under federal law by the Davis Bacon Act, as determined by the US Department of Labor. All pertinent federal and state statutes and regulations, including but not limited to those referred to above are hereby incorporated by reference into this document as though set forth in their entirety.

This Contract is also subject to the payment of a living wage, as set forth in the Living Wage Policy (LWP). Contractors under contract for the furnishing of service to or for Metro and that involve expenditures in excess of \$25,000 and a contract term of at least three (3) months, shall comply with the provisions in the LW P.

In the event of a conflict between LACMTA's living wage, the prevailing wage under state law as determined by California authorities and the prevailing wage under federal law as determined by the U.S Department of Labor, the Contractor shall pay at minimum the highest of the three (3) wages.

Prevailing Wage Reporting System — LACMTA may require, at time of award, the Contractor to utilize LACMTA's online "Prevailing Wage Reporting System," in lieu of hard copy manual submittals, for the following documents:

- Certified Payroll and other related documents if applicable
- Project Labor Agreement related documents (if applicable)
- Construction Careers Policy monthly reports and related documents (if applicable)

SP-43 SERVICE CONTRACT WORKER RETENTION POLICY (NOT APPLICABLE)

This Contract may be subject to the Service Contract Worker Retention Policy ("SCWRP") which is incorporated herein by this reference. If applicable, Contractor must also comply with the SCWRP which requires that, unless specific exemptions apply, all employers under contracts that are primarily for the furnishing of services to or for the Los Angeles County Metropolitan Transportation Authority (Metro) and that involve an expenditure or receipt in excess of Twenty-Five Thousand Dollars (\$25,000) and a contract term of at least three (3) months, shall provide retention by a successor contractor for a ninety-day (90-day) transition period of the employees who have been employed for the preceding twelve (12) months or more by the terminated contractor or subcontractor, if any, as provided for in the SCWRP. Metro has the authority, under appropriate circumstances, to terminate this Contract and otherwise pursue legal remedies that may be available if Metro determines that the subject contractor violated the provisions of the SCWRP.

SP-44 BUY AMERICA CERTIFICATION

A. Buy America Certification

1. As described in Regulatory Requirements Section RR-15 of this RFP, this Contract is subject to the "Buy America" statutory requirements of 49 USC §5323U) and regulatory requirements of 49 CFR Part 661, as may be amended from time to time. Proposer's attention is directed to 49 CFR §661.11, Rolling Stock Procurements. Proposer has the responsibility to comply with the above cited provisions and any other governing statutes and regulations, including official interpretations.
2. Proposers shall execute the appropriate "Buy America" certification in the Proposal Documents. Failure to do so will make the Proposal non-responsive. The two signature blocks on the "Buy America" Certificate are mutually exclusive. Proposer shall sign only one signature block on the Certificate. Signing both signature blocks will make the Proposal non-responsive. Knowingly and willfully making a false certification is a criminal act under 18 USC §1001.
 - 2.1 The Proposer who has submitted an incomplete "Buy America" certificate or incorrect certificate of non-compliance through inadvertent or clerical error (but not including failure to sign the certificate, submission of certificates of both compliance and

non-compliance, or failure to submit any certification), may submit to the FTA Chief Counsel within ten (10) Days of Proposal opening a written explanation of the circumstances surrounding the submission of the incomplete or incorrect certification in accordance with 28 USC §1746, sworn under penalty of perjury, stating that the submission resulted from inadvertent or clerical error. The Proposer will also submit evidence of intent, such as information about the origin of the product, invoices, or other working documents. The Proposer will simultaneously send a copy of this information to LACMTA.

2.2 The FTA Chief Counsel may request additional information from the Proposer, if necessary. LACMTA may not make Contract Award until the FTA Chief Counsel issues his/her determination, except as provided in 49 CFR Part 661.15(m).

2.3 Certification based on ignorance of proper application of the "Buy America" requirements is not an inadvertent or clerical error.

3. Any party may petition FTA to investigate a successful Proposer's compliance with the "Buy America" certification. The procedures are set out in 49 CFR Part 661.15. If FTA determines the evidence indicates noncompliance, FTA will require LACMTA to initiate an investigation. The successful Proposer has the burden of proof to establish compliance with its certification. If the successful Proposer fails to so demonstrate compliance, the successful Proposer will be required to substitute sufficient domestic materials without revision of the original Contract terms or increase in the Contract Price. A willful failure to comply with a certification will be a breach of the Contract and may lead to the initiation of debarment or suspension proceedings under 49 CFR Part 29.

B. Buy America Pre-Award and Post-Delivery Audit Requirements.

- a. Proposer/Supplier agrees to provide the information requested by LACMTA in order for LACMTA to meet the pre-Award and post-Delivery audit requirements of 49 USC. §5323(m) and 49 CFR Part 663.
2. Pre-Award Audit Requirements: If Proposer certifies compliance with Buy America as set forth in these Special Provisions, Proposer shall submit documentation which lists 1) component and subcomponent parts of the Vehicle, as defined by 49 CFR Part 661, to be purchased, identified by manufacturer of the part, its country of origin and cost; 2) the location of the final assembly point for the Vehicle; and 3) a description of the activities that will take place at the final assembly point and the cost of final assembly, in order to allow LACMTA to complete the pre-award audit. Proposer shall provide enough detail to

allow for the determination that all final assembly activities will be performed in the Contractor's final assembly facility in the U.S. In addition, the Pre-Award Audit must include the Purchaser's Requirements Certification required under 49 CFR 663.27.

3. Post-Delivery Audit Requirements: If Proposer certifies compliance with Buy America as set forth in these Special Provisions, Proposer shall submit documentation which lists 1) component and subcomponent parts of the Vehicle purchased, as defined by 49 CFR Part 661, identified by manufacturer of the part, its country of origin and cost; 2) the actual location of the final assembly point for the Vehicle; and 3) a description of the activities that took place at the final assembly point and the cost of final assembly, in order to allow LACMTA to complete the post-Delivery audit. Proposer shall provide accurate records of all vehicle construction activities; and address how the construction and operation of the vehicles fulfills the contract specifications in enough detail to allow for the determination that all final assembly activities were performed in the Contractor's final assembly facility in the U.S.

C. Buy America Compliance Reporting

The Contractor shall promptly report and provide enough details to LACMTA of any substitution / addition / deletion of supplier(s) that may impact Buy America domestic content proposed at the time of the Pre-Award audit.

Additionally, the Contractor shall report Buy America compliance status each month in the monthly progress report in a format approved by LACMTA.

ATTACHMENT A: NEW BUS MANUFACTURING INSPECTION GUIDELINES

This attachment was developed by the APTA Bus Equipment and Maintenance Committee and is intended as a guideline for use by transit systems (Agencies) and vehicle manufacturers (Contractors). Two lists are included to reflect the expectations of both the transit system and the vehicle manufacturer.

Pre-Building Phase

Bus Manufacturer's Expectations	Transit System's Expectations
<ol style="list-style-type: none">1. Contract/transit system inspectors must be given all Contract documentation before beginning the inspection process.2. The bus manufacturer's inspection process should be reviewed at pre-production audit meeting. Inspectors should be present and understand the difference among various manufacturing processes. At least one key customer and manufacturer representative who will follow the entire procurement from start to finish should be present.3. When change orders are required, they need to be made as early in the process as possible. If change orders have an impact on the delivery schedule, consideration should be given to a delivery schedule revision.4. Transit system inspection forms should be provided to manufacturers prior to the build so that the manufacturers will know what items the customer believes are critical. The inspection forms should be provided to the manufacturer after completion so that the Defects to be corrected can be identified.5. If the transit system requires sole-source components, it should obtain assistance for the first installation of new components.6. The transit system should have a decision maker at the pre-production audit meeting.7. The transit system should make every effort to inform manufacturers of what they want. Hidden agenda items buried in the Contract to not promote the cooperative environment desired.8. The parties should agree on what necessitates a line shutdown before the build begins.	<ol style="list-style-type: none">1. Manufacturers should have a formal, approved quality assurance (QA) program and must adhere to the program. Any changes in the approved program must be resubmitted to the transit system for approval.2. At the pre-production audit meeting with the transit system:<ul style="list-style-type: none">• Representatives from contracts, engineering, quality and production should be represented.• Manufacturers should ensure good communication among their departments regarding Contract requirements.• A formal sales release must be ready for review at the meeting, and a final sales release must be ready before production.• Manufacturers should not use the meeting to sell parts.• Manufacturers should supply test information and other documents required to meet expectations.3. Manufacturers should have application and installation approvals from Suppliers whenever possible. On installations of new major components, the sub-Supplier must be present at initial production.4. Manufacturers should read and understand the specification prior to bid. Specification clarifications should be made during the approved equals process. Ask the appropriate questions at pre-bid meetings.5. The manufacturer's service representative should be involved with the pre-production audit meeting and initial production, and/or at final acceptance.6. Prior to build, the manufacturer should be able to provide the transit system a complete Bill of Materials for the buses to be built.

Process During Building Phase

Bus Manufacturer's Expectations	Transit System's Expectations
<ol style="list-style-type: none"> 1. One person should be the primary inspector from start to finish. The primary inspector should be included in the design review process and pre-production meetings. The rotation of personnel with different expectations and standards causes difficulties. The first or second bus should stay at the manufacturer's location as a quality standard and be delivered last. 2. An adequate number of experienced inspectors should be available to prevent production line movement delays. 3. Inspectors should be available to support the manufacturing effort Monday through Friday, consistent with the manufacturer's production personnel hours. 4. Inspection should be conducted in a cooperative, professional manner. The inspector must <i>want</i> to solve problems. 5. Only one person should be able to make stop ship calls, and the reason for the stop ship <i>must</i> be immediately available. The stop ship should be in writing. 6. Problems identified should be brought to the attention of the manufacturer at the stage when they occur rather than at a future stage or when the vehicle is complete. 	<ol style="list-style-type: none"> 1. The resident inspector should have access to a complete set of engineering drawings and documents for the bus being built. Engineering or manufacturing changes must be formally documented and included in documents provided to transit systems. 2. Manufacturers should maintain the build schedule if possible. Changes in the build schedule and requests for overtime and weekend Work must be communicated as early as possible. 3. Buses that are not ready or complete should not be presented for final inspection. 4. Manufacturers should have a formal internal/external communications process and feedback for inspection problems and resolutions. Manufacturers should provide early resolution of problems identified by inspectors. QA procedures must be revised to reflect problem corrections. 5. The attitude of manufacturers and QA personnel is important; remember who the customer is. However, there must be mutual respect. 6. The transit system is not responsible for redesigning the bus, correcting problems or providing manufacturing quality. It audits only. Manufacturers should not need a learning period to determine acceptable quality standards. 7. Buses should be identical and interchangeable within an order unless provided by the transit system. 8. Inspection Work should be spread evenly during the workday to the extent possible.

Post-Building Phase

Bus Manufacturer's Expectations	Transit System's Expectations
<ol style="list-style-type: none">1. To ensure prompt payment, the transit system should increase the rate of the final acceptance process.2. The on-property final acceptance inspection should be primarily for shipping damage and Defects that occur during shipment. It should not be a complete vehicle inspection with criteria different from those used at the plant.	<ol style="list-style-type: none">1. Defects noted at the property final inspection should be repaired in a timely and acceptable manner.

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ATTACHMENT B – FAITHFUL PERFORMANCE BOND

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000

FORTY-FOOT (40') LOW FLOOR CNG TRANSIT VEHICLES

PERFORMANCE BOND

WHEREAS the Los Angeles County Metropolitan Transportation Authority ("LACMTA") has awarded to ELDORADO NATIONAL (CALIFORNIA), INC. ("Principal"), Contract No. OP28367-000, for Forty-Foot (40') Low Floor CNG Transit Vehicles. And

WHEREAS Principal is required under the terms of the Contract to furnish a Bond for the faithful performance of the Contract;

NOW, THEREFORE, we ELDORADO NATIONAL (CALIFORNIA), INC., as Principal, and ("Surety"), as Surety, are held and firmly bound unto LACMTA in the sum of fifteen percent (15%) of the Not to Exceed (NTE) Contract value, in lawful money of the United States of America, for payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns, jointly and severably, firmly by these presents. In case suit is brought upon this Bond, Surety shall pay reasonable attorneys' fees to LACMTA in an amount to be fixed by the court. In no event shall the surety be liable under this Bond for an amount greater than the aggregate penal sum designated in this paragraph.

The condition of this obligation is such that, if the hereby-bonded Principal or its heirs, executors, administrators, successors, assigns, or Subcontractors shall in all things stand to and abide by and well and truly keep and perform all the undertakings, terms, covenants, conditions, and agreements in the Contract and any alteration thereof, made as therein provided, all within the time and in the manner therein-designated and in all respects according to their true intent and meaning, then this obligation shall become null and void; otherwise, it shall be and remain in full force and effect.

Further, Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, or modification of the Contract, or of the Goods to be furnished thereunder, shall in any way affect its obligations under this Bond, and it does hereby waive notice of any such change, extension of time, alteration, or modification of the Contract or of the Goods and Technical Services to be performed thereunder.

IN WITNESS WHEREOF, three identical counterparts of this instrument, each of which shall for all purposes be deemed an original hereof, have been duly executed by Principal and Surety named herein, on the _____ day of _____ 20__, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative pursuant to authority of its governing body.

By: _____
(Principal)

By: _____
(Surety)

By: _____

ATTACHMENT C – ASSIGNMENT AGREEMENT

ASSIGNMENT TO PURCHASE AGREEMENT

Los Angeles County Metropolitan Transportation Authority of Los Angeles, California, "Assignor", hereby assigns to _____ of _____, "Assignee", to purchase from _____ of, "Seller", _____ floor transit Vehicles at a price and under the terms and conditions contained in Assignor's Contract No OP28367-000, dated _____ with Seller ("Contract").

Contract OP28367-000 commenced, per terms of Contract, on _____, and any unused buses may be assigned at any time on or before _____.

With respect to Vehicles assigned hereunder and this Assignment, Assignee agrees to perform all covenants, conditions and obligations required of Assignor under said Contract and agrees to defend, indemnify and hold Assignor harmless from any liability or obligation under said Contract. Assignee further agrees to hold Assignor harmless from any deficiency or defect in the legality or enforcement of the terms of said Contract or option to purchase thereunder. Assignee agrees and understands that Assignor is not acting as a broker or agent in this transaction and is not representing Seller or Assignee, but rather is acting as a principle in assigning its interest in the above-referenced option to purchase the Vehicles under the Contract to Assignee.

Assignee hereby unconditionally releases and covenants not to sue Assignor upon any claims, liabilities, damages, obligations or judgments whatsoever, in law or in equity, whether known or unknown, or claimed, which they or either of them have or claim to have or which they or either of them may have or claim to have in the future against Assignor, with respect to the Vehicles or any rights whatsoever assigned hereunder.

Dated this _____ day of _____, 201__

Assignor

Assignee

I hereby accept and approve the terms of this agreement and agree to hold Assignor harmless from any further liability or obligation under our agreement.

Seller

END OF SPECIAL PROVISIONS

GENERAL CONDITIONS (SERVICES)

Note: * = Flow-down requirement as defined in the Article entitled SUBCONTRACTORS AND SUPPLIERS herein

GC-01 GLOSSARY OF TERMS*

GC-01-A Abbreviations And Symbols

ADR	Alternative Disputes Resolution
Cal-OSHA	California Occupational Safety and Health Administration
CEO	Chief Executive Officer
CFR	Code of Federal Regulations
DVBE	Disabled Veteran Business Enterprise
EPA	United States Environmental Protection Agency
FAR	Federal Acquisition Regulations
FTA	Federal Transit Administration
GEC	General Engineering Consultant
Metro	Los Angeles County Metropolitan Transportation Authority
NTE	Not-to-Exceed
OSHA	United States Department of Labor, Occupational Safety and Health Administration, and Occupational Safety and Health Act
PUC	Public Utilities Code, State of California
RFC	Request for Change
SBE	Small Business Enterprise
USC	United States Code

GC-01-B Definitions

Acceptance	Documentation prepared by Metro or its Authorized Representative attesting to the completion of all of the Services or Work under the Contract or a CWO or a specified portion thereof.
Alternative Disputes Resolution:	Means for settling a disputed claim which may include arbitration, mediation or other recognized means for settling a dispute.
Amendment:	A document mutually agreed to by the Parties modifying the Contract.
Approve:	To confirm documents presented by and/or actions of the Contractor related to the Work under the Contract or CWO.
Assessment:	A cost imposed on the Contractor for non-compliance with certain contractual requirements.
Authorized Representative:	Person or firm empowered to act for or in the place of the named business or governmental entity.

Chief Executive Officer:	The Chief Executive Officer (CEO) of Metro.
Claim:	A written demand by one of the Contracting Parties for: <ol style="list-style-type: none"> 1. Time extension; and/or 2. Payment of money.
Consultant	One that provides Services or Work to Metro, also defined as the Contractor.
Consultant Change Notice (CCN):	A document issued by Metro to the Contractor detailing a proposed change to the Contract or CWO.
Contract:	Written agreement executed by Metro and the Contractor which sets forth the rights and obligations of the parties in connection with the Services and Work, and which includes the Contract Documents.
Contract Work Order (CWO):	The document issued by Metro for each separate assignment detailing the Scope of Work, price and completion time.
CWO Period of Performance:	The total time period allowed for completion of the Work, including all authorized time extensions, as specified in each CWO.
CWO Price:	The not-to-exceed amount agreed to by the Parties to perform the Scope of Work.
Contracting Officer:	The CEO or a designated representative who is authorized and empowered to execute contracts, contract amendments, CWOs, CWO Revisions, WACNs, and agreements on behalf of Metro.
Contractor:	The individual, firm, partnership, corporation, joint venture or combination thereof, referred to throughout the Contract in the singular and by the neuter term "it", that has entered into the Contract with Metro.
Cure Notice:	Written notice from Metro to the Contractor to correct Work performed not in conformance with the Contract or CWO.
Days:	Unless otherwise stated, "days" shall mean calendar days. When a required submittal falls on a non-business day, submittal shall be on the next

	business day.
Design Professional (DP):	A person licensed as an architect, registered as a professional engineer, licensed as a land surveyor or otherwise licensed or registered in a professional discipline pursuant to the laws of the State of California.
DVBE:	Disabled Veteran Business Enterprise (DVBE): A business enterprise certified by the State of California's Department of General Services (DGS) and is 51% owned by one or more disabled veterans, whose daily business operations are managed and controlled by one or more disabled veterans.
Goods:	Equipment, material and/or products required to perform the Services. Goods may be furnished by Metro or required to be furnished by the Contractor.
Government Entity	Any federal, state, or local government and any political subdivision or any governmental, quasi-governmental, judicial, public or statutory instrumentality, administrative agency, authority, body or entity other than Metro.
Home Office:	The home office(s) of the Contractor's firm.
Invoice:	A request for payment for Work performed.
Milestone:	An established event or occurrence that is associated with the Schedule as defined in the Contract or CWO.
Modification	Any written addition, deletion, adjustment or alteration to the Contract, whether arising out of the unilateral exercise by the MAT of any right under the Contract, or by mutual agreement/action executed by the Parties. A Modification may be unilateral or bilateral, and includes Change Orders, adjustments in quantities, extensions of time, administrative changes and adjustments, and all other actions and events that result in an alteration, correction or adjustment of the Total Contract Price or Time, any Contract term or process, or any other obligation of either Party.
Metro or MTA	The Los Angeles County Metropolitan Transportation Metro (Metro) or its successor, or

	any successor in interest, or its Authorized Representative.
Notice of Termination:	Written notice from Metro to the Contractor terminating the Contract or/CWO, or a portion thereof, either for convenience of Metro or for default due to the Contractor's failure to perform its contractual obligations.
Payment Application:	A request for payment for Work performed.
Parties:	Metro and the person(s), governmental entities, or business entities entering into the Contract.
Period of Performance:	The total time period allowed for completion of all Services or Work under the Contract or CWO, as specified in the Form of Contract or CWO.
Prime Design Professional (PDP):	A design professional with a written Contract directly with Metro.
Program:	Existing and planned rail transit system that is and will be operated by Metro.
Project:	A portion of Metro Transit System as defined in the Form of Contract
Provide:	In reference to Work to be performed by the Contractor, "provide" means to perform Work in accordance with the Scope of Services and the Scope of Work.
Request for Change (RFC):	A document issued by the Contractor to Metro detailing a proposed change to the Contract or CWO.
Request for Substitution:	Goods, service(s), or system(s) that the Contractor requests to use in lieu of that specified in the Contract.
Revision:	A document issued by Metro to the Contractor or mutually agreed to by the Parties modifying the Contract or CWO.
SBE:	Small Business Enterprise (SBE): A small business that is 55 percent owned and controlled by one or more economically disadvantaged individuals; and whose management and daily business operations are controlled by one or more economically disadvantaged individual who owns it.

Schedule:	A time phased Project execution plan that identifies all activities necessary to implement a given Project in a logical time phased manner. The Contract or CWO Schedule provides the start and completion date of each activity and its Milestones. The Project Schedule shall include the Milestones for the entire Project.
Scope of Services (Services):	Description of the sum total of productive and operative efforts used to generate the results specified, indicated, or implied in the Contract, including all technical and professional services, and Goods used during all related activities whether originally or subsequently Scheduled.
Scope of Work:	Description of the Work to be provided by the Contractor under the Contract or CWO.
Special Provisions:	Requirements applicable to the Contract that invoke, modify, and/or supplement the General Conditions
State:	The State of California.
Sub-consultant Design Professional (SDP):	Design professional hired by a prime design professional.
Subcontractor:	Any individual, firm, partnership, corporation, joint venture or combination thereof, other than employees of the Contractor, that enters into a legal agreement with the Contractor to furnish Work, labor or Goods as a portion of the Work. Unless otherwise specified, Subcontractors includes Subcontractors of any tier.
Supplier:	Any individual, firm, partnership, corporation, joint venture, or combination thereof, other than employees of the Contractor, or Subcontractor that enters into a legal agreement with the Contractor and that manufacturers, distributes or furnishes tangible Goods as a portion of the Work, with Work usually limited to delivery and/or required testing.
Technical Review:	A technical quality and progress audit including, but not limited to, a check of budget versus expenses to date, technical progress, quality of work, Schedule assessment and a measurement of design hours per drawing, review of adherence to policies and procedures and safety requirements.

Total Contract Price (TCP):	The total compensation approved by Metro's governing board to be paid to the Contractor in accordance with the terms of the Contract (and Amendments thereto).
Transit System:	The entire fixed guideway rail transportation system, including right-of-way, pavement, tracks, structures, equipment appurtenances, and all other related property of Metro.
Work:	The sum of all activities, Services and Deliverables, to be accomplished under the Contract or CWO.
Worksite:	The location where the Contractor's Work will be performed as defined in the Contract or CWO(s). The term may include the location of work performed by others (i.e., the construction site of a Project).

GC-02 INTERPRETATION*

GC-02-A Information

1. Furnished By Metro:

Upon request by the Contractor, Metro shall furnish the Contractor any general information and data readily available to Metro or those under contract to Metro, which the Contractor determines, may be of use to the Contractor in the performance of the Work. Metro shall rely upon the Contractor to determine which of the general information and data readily available to Metro the Contractor requires for the performance of the Work hereunder. Metro makes no representations with respect to the reliability, accuracy, or completeness of any information or data it may furnish hereunder. The Contractor is entitled to rely on the information or data to the extent a professional engineer believes it is appropriate to do so. The Contractor is expected to apply its professional judgment and seek any clarification it deems necessary.

2. Furnished by Others:

The Contractor is to obtain, utilizing its own personnel, any required information that has been developed by other public or private agencies or companies that are not under contract to Metro. The Contractor is to apply its professional judgment as to the reliability of the information or data for the purpose for which the Contractor intends on utilizing such information or data.

GC-03 PRECEDENCE OF CONTRACT DOCUMENTS

See Form of Contract Article 1

GC-04 CONTRACT DOCUMENTS

GC-04-A Explanations

Should it appear that the Work to be performed or any relative matters are not sufficiently detailed or explained in the Contract, the Contractor shall request in writing from Metro a written explanation as may be necessary and shall conform to the explanation given.

GC-04-B Omissions And Misdescriptions

1. The Contractor shall carefully study the Contract; shall verify all figures in the Contract Documents before performing the Work; shall promptly notify Metro of all errors, inconsistencies, and/or omissions that it discovers; and, in instances where such non-conformities are discovered, shall obtain specific instructions in writing from Metro before Contractor's proceeding with the Work. Any Work affected that is performed prior to Metro's decision shall be at the Contractor's risk. The Contractor shall not take advantage of any apparent non-conformity that may be found in the Contract. Metro shall be entitled to make such corrections therein and interpretations thereof as it may deem necessary for the fulfillment of the intent of the Contract. Omissions or misdescription of any Work that are manifestly necessary to carry out the intent of the Contract, or that are customarily performed, shall not relieve the Contractor from performing such Work at no additional expense and/or delay, and such Work shall be performed as if fully and correctly set forth in the Contract.

2. Terms

Where the terms "as indicated" and "as detailed," or words of similar import are used by themselves, it shall be understood that reference is made to the Technical Specifications or other technical documents provided by Metro, or Contract drawings unless otherwise expressly stated. "Directed," "required," "permitted," "ordered," "designated," "selected," "approve," "accept," "satisfactory," "equal," "necessary," or words of like import shall be understood to require an identifiable action by Metro unless otherwise expressly stated.

3. References within the Contract

References to Articles and Subarticles herein are made by citing the Title of the Articles only, e.g., a reference to this particular paragraph would be phrased "in the Article entitled 'INTERPRETATION,' which would necessarily be inclusive of all other paragraphs in this Article. However, where a reference is made to other paragraphs within the same Article, the reference is made as in the preceding sentence, i.e., "in this Article." References to other Sections of the Contract are made by citing the title of the Section.

GC-05 AUTHORITY OF THE CONTRACTING OFFICER

Metro has the final approval in all matters relating to or affecting the Work. Except as expressly specified in the Contract, the Contracting Officer may exercise any powers, rights, and/or privileges that have been lawfully delegated by Metro. Metro shall inform Contractor in writing of delegations given by it to the Contracting Officer. Nothing in the Contract shall be construed to bind Metro for acts of its employees and Authorized Representatives that exceed the delegation of Metro specified herein.

GC-06 METRO'S TECHNICAL REPRESENTATIVE (PROJECT MANAGER)

Metro shall provide a Project Manager and/or a technical representative for all technical aspects related to the performance of the Contract. The Contractor shall make such oral or written reports to Metro's technical representative with an information copy to Metro's Contract Administrator as may be requested by Metro or as specifically required by the Contract. ALL CONTRACTUAL MATTERS SHALL BE ADDRESSED TO THE DESIGNATED CONTRACT ADMINISTRATOR.

GC-07 INDEPENDENT CONTRACTOR

The Contractor represents that it is fully experienced and properly qualified to perform the class of Work required for the Contract and that it is properly licensed, equipped, organized, and financed to perform the Work. The Contractor shall be an independent contractor. The Contractor is not an agent of Metro in the performance of the Contract, and shall maintain complete control over its employees and its Subcontractors and Suppliers of any tier. Nothing contained in the Contract or any Subcontract awarded by the Contractor shall create any contractual relationship between any Subcontractor and Metro. The Contractor shall perform the Work in accordance with its own methods, in compliance with the terms of the Contract.

Metro reserves the right of prior approval of all subcontractors and retains the right to request Contractor to terminate any subcontractor, for any reason deemed appropriate by Metro, by so notifying Contractor in writing. Should said notification be submitted to Contractor, it shall terminate said subcontractor immediately.

GC-08 ORGANIZATIONAL AND KEY PERSONNEL

- A. Before starting any Work, the Contractor shall submit for Metro review and acceptance, an organization chart showing the proposed organization established by the Contractor for the performance of the Work, including:
1. Lines of authority, responsibility, and communication;
 2. Office organizations, if any; and
 3. Names, titles, and functions of all supervisory and other key personnel.

- B. The Contractor's Project Manager shall supervise and direct the Work, and have overall responsibility for the Work in accordance with the Contract. The Contractor shall be solely responsible for implementation of all Work, means, methods, techniques, sequences, and procedures and for coordination of all portions of the Work under the Contract.
- C. The Contractor shall not reassign such key personnel to other projects without Metro's prior written approval and until a satisfactory replacement has been approved by Metro. The Contractor shall secure the prior written approval of Metro for any change or reassignment of the key personnel, submitting written documentation of the new individuals' qualifications.
- D. If Metro provides office space to the Contractor, or requires Contractor to locate its office space in a specific location, then at all times during the performance of Work hereunder, only related Work shall be performed in such office space and Contractor shall not use such office space to perform non-Contract related work.

GC-09 SUBCONTRACTORS AND SUPPLIERS*

GC-09-A Documentation And Acceptance

The Contractor shall submit a copy of all executed subcontracts at any time within fourteen (14) days of execution regardless of value to Metro for fulfillment of the (DBE), (SBE/DVBE) commitments, and a copy of insurance certificates in accordance with the Exhibit to the Form of Contract entitled INSURANCE REQUIREMENTS. Failure to submit subcontracts and certificates within the required time period will result in the Subcontractor's not being permitted to perform Work on the Project.

GC-09-B Performance Of Work

The Contractor shall:

- 1. Be responsible to Metro for all acts and omissions of its own personnel, and of Subcontractors, Suppliers and their employees; and
- 2. Be responsible for coordinating the Work performed by Subcontractors and Suppliers.

Should a portion of the subcontracted Work not be performed in accordance with the terms of the Contract, or if a Subcontractor commits or omits any act that would constitute a breach of the Contract, the Subcontractor shall be replaced and shall not again be employed on the Program.

GC-09-C Acceptance Of Substitution Of Subcontractor

- 1. The Contractor shall notify Metro in writing of any proposal to substitute a Subcontractor in place of a Subcontractor listed in the Contractor's Qualification/Proposal. Prior to such substitution the Contractor shall secure

the acceptance of Metro. The Contractor shall submit the following information in a form similar to that contained in the Contractor's original Qualification/Proposal.

- a. Name of Subcontractor
- b. Location and Phone Number of Place of Business
- c. Contact Person
- d. Subcontractor's License(s) number and expiration date (if applicable)
- e. Current Metro Contract Compliance Certification Status (if applicable)
- f. The portion of the Services that will be performed by each Subcontractor.

Metro will promptly initiate a review of the information submitted on each Subcontractor and transmit written notification to the Contractor concerning its decision.

2. Metro shall not be responsible for delays incurred by the Contractor because of a timely disapproval by Metro of a Subcontractor proposed by the Contractor, or for the late submittal for acceptance of a Subcontractor to Metro, or because of a Subcontractor's removal from the performance of the Work.
3. The Contractor shall not do any of the following without the prior written consent of Metro:
 - a. replace any previously accepted Subcontractor;
 - b. permit any previously accepted Subcontract to be assigned or transferred; and/or
4. However, the Contractor may perform the Work itself with qualified personnel, provided written permission is obtained from Metro prior to performance of the Work.

GC-09-D Flow-Down Requirements

1. The Contractor shall incorporate the following into each Subcontract and require insertion of same into all lower-tier Subcontracts:
2. All Articles, Subarticles or portions of the Contract noted by a star (*) shall be included in all Subcontracts of any tier.
3. All provisions required by law, regulation, rule, or the Contract shall apply to subcontracts and shall apply to all subcontracts of any tier.
4. By virtue of signing the subcontract, the following apply:

- a. The Subcontractor acknowledges and agrees that all Work being performed by it under the subcontract shall be performed in accordance with the Contractor's Contract with Metro.
- b. The Subcontractor agrees that it shall have the same duties and obligations to the Contractor with respect to its performance of its own Work as the Contractor has to Metro under its Contract.
- c. The Contractor and the Subcontractor agree that Metro is the third party beneficiary of the Subcontract and shall have the right to enforce all of the terms of the Subcontract for its own benefit. All guarantees and warranties, express or implied, shall inure to the benefit of both Metro and the Contractor during the performance of the Work; upon final completion of the Work, such guarantees and warranties shall inure to the benefit of Metro.

The Contractor and the Subcontractor agree that nothing contained in the Subcontract shall be deemed to create any privity of the Contract between Metro and the Subcontractor, nor does it create any duties, obligations, or liabilities on the part of Metro to the Subcontractor except those allowed under California Law. In the event of any claim or dispute arising under the subcontract and/or the Contractor's Contract with Metro, the Subcontractor shall look only to the Contractor for any payment, redress, relief, or other satisfaction. The Subcontractor hereby waives any claim or cause of action against Metro arising out of the subcontract.

GC-09-E This Article does not and shall not operate to relieve the Contractor of any duty or liability under the Contract nor does it create any duty or liability on the part of Metro. The Contractor shall have sole responsibility for promptly settling any disputes between its Subcontractors and between the Subcontractors and any of their Subcontractors.

GC-09-F No Subcontractor shall be permitted to perform the Work under the Contract until it, or the Contractor, has supplied satisfactory evidence of required insurance to Metro, in compliance with the Exhibit to the Form of Contract entitled INSURANCE REQUIREMENTS.

GC-10 PERMITS

Except for any permits furnished by Metro, the Contractor shall be fully responsible for identifying and obtaining, at its own expense, all necessary licenses and permits required for the timely prosecution of the Work.

The Contractor acknowledges that prior to entering into the Contract or any CWO it familiarized itself with the requirements of all applicable federal, state, county, and municipal laws, codes, rules, and regulations, as well as the conditions of any required licenses and permits, in effect at time of execution of the Contract or issuance of any CWO. The Contractor shall be responsible for complying with all of the foregoing, at its sole expense and without any increase in the TCP or CWO Price or Contract or CWO Period of Performance set forth in the Form of Contract or CWO on account of such compliance, regardless of whether such

compliance would require additional labor, equipment, or Goods not expressly stated in the Contract or CWO.

GC-11 GOODS*

GC-11-A The Contractor shall furnish all Goods required to complete the Work, except those designated to be furnished by Metro. Unless otherwise indicated in the Contract or CWO, Goods incorporated into the Work shall be new, of good quality, and of the grade specified for the purpose intended. Unless otherwise specifically stated, reference to Goods or patented processes by trade name, make, or catalog number shall be regarded only as a means of establishing a standard of quality; such references shall not be construed as limiting competition. The Contractor may, at its option, use any Goods or process that is equivalent to that named subject to the prior written acceptance by Metro. Metro shall be the sole judge of the quality and suitability of proposed alternative Goods or processes subject to the right of Metro to accept or reject such alternative.

GC-11-B Any Goods that may be purchased under the Contract shall be transported, handled, and stored by the Contractor in a manner that shall ensure the preservation of their quality, appearance, and fitness for the Work. All Goods shall also be stored in a manner that facilitates inspection.

GC-12 STANDARDS OF PERFORMANCE*

GC-12-A The Contractor shall perform and require its Subcontractors to perform the Work in accordance with the requirements of the Contract and in accordance with professional standards of skill, care, and diligence adhered to by firms recognized for their expertise, experience and knowledge in performing Work of a similar nature. The Contractor shall be responsible for the professional quality, technical accuracy, completeness, and coordination of the Work, it being understood that Metro will be relying upon such professional quality, accuracy, completeness, and coordination in utilizing the Work. The foregoing obligations and standards shall constitute the "Standard of Performance" for purposes of the Contract.

GC-12-B Contractor hereby represents that it has made the necessary commitment, that it possesses the necessary professional capabilities, qualifications, licenses, skilled personnel, experience, expertise, and financial resources, and it has available or will make the necessary equipment, materials, tools, and facilities to perform the Work in an efficient, professional, and timely manner in accordance with the terms and conditions of the Contract.

GC-12-C All personnel shall have sufficient skill and experience to perform the work assigned to them. Contractor shall ensure that any individual performing work under the Contract requiring a California license shall possess the appropriate license required by the State of California. All personnel shall have sufficient skill and experience to perform the Work assigned to them.

GC-12-D If any Work provided by the Contractor is deficient because of the Contractor's or a Subcontractor's failure to perform the Work in accordance with the above

standards, Metro shall report such deficiencies in writing to the Contractor. Metro thereafter may:

1. Have the Contractor re-perform such Work at the Contractor's own expense; or
2. Have such Work performed in accordance with the Article entitled TERMINATION FOR DEFAULT herein, by others and the costs thereof charged to and collected from the Contractor.

GC-12-E Corrected or re-performed Work shall be subject to the above standards of performance.

GC-12-F The Contractor shall provide such specific standards of performance as may be set forth in individual CWOs as agreed to by the parties. If parties cannot agree Metro shall unilaterally establish them.

GC-12-G Metro shall have the right, in its absolute discretion, to require the removal of Contractor's personnel at any level assigned to the performance of the Services or Work, if Metro considers such removal necessary in the best interests of the Program and requests such removal in writing. Such personnel shall be promptly removed from the Project by the Contractor at no cost or expense to Metro. Further, an employee who is removed from the Project for any reason shall not be re-employed on the Program.

GC-13 UNAUTHORIZED ACTIONS*

Any action taken by the Contractor or its Subcontractors not in conformance with the terms and conditions of the Contract will be considered as unauthorized and at the sole expense of the Contractor. Contractor or its Subcontractors will not be compensated for any actions deemed by Metro to be unauthorized. No extensions of time will be granted under the Contract or CWO due to unauthorized actions.

No Metro employee or officer, except the Contracting Officer, may authorize any Amendments to the Contract, issue a CWO or make Revisions to CWOs.

GC-14 PERIOD OF PERFORMANCE

- A. Neither party hereto shall be considered in default in the performance of its obligations with respect to schedule, to the extent that the performance of any such obligation is prevented or delayed by an excusable delay. Should Contractor's Work be delayed by an excusable cause, Contractor's schedule for completion of tasks affected by such delay may be extended. Excusable delays may include, but are not limited to, Acts of God or acts or failures to act of government agencies or Metro in either their sovereign or contractual capacities; fires, floods, earthquakes, epidemics, quarantine restrictions, strikes, civil disturbance; but, in every case, the failure to perform must be reasonably beyond the control, and without the fault or negligence of the Contractor.

- B. Within 30 days after the last day of delay, the Contractor shall furnish Metro with detailed information concerning the circumstances of the delay, the number of days actually delayed, the appropriate Contract references, and the measures taken to prevent or minimize the delay. Failure to submit such information shall be sufficient cause for denying the delay claim.

GC-15 INSPECTION OF WORK (ACCEPTANCE)*

- GC-15-A** Metro reserves the right to inspect all and every part of the Work at any time during the performance and after completion, at its discretion.
- GC-15-B** If the Work or any parts thereof have not been performed in accordance with the Contract, the Contractor will be notified in writing that such Work is rejected. Thereupon, the Contractor shall take the necessary corrective action. Metro shall not be obligated to make any inspections, however, and neither the inspection of the Work, nor the lack thereof, shall relieve the Contractor of its responsibility for performing and providing the Work in accordance with the terms of the Contract.
- GC-15-C** Metro shall not be deemed to have accepted the Contractor's performance of the Work unless Metro or its designated representative has given written notice of final acceptance of the Work to the Contractor. No payment in whole or in part shall be construed to be an acceptance of the Work.
- GC-15-D** Metro shall have access, at all reasonable times, to the Contractor's calculations, supporting materials, data, and information concerning the Work, including computer programs and printouts, which Metro determines are required to review the Work properly and expeditiously. The Contractor shall furnish sufficient and convenient facilities for such inspection and review, and shall grant Metro's designated representatives free access at all reasonable times to all locations where the Work is performed.
- GC-15-E** Prior to the release of Work or issuance of a CWO, Metro and the Contractor shall determine which required reports will be submitted to Metro in draft form before final submission of the report.

GC-16 FINAL ACCEPTANCE*

GC-16-A Final Acceptance Of Work

When the Contractor determines that all Work as authorized in the Contract or CWO is fully completed including all required submissions and deliveries to Metro specified in the Contract or CWO, the Contractor shall give Metro a written Request for final Contract or CWO Acceptance within ten (10) working days thereafter, specifying that the Work is completed and the date on which it was completed. Within ten (10) days after the receipt of the Request for Final Contract or CWO Acceptance, Metro will commence a final review of the Work and, within 60 days will either:

1. Give the Contractor a final Contract/CWO Acceptance; or
2. Advise the Contractor in writing of any outstanding item or items which must be furnished, completed or corrected at the Contractor's cost.

Upon submittal of the request for final Contract/CWO Acceptance, the Contractor shall make no additional charges for Work under the Contract/ CWO. Metro shall not pay for any additional charges or be liable for any costs incurred after the date of receipt of the request for final Contract/CWO Acceptance of Contract/CWO Work.

This procedure shall comply with Metro's procedure entitled Services Contract Close-out in effect at the time of the request for Final Acceptance and shall be repeated until such time as Metro is satisfied that GC-17-B Final Acceptance of CONTRACT

GC-16-B Final Acceptance Of Contract

When Metro determines that all Work authorized under the Contract has been completed and Metro requires no further work from Contractor, or the Contract is otherwise terminated or expires in accordance with the terms of the Contract, Metro shall give the Contractor written notice that the Contract will be closed out. Contractor shall submit all outstanding Billings, Work submittals, Deliverables, reports or similarly related documents as required under the Contract and any CWO, within ninety (90) days of receipt of notice of Contract close-out. Upon Metro's receipt of Contractor's submittals under this Article, Metro shall commence a closeout audit of the Contract within one hundred twenty (120) days after final submission of the last Contractor's or Subcontractor's overhead rates and will either:

1. Give the Contractor final Contract acceptance; or
2. Advise the Contractor in writing of any outstanding item or items which must be furnished, completed or corrected at the Contractor's cost.

This procedure shall comply with Metro's procedure entitled Services Contract Close-out. Notwithstanding the final Contract/CWO Acceptance the Contractor will not be relieved of its obligations hereunder, nor will the Contractor be relieved of its obligations to complete any portions of the Work, the non-completion of which were not disclosed to Metro (regardless of whether such nondisclosures were fraudulent, negligent, or otherwise); and the Contractor shall remain obligated under all those provisions of the Contract which expressly or by their nature extend beyond and survive final Contract and/or CWO Acceptance.

GC-16-C Any failure by Metro to reject the Work or to reject the Contractor's Request for final Contract or CWO Acceptance as set forth above, shall not be deemed to be Acceptance of the Work by Metro for any purpose nor imply Acceptance of, or agreement with, the Contractor's Request for final Contract and/or CWO Acceptance.

GC-17 SAFETY*

GC-17-A The Contractor shall at all times conduct its operations in such a manner as to avoid risk of bodily harm to persons or damage to property. The Contractor shall promptly take all reasonable precautions to safeguard against such risks and shall make regular safety inspections of its operations. The Contractor shall be solely responsible for the discovery, determination and correction of any unsafe conditions caused by the Contractor's performance of the Work.

GC-17-B In addition, the Contractor shall comply with all applicable safety laws, standards, codes, rules, and regulations, including any safety program established by Metro. The Contractor shall cooperate and coordinate with Metro and with other Metro Contractors on safety matters and shall promptly comply with any specific safety instructions or directions given to the Contractor by Metro. Notwithstanding, the construction contractor shall remain responsible for the construction site safety.

GC-17-C The Contractor shall inform its personnel of Metro safety practices and the requirements of Metro's safety program. If any of the Contractor's personnel are required to visit any Worksites, the Contractor shall furnish suitable safety equipment and enforce the use of such equipment by those personnel.

GC-18 WARRANTY*

The Contractor warrants that all Work shall be in accordance with the Contract and shall comply with the Standard of Performance for a period of one year from final acceptance of the Work. In the event of breach of this warranty, the Contractor shall take the necessary actions to correct the breach and the consequences thereof, at the Contractor's sole expense, in the most expeditious manner as permitted by existing circumstances. If the Contractor does not promptly take steps to correct the breach upon notification thereof by Metro, Metro without waiving any other rights or remedies it may have at law or otherwise, may do so or cause others to do so, and the Contractor shall promptly reimburse Metro for all expenses and costs incurred in connection therewith.

GC-19 RIGHTS IN PROPERTY*

GC-19-A Title

1. All property purchased by the Contractor for Metro, shall be hereinafter referred to as Metro Property. Title to Metro Property shall pass to and vest in Metro upon the vendor's delivery and acceptance of such property by the Contractor.
2. Title to Metro Property shall not be affected by its incorporation into or attachment to any property not owned by Metro, nor shall Metro Property become a fixture or lose its identity as personal property by being attached to any real property.
3. The title transferred as described above shall in each case be good, and free and clear from any and all security interests, liens, and/or other

encumbrances. The Contractor shall not pledge or otherwise encumber the items in any manner that would result in any lien, security interest, charge, and/or claim upon or against said items.

4. The Contractor shall promptly execute, acknowledge, and deliver to Metro proper bills of sale or other written instruments of title in a form as required by Metro; said instruments shall convey to Metro title to material free and clear of debts, claims, liens, mortgages, taxes, and/or encumbrances.

GC-19-B Metro Property shall be used only for performing Work on the Contract or CWO, unless otherwise provided in the Contract or approved by Metro's Contract Administrator.

GC-19-C PROPERTY ADMINISTRATION

1. The Contractor shall be responsible and accountable for all Metro Property provided under the Contract and shall submit an inventory list, or revised list, in a form acceptable to Metro's Contract Administrator within thirty (30) days of acquisition of Metro Property.
2. The Contractor shall establish and maintain a program for the use, maintenance, repair, protection, and preservation of Metro Property in accordance with sound business practice.
3. If damage occurs to Metro Property, the Contractor shall replace the items not otherwise covered by any warranties, or the Contractor shall make the necessary repairs at Metro's direction, all at no additional charge to Metro.

GC-19-D Metro and all its designees shall have access at all reasonable times to the premises in which any Metro Property is located for the purpose of inspecting Metro Property.

GC-19-E Upon completing the Contract or CWO or at such earlier dates as may be fixed by Metro: (1) the Contractor shall prepare and submit a final inventory list of all Metro property which includes the property's description, location and condition, and; (2) the Contractor shall prepare for shipment, and deliver F.O.B. destination, Metro property as may be directed or authorized by Metro.

GC-20 EXTENTION OF TIME

GC-20-A The Contractor will be granted an extension of time for any portion of a delay in completion of the Work caused by acts of a public enemy, wars, civil disturbances, fires, floods, earthquakes, epidemics, quarantine restrictions, freight embargoes, strikes, weather more severe than normal, any other cause not in the reasonable control of the Contractor or acts of God, providing that the:

1. Aforesaid causes were not foreseeable and did not result from the fault or negligence of the Contractor;

2. Contractor has taken reasonable precautions to prevent further delays owing to such causes; and
3. Contractor notifies Metro in writing of the cause(s) for the delay within five (5) days from the beginning of any such delay.

GC-20-B Claims for additional compensation shall be limited to the costs incurred during a Metro approved extension of time measured at end of period of performance not at time of delay.

GC-20-C An extension of time will not be granted for a delay described above caused by a shortage of Goods, except Metro-furnished Goods, unless the Contractor supplies Metro with documented proof that it made every effort to obtain such Goods from every known source within reasonable distance of the Work. The Contractor shall also submit proof, that the inability to obtain such Goods when originally planned, did in fact cause a delay in final completion of the Work that could not be compensated for by revising the sequence of its operations. Only the physical shortage of Goods will be considered as a basis for an extension of time. No consideration will be given to any claim that Goods could not be obtained at a reasonable, practical, or economical cost, unless it is shown to the satisfaction of Metro that:

1. Such Goods could have been obtained only at exorbitant prices or;
2. The prices were entirely inconsistent with current rates, taking into account the quantities involved and the usual practices employed in obtaining such quantities; and
3. Such facts could not have been known or anticipated at the time the Contract or CWO was executed.

GC-20-D In case the Contractor is actually and necessarily delayed by any act or omission on the part of Metro, or others under contract with Metro and providing that the Contractor notifies Metro in writing within five (5) days from the beginning of any such delay, specifying the act or omission causing such delay, the time for completion of the Work shall be extended accordingly, and an adjustment shall be made to the TCP or CWO Price for any increase in the cost of performance of the Services or Work (excluding profit) necessarily caused by such delay. If the delay in the performance of the portion of Work described in the Contractor's five (5) day notice has been similarly delayed by Contractor-induced causes, including but not limited to the fault or negligence of the Contractor or any of its Subcontractors, the time for completion of the Work will be extended for the period of any such concurrent delay with no adjustment to the TCP or CWO Price.

GC-20-E Within thirty (30) days after the last day of a delay, the Contractor shall supply Metro with detailed information concerning the circumstances of the delay, the number of days actually delayed, the appropriate Contract and CWO references, and the measures taken to prevent or minimize the delay. Failure to submit such information shall be sufficient cause for denying the delay claim. Metro will ascertain the facts and the extent of the delay; its findings thereon will be final

and conclusive unless the Contractor disputes the decision. All time extensions must be approved by Metro prior to Contract or CWO Final Acceptance.

GC-20-F No extension of time will be granted under this Article for any delay in which remedies are included or excluded by any other provision of the Contract. Only the actual delay necessarily resulting from the causes specified in this Article shall be grounds for extension of time. In case the Contractor is delayed at any time or for any period by two or more of the causes specified in this Article, the Contractor shall not be entitled to a separate extension for each one of the causes; only one extension will be granted for the entire delay.

The Work shall continue and be carried on in accordance with all the provisions of the Contract. The Contract shall remain in full force and effect during the continuance and until the completion and Final Acceptance of the Services or Work covered by the Contract or CWO, unless formally suspended or terminated in accordance with the terms of the Contract. Permitting the Contractor to finish the Work, or any part thereof, after the time fixed for completion or after the date to which the time for completion may have been extended and/or making payments to the Contractor after any such periods shall not constitute a waiver on the part of Metro of any rights under the Contract.

GC-20-G Neither the granting of an extension of time beyond the date fixed for the completion of any part of the Work nor the performance and Acceptance of any part of the Work after the time specified for the completion of the Work shall be deemed to be a waiver by the authority of Metro's right to terminate the Contract or CWO for abandonment or failure to complete within the total time specified or to impose and deduct damages as may be specified.

GC-20-H In all cases that the Contractor either claims or intends to claim a delay, the Contractor shall submit to Metro at the earliest possible date and supplement thereafter as information becomes available:

1. An analysis of the impact of the claimed delay event upon the Contractor's then current Schedule, identifying the affected activities and the actual impacts; and
2. Proposals to minimize the effects of the claimed delay.

GC-21 CHANGES

GC-21-A The term "Change(s)," as used herein, means substitutions, additions, or deletions which result in revisions to the Contract or CWO. Change does not mean work performed by the Contractor to correct defective Work caused by the Contractor's negligent acts, errors or omissions.

GC-21-B Metro may at any time, and from time to time without invalidating the Contract or CWO, make Changes in the Scope of Work. Metro and Contractor will endeavor to reach mutual agreement regarding costs and Schedule associated with the Change; however, Metro reserves the right to direct the Contractor to perform the Changed Work. Such Changes, including any increase or decrease in the amount of the Contractor's compensation and/or the period of performance, shall

be incorporated into the Contract or CWO through the issuance of a Contract Amendment or CWO Revision. All of the provisions of the Contract shall apply to Changes. Upon receipt of a Contract Amendment or CWO Revision, approved by Metro, the Contractor shall continue performance of the Scope of Work as modified by the Amendment.

GC-21-C If a Fixed Fee as defined in the Compensation and Payment section is a part of the compensation for the Contract or CWO, it is the agreed intent of the parties that the Fixed Fee is an amount fixed at the inception of a CWO with respect to the Work planned and Scheduled as set forth in the Scope of Work and is not intended to vary with actual costs for the Work. A Contract Amendment or CWO Revision issued hereunder may, but will not automatically; result in a Change to the Fixed Fee.

GC-21-D Contractor's Cost and Schedule Proposal: The Contractor shall submit a Contractor's Cost and Schedule Proposal (utilizing the Form 60 provided in Compensation and Payments Provisions) to Metro within ten (10) days after receipt of a change request. The proposal shall detail price and scheduling information showing all of the cost and time ramifications of the Changes shown in the request. If any prices or other aspects are conditional, such as orders being made by a certain date or the occurrence of a particular event at a specified time, the Contractor shall identify these conditions in its proposal. The components to be used by the Contractor in preparing the proposal shall be those set forth in the Compensation and Payment Provisions and shall be presented in such a manner that all elements of the proposal can be easily identified and certified upon request. The submittal shall include certified current cost or pricing data as described in the Article entitled AUDITS herein.

GC-21-E Contract Amendment Or CWO Revision:

A Contract Amendment shall be agreed to by the Parties to reflect changes in the Contract terms and/or Scope of Services.

When the Contractor's compensation for a Change and the required adjustments, if any, to the Total Contract Price or CWO Price and/or Schedule have been determined, a Contract Amendment or CWO Revision will be issued containing the following items:

1. The total Contract/CWO adjustments to be made.
2. A statement that it is Metro's intention to treat the items described therein as Changes in the Work.
3. Scheduling requirements, time extensions, prices, and all costs of any nature arising out of each Change and a Certificate of Current Cost or Pricing Data.
4. A statement that the adjustment to the Total Contract Price or CWO Price, if any, includes all amounts to which the Contractor is entitled as a result of the events giving rise to the CWO Revision.

The execution of a Contract Amendment or CWO Revision by both parties shall be deemed to be an agreement to all Changes in Contract terms and/or Scope of Services and costs and time of performance related to each Change. There will be no reservation of rights by either party on a bi-lateral Contract Amendment or CWO Revision.

For all Contract Amendments or CWO Revisions greater than or equal to one-hundred-thousand dollars (\$100,000), an Ethics Declaration must be submitted by the Contractor.

- GC-21-F** Except as expressly provided herein, no order, statement, or conduct of any person shall be treated as a Change under the Contract or a CWO or entitle the Contractor to any adjustment under the Contract or a CWO.

GC-22 AUDIT SOFTWARE

At the request of Metro, the Contractor, Subcontractors and Suppliers shall allow installation of computer assisted audit techniques (CAAT) software supplied by Metro on its computer systems during the audit of Metro's contract. In lieu of installation of CAAT software on the Contractor's, Subcontractor's or Supplier's Home Office computers, a verified backup copy of its computer systems' database(s) can be supplied. Upon reasonable advance notice, the Authorized Auditors shall have access at all reasonable times to this software, database or verified copy for the purpose of auditing and verifying the Contractor's costs claimed to be due and payable hereunder. Prior to the start of an audit, the CAAT software will be supplied to the Contractor, its Subcontractors and Suppliers to allow for testing and review on its computer system. Once the audit is complete, the software will be removed from the Contractor's, its Subcontractors' and its Suppliers' computer system. The software will be installed permanently at the Program Office in order to assist the Authorized Auditors in the review of the Program Office costs.

GC-23 NOTICE OF INTENT TO CLAIM AND CLAIMS

- A. The Contractor shall give to Metro a written notice of potential claim within five (5) days of any act or event for which it intends to seek adjustment in the Contract/CWO price, terms, or schedule. The written notice shall set forth the basis of the claim and an estimate of any costs involved. The claim shall be filed within 30 days of the act or event and shall be in sufficient detail to allow Metro to evaluate the claim. The Contractor shall also furnish any additional information relating to the claim as Metro may request. Failure of the Contractor to comply with these requirements shall be sufficient cause for denying the Contractor's claim.
- B. Metro shall, within 30 days of the receipt of the claim, render a decision or provide an estimate of when a decision will be made. If no decision is made within 30 days of the filing of the claim, or within any extended period mutually agreed to in writing by the parties, the claim shall be deemed rejected by Metro. The Contractor shall proceed diligently with performance

of the Contract/CWO, pending resolution of any claim or appeal or action ensuing under the Contract/CWO.

GC-24 RESOLUTION OF DISPUTES

The Parties shall use their best efforts to resolve disputes under the Contract by submission of the dispute to Metro's Contract Administrator and the Contractor's Contract Administrator. If a dispute cannot be resolved at this administrative level, the Parties may mutually agree to utilize an alternative dispute resolution (ADR) process such as arbitration, mediation, or other recognized ADR process for settling a dispute.

GC-25 SUSPENSION*

GC-25-A The requirements of this Article are in addition to other audit, inspection, and record keeping requirements specified elsewhere in the Contract.

GC-25-B If Metro notifies Contractor that work on a particular portion of the Project will be suspended for a period to exceed one hundred eighty (180) days, Contractor shall immediately notify Metro that key personnel working on that portion of the work can either:

- (1) Be moved to support another portion of the Program, as approved by Metro, or
- (2) Be released because there is no need for the services of the specific key personnel on the Program

If suspension is less than one hundred eighty (180) days, Contractor and Metro shall agree upon the short-term duties of all affected personnel.

GC-25-C The Contractor shall comply immediately with any written order it receives from Metro suspending the Work and take all reasonable steps to minimize costs allocable to the Work covered by the suspension during the period of suspended Work. The Contractor shall resume performance of the suspended Work upon expiration of the notice of suspension, or upon direction of Metro.

GC-25-D The Contractor shall be allowed an equitable adjustment in the TCP and CWO Price (not to include profit) and/or an extension of the Contract or CWO Time, directly attributable to any suspension and/or to recover reasonable costs incurred during suspension, provided that the Contractor makes a Claim as provided in the Article entitled NOTICE OF INTENT TO CLAIM AND CLAIMS herein. However, no adjustment shall be made under this Article for any suspension, delay or interruption to the extent that Contractor's performance would have been so suspended, delayed or interrupted by any other cause, including the fault or negligence of the Contractor, or for which an equitable adjustment or an extension of time is provided for or excluded under any other term or condition of the Contract.

GC-25-E Submittal of an RFC by the Contractor for an equitable adjustment of the TCP or CWO Price or the Contract or CWO Time extension shall be filed in compliance with the Article entitled CHANGES herein; and within twenty (20) days after the end of the Work suspension. The provisions of this Article shall only apply if a written order of suspension is issued by Metro.

GC-25-F Metro will make partial payments against costs authorized by Metro and incurred by the Contractor in connection with the suspended portion of the Contract or CWO, so long as the aggregate of such payments does not exceed the authorized value of the Contract or CWO.

GC-26 TERMINATION FOR CONVENIENCE OF Metro*

GC-26-A The performance of the Services or Work under the Contract or a CWO may be terminated at any time, in whole or in part, as determined by Metro in its sole discretion. Such termination will be accomplished by delivery of a Notice of Termination to the Contractor, specifying the extent to which performance of the Services or Work under the Contract or CWO shall be terminated and the date upon which such termination shall become effective.

GC-26-B After receipt of a Notice of Termination, except as otherwise directed by the AUTHORITY, the Contractor shall:

1. Stop Work under the Contract or a CWO on the date and to the extent specified in the Notice of Termination.
2. Place no further orders or Subcontracts for Goods or Work, except as may be necessary for completion of such portions of the Services or Work expressly excluded from the Notice of Termination.
3. Communicate any Notice of Termination to the affected Subcontractors and Suppliers, and any other parties, at any tier.
4. Terminate all orders and Subcontracts that relate to the performance of the Work terminated by the Notice of Termination.
5. Settle outstanding liabilities and Claims arising out of such termination of orders and Subcontracts, with the acceptance of Metro if required (which acceptance shall be final for the purposes of this Article).
6. Assign to Metro in the manner, at the times, and to the extent directed by Metro all of the rights, titles, and interests of the Contractor under the orders and Subcontracts so terminated; in which case Metro will have the right, at its sole discretion, to settle or pay any or all Claims arising out of the termination of such orders and Subcontracts.
7. Transfer title and deliver to Metro in the manner, at the times, and to the extent directed by it:

- a. Work in process, completed Work, and other Goods procured as a part of, or acquired in connection with, the performance of the Work terminated; and
 - b. The completed or partially completed plans, drawings, information, and other items that would have been required (per the Scope of Services and Scope of Work) to be furnished to Metro if the Contract or a CWO had been completed.
8. Use its best efforts to sell the Goods of the types referred to above in the manner, at the times, to the extent, and at the price(s) directed or authorized by Metro, providing that the:
 - a. Contractor is not required to extend credit to any purchaser;
 - b. Contractor may acquire any such Goods under the prescribed conditions; and/or
 - c. Proceeds of any such transfer or disposition are applied or otherwise credited to reduce payments made by Metro to the Contractor under the Contract or CWO.
9. Take any action that may be necessary, or that Metro may direct, for the protection and preservation of the property related to the Contract that is in the possession of the Contractor and in which Metro has or may acquire an interest.
10. Comply with all other requirements of Metro as may be specified in the Notice of Termination.
11. Complete performance of that portion of the Work that has not been terminated by the Notice of Termination, as applicable and in accordance with the Contract.

GC-26-C If the termination is for the convenience of Metro, Contractor shall submit a final invoice within 60 days of termination and upon approval by Metro, Metro shall pay Contractor a percentage of the total Contract price based on the percentage of the Work completed prior to the effective date of termination and other costs reasonably incurred by the Contractor to implement the termination.

GC-26-D Upon failure of the Contractor to submit its termination claim within the time specified, Metro will determine the amount due the Contractor, if any, on the basis of information available, and will pay the Contractor the amount so determined. Such payment shall constitute payment in full for the Work performed under the Contract or CWO. Any allowable costs incurred prior to the date of termination shall be handled in accordance with the Compensation and Payment Provisions.

GC-26-E Subject to the provisions of the above Subarticle, the Contractor and Metro may agree upon the total or partial amount to be paid to the Contractor by reason of the total or partial termination of the Work pursuant to this Article. The Contract

or CWO will be amended or revised accordingly and the Contractor will be paid the agreed-upon amount. Nothing in the following Subarticle, which deals with the failure to reach agreement on the total amount to be paid to the Contractor, shall be deemed to limit, restrict, or otherwise determine or affect the amount that may be agreed upon pursuant to this Subarticle.

GC-26-F In the event of failure of the Contractor and Metro to agree on the total amount to be paid the Contractor by reason of the termination of Work pursuant to this Article, Metro will pay the Contractor the amounts determined by Metro as follows, exclusive of any amounts agreed upon in accordance with the preceding Subarticle:

1. The Contract or CWO Price allocable to the portion of the Work properly performed by the Contractor as of the date of termination, including overhead, and Fixed Fee or profit, as determined in accordance with the Compensation and Payment Provisions, reduced by any sums previously paid to the Contractor.
2. The cost of settling and paying Claims arising out of the termination of the Work under Subcontracts or orders as specified above, exclusive of the amounts paid or payable on account of Goods delivered or Work furnished by Subcontractors prior to the effective date of the Notice of Termination of Work under the Contract or CWO, which amounts are included in subarticle E of this Article.
3. Profit on the cost of Work performed is included in the amount determined in subarticle E of this Article. However, if the Contractor would have sustained a loss on the entire Contract or CWO had it been completed, the Contractor shall not be entitled to a profit and the settlement will be reduced to reflect the indicated rate of loss.
4. The reasonable cost of preserving and protecting property will also be paid, as well as any other reasonable costs incidental to the termination of the Work under the Contract or a CWO, including those reasonable expenses incurred to determine the amounts due.

GC-26-G Except to the extent that Metro will have otherwise expressly assumed the risk of loss, the fair value (as determined by Metro) of property that is destroyed, lost, stolen, or damaged (so as to become undeliverable to Metro or other buyer as described above) shall be excluded from the amounts paid to the Contractor.

GC-26-H In arriving at the amount due the Contractor under this Article, retention shall be made for the following:

1. The amount of the Claim that Metro may have against the Contractor in connection with the Contract or a CWO; and
2. The agreed upon price for and/or proceeds from the sale of Goods or other items acquired or sold by the Contractor that have not been otherwise recovered by or credited to Metro.

GC-26-I Under such terms and conditions as it may prescribe and at its sole discretion, Metro may make partial payments against costs incurred by the Contractor in connection with the terminated portion of the Contract or a CWO whenever Metro decides that the aggregate of such payments is within the amount to which the Contractor is entitled hereunder. If the total of such payments is in excess of the amount finally agreed-upon or determined to be due under this Article, such excess shall be payable by the Contractor to Metro upon demand, together with interest at a rate equal to that set forth in California Code of Civil Procedure Section 685.010.

GC-26-J The Contractor shall not be entitled to anticipatory or consequential damages as a result of any termination under this Article. Payment to the Contractor in accordance with this Article shall constitute the Contractor's exclusive remedy for any termination hereunder. The rights and remedies of Metro provided in this Article are in addition to any other rights and remedies provided by law or under the Contract.

GC-26-K Anything contained in the Contract or a CWO to the contrary notwithstanding, a termination under this Article shall not waive any right or claim to damages that Metro may have; Metro may pursue any cause of action that it may have by law or under the Contract.

GC-27 TERMINATION FOR DEFAULT*

GC-27-A Metro may terminate the Contractor's Work, in whole or in part, for default under any of the following circumstances:

- 1) Failure or refusal of the Contractor to perform any obligation required under the Contract or a CWO, or violation of any duty required of the Contractor under the Contract or a CWO.
- 2) Bad faith by the Contractor.
- 3) Violation by the Contractor of an order or requirement of Metro authorized by or within the scope of the Contract or a CWO.
- 4) Abandonment of the Contract or a CWO by the Contractor.
- 5) A filing by or against the Contractor of a petition in bankruptcy, reorganization, insolvency, conservatorship, or similar proceeding.
- 6) Failure of the Contractor to pay any amounts owing to any persons performing any portion of the Work, or the failure of the Contractor to pay its debts incurred on the Contract as they become due, providing that such failure continues for a period of ten (10) working days after written notice to the Contractor by Metro.
- 7) The attachment, levy, execution, or other judicial seizure of any portion of the Contractor's property, or any substantial portion of the other assets of the Contractor, which is not released, expunged, or discharged within a period of ten (10) working days.

- 8) Material failure to comply with any law, ordinance, rule, regulation, or order of a legal authority applicable to the Contractor, the Services, the Work, the Contract, a CWO, the Program or the Project.
- 9) Failure to indemnify any party that the Contractor is obligated to indemnify under the Article entitled LIABILITY AND INDEMNIFICATION herein or elsewhere under the Contract.
- 10) Failure to promptly correct or re-perform rejected Work.
- 11) Conviction of the Contractor or any of its officers, partners, principals, or employees for a violation of any federal, state or local safety law or regulation, or for a crime arising out of, or in connection with, the Work to be done or payment to be made under the Contract.

GC-27-B If Metro determines the Contractor is in default of the Contract or CWO, Metro will so notify the Contractor by issuing a Cure Notice describing the default. If the Contractor fails to cure the default within five (5) days after receipt of such Cure Notice, or if the default cannot be cured within five (5) days, and the Contractor fails to commence to cure within five (5) days and diligently proceed to cure within the time Metro determines to be necessary, Metro may, by written notice, terminate the Contractor's right to proceed under all or such part of the Contract or CWO as Metro at its sole discretion deems to be in its best interest. Whether or not the Contract or a CWO or any part thereof is terminated, the Contractor shall be liable for any damage to Metro resulting from the Contractor's default.

GC-27-C Upon receipt of a Notice of Termination for default from Metro, the Contractor shall:

- 1) Stop all Work under the Contract or a CWO on the date and to the extent specified in the Notice of Termination.
- 2) Place no further orders or Subcontracts for Goods or Work, except as may be necessary for completion of such portions of the Services or Work expressly excluded from the Notice of Termination.
- 3) Communicate any Notice of Termination to the affected Subcontractors and Suppliers, and any other parties, at any tier.
- 4) Terminate all orders and Subcontracts that relate to the performance of Work terminated by the Notice of Termination.
- 5) Comply with all other requirements of Metro as may be specified in the Notice of Termination.

GC-27-D Upon Metro's termination of the Contract or CWO because of the Contractor's default under the Contract or a CWO, Metro shall have the right to complete the Work by whatever means and methods it deems advisable. Metro will not be required to obtain the lowest prices for completing the Work, but shall make such expenditures that, in Metro's sole judgment, best accomplish such completion.

GC-27-E If the termination is due to the failure of the Contractor to fulfill its contractual obligations, Metro may take over the Work, and complete the Work by contract or otherwise. In such case, the Contractor shall be liable to Metro for any reasonable costs or damages occasioned to Metro thereby. The expense of completing the Work, or any other costs or damages otherwise resulting from failure of the Contractor to fulfill its obligations, will be charged to the Contractor and will be deducted by Metro out of such payments as may be due or may at any time thereafter become due to Metro. If such costs and expenses are in excess of the sum which otherwise would have been payable to the Contractor, then the Contractor shall promptly pay the amount of such excess to Metro upon notice of the excess so due.

GC-27-F If the Contract or CWO is terminated as specified in this Article, Metro may require that the Contractor transfer title to and deliver the following items to Metro as directed: any Goods, fixtures, plans, drawings, information, reports, estimates, Contract or CWO rights and other items that the Contractor has specifically produced or acquired for the terminated portion of the Contract or a CWO and would have been required to be furnished to Metro if the Contract or a CWO had been completed. The Contractor also shall, at its sole expense, protect and preserve property in its possession in which Metro has an interest.

GC-27-G If, after the notice of termination for failure to fulfill Contract obligations, it is determined that the Contractor has not so failed, the termination shall be deemed to have been effected for the convenience of Metro. In such event, adjustment shall be made as provided in Article entitled TERMINATION FOR CONVENIENCE herein.

The Contractor shall not be entitled to anticipatory or consequential damages as a result of any termination under this Article. Payment to the Contractor in accordance with this Article shall constitute the Contractor's exclusive remedy for any termination hereunder. The rights and remedies of Metro provided in this Article are in addition to any other rights and remedies provided by law or under the Contract.

GC-28 ASSIGNMENT*

GC-28-A The Contractor shall not assign, transfer, convey, or otherwise dispose of the Contract or a CWO (or the right, title, or interest in it or any part of it) without the prior written consent and endorsement of Metro, which consent shall not be unreasonably withheld.

GC-28-B No right under the Contract shall be asserted against Metro, in law or in equity, by reason of any assignment of the Contract, or any part thereof, unless authorized by Metro as specified in this Article.

GC-28-C Any assignment of proceeds of the Contract shall be subject to all proper setoffs and withholdings in favor of Metro and to all deductions specified in the Contract or CWO. All monies withheld, whether assigned or not, shall be subject to being used by Metro for completion of the Work, pursuant to the terms of the Contract. In the event that Metro consents to such assignment of monies, written notice

thereof shall be given by the Contractor to Metro at least ten (10) days before payment is due.

GC-29 ENVIRONMENTAL COMPLIANCE

GC-29-A The Contractor shall include the requirements of the following Subarticles in every Subcontract that is more than one hundred thousand dollars (\$100,000) and shall take such action as Metro directs to enforce these requirements.

GC-29-B The Contractor shall comply with all air, water, and noise pollution provisions set forth in the Scope of Services or Scope of Work.

GC-29-C Air Quality Control

1. The Contractor shall comply with all applicable standards, orders, and requirements issued under the Clean Air Act (42 USC § 7401); all applicable standards of the State of California; and all clarifications, mitigation measures, and any other requirements approved by Metro in accordance with state and federal laws.
2. The Contractor shall comply with all rules, regulations, and ordinances of the South Coast Air Quality Management District (SCAQMD) and statutes of the State that apply to any Work performed pursuant to the Contract or CWO, including any air quality control rules, regulations, ordinances, and statutes specified in Section 11017 of the California Government Code. Contractor, Subcontractors, and Suppliers shall submit evidence to Metro that the governing air quality control criteria are being met; such evidence will be retained by Metro.
3. In the absence of applicable air quality control rules, regulations, ordinances, or statutes governing solvents, including but not limited to the solvent portions of paints, thinners, curing compounds, and liquid asphalt used on the Contract or CWO, the Contractor shall comply with the applicable material requirements of the SCAQMD. Containers of paints, thinner, curing compound, or liquid asphalt shall be labeled to indicate that the contents fully comply with said requirements.
4. The Contractor shall comply with California state law regarding pollution controls in purchasing new motor vehicles with Project funds.
5. Material to be disposed of shall not be burned.

GC-29-D Water Quality:

The Contractor shall comply with all applicable standards, orders, and requirements issued under the Clean Water Act (33 USC § 1251); all applicable water standards of the State of California; and all clarifications, mitigation measures, and any other requirements approved by Metro in accordance with state and federal laws.

GC-29-E Environmental Protection Agency Regulations

1. The Contractor shall comply with all applicable regulations (40 CFR Part 15) of the Environmental Protection Agency (EPA).
2. The Contractor shall not use any facility in the performance of the Contract or CWO that is listed on the EPA List of Violating Facilities, unless and until the EPA eliminates said name of such facility from said listing. The Contractor shall promptly notify Metro of the receipt of any communication from the Director, Office of Federal Activities, EPA (or any successor agency), indicating that a facility to be used by the Contractor is under consideration for listing on the EPA List of Violating Facilities. The Contractor shall also report violations to Metro, to the FTA, and to the EPA Assistant Administrator for Enforcement.

GC-29-F Energy Conservation:

The Contractor shall comply with all mandatory standards and policies relating to energy efficiency that are contained in the State energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 USC 6321). Refer to the Scope of Services or the Scope of Work for energy conservation measures.

GC-30 HISTORICAL, ARCHAEOLOGICAL, PALEONTOLOGICAL, AND SCIENTIFIC DISCOVERIES*

All things of historical, archaeological, paleontological, or scientific interest encountered by the Contractor during performance of the Work shall be reported immediately to Metro. Work in the vicinity of the discovery shall be halted in order to preserve and protect it until its significance can be determined by Metro. Metro will issue instructions to the Contractor with respect to the disposition of the discovery.

GC-31 THE CONTRACTOR'S INTERACTION WITH THE MEDIA AND THE PUBLIC*

1. Metro shall review and approve all Metro related copy proposed to be used by the Contractor for advertising or public relations purposes prior to publication. The Contractor shall not allow Metro related copy to be published in its advertisements and public relations programs prior to receiving such approval. The Contractor shall ensure that all published information is factual and that it does not in any way imply that Metro endorses the Contractor's firm, service, and/or product.
2. The Contractor shall refer all inquiries from the news media to Metro, and shall comply with the procedures of Metro's Public Affairs staff regarding statements to the media relating to the Contract or the Work.

3. If the Contractor receives a complaint from a citizen or the community, the Contractor shall inform Metro about what action was taken to alleviate the situation.
4. The Contractor shall not publish information or technical data acquired or generated by the Contractor in performing the Contract until such time as such information or technical data is released in published reports by Metro or otherwise authorized by Metro.

GC-32 WHISTLEBLOWER REQUIREMENTS*

GC-32-A The Contractor shall not adopt any rule, regulation or policy preventing an employee from disclosing information to a government or law enforcement agency, where the employee believes the information discloses violation or noncompliance with a state or federal regulation; nor shall an employer retaliate against an employee for taking such actions as set forth in the California Labor Code Sections 1101 et. seq.

GC-32-B The Contractor shall post and maintain all Metro Phone Hotline literature provided by Metro ("Hotline Literature") at place(s) of performance during the term of the Contract. All Hotline Literature is to be posted in prominent locations that are highly visible and accessible to Contractor's employees. Contractor shall not hinder or coerce its employees from using Metro Phone Hotline to voice ideas, suggestions, or concerns relative to the performance of any Metro contract. The Contractor shall provide access to Metro representatives for the purpose of verifying Contractor's adherence to this section. In the event Metro inspection finds the Contractor has failed to comply herewith, the Contractor shall correct such failures including, but not limited to, replacing Hotline Literature and sponsoring training sessions, with Metro representatives, on the use of Metro Phone Hotline.

GC-33 COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT*

The Contractor shall comply with all applicable provisions of the Americans with Disabilities Act in performing the Work under the Contract.

GC-34 SEVERABILITY*

In the event any Article, section, Subarticle, paragraph, sentence, clause, or phrase contained in the Contract or CWO shall be determined, declared, or adjudged invalid, illegal, unconstitutional, or otherwise unenforceable, such determination, declaration, or adjudication shall in no manner affect the other Articles, sections, Subarticles, paragraphs, sentences, clauses, or phrases of the Contract or CWO, which shall remain in full force and effect as if the Article, section, Subarticle, paragraph, sentence, clause, or phrase declared, determined, or adjudged invalid, illegal, unconstitutional, or otherwise unenforceable, was not originally contained in the Contract or CWO.

GC-35 GOVERNING LAW*

The Contract has been negotiated between Metro and the Contractor and shall be subject to the laws of the State of California.

By entering into the Contract, the Contractor consents and submits to the jurisdiction of the Courts of the State of California, County of Los Angeles, over any action at law, suit in equity, and/or other proceeding that may arise out of the Contract.

GC-36 PUBLIC RECORDS ACT*

GC-36-A All records, documents, drawings, plans, specifications and other information relating to conduct of Metro's business, including information submitted by the Contractor shall become the exclusive property of Metro and shall be deemed public records. Said materials are subject to the provisions of the California Public Records Act (Government Code sections 6250 et. seq.). Metro's use and disclosure of its records are governed by this Act. Metro will not advise as to the nature or content of documents entitled to protection from disclosure under the California Public Records Act.

GC-36-B In the event of litigation concerning the disclosure of any information submitted by the submitting parties, Metro's sole involvement will be as a stakeholder, retaining the information until otherwise ordered by a court. The submitting party, at its sole expense and risk, shall be responsible for any and all fees for prosecuting or defending any action concerning the information, and shall indemnify and hold Metro harmless from all costs and expenses including attorneys' fees, in connection with any such action.

GC-37 LIABILITY AND INDEMNIFICATION*

GC-37-A Indemnification

To the fullest extent permitted by law, the Contractor shall defend, indemnify and hold harmless Metro, its subsidiaries, and any of their respective members, directors, officers, employees and agents, from and against any and all Claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses, including but not limited to workers compensation suits, breaches of contract and any fees of accountants, attorneys or other professionals arising out of, or resulting from any act, omission, fault or negligence of the Contractor or any of its officers, Authorized Representative, employees, Subcontractors or Suppliers, or any person or organization directly or indirectly employed by any of them, in connection with or relating to, or claimed to be in connection with or relating to, the Services, the Work, the Contract, or the Program, including but not limited to any costs or liability on account of:

1. Personal injury to or death of any person (including employees of the parties to be indemnified) or for damage to or loss of use of property (including property of Metro); and

2. Metro's reasonable reliance upon the use of data or other information provided or delivered by the Contractor pursuant to the Contract or CWO.

The indemnification specified in this Article shall apply even in the event of the act, omission, fault or negligence whether active or passive, of the party or parties to be indemnified, but shall not apply to Claims, actions, demands, costs, judgments, liens, penalties, liabilities, damages, losses, and expenses arising from the willful misconduct of, or defects in design furnished by, the party or parties to be indemnified. Metro shall not be responsible for any negligence, willful misconduct or defects in design caused and/or furnished by the Contractor.

The indemnification specified in this Article shall survive termination or closeout of the Contract, CWO or Final Payment thereunder and is in addition to any other rights or remedies that Metro may have under the law or under the Contract. In the event of any Claim or demand made against any party that is entitled to be indemnified hereunder, Metro may at its sole discretion reserve, retain, and/or apply any monies due the Contractor under the Contract or CWO, for the purpose of resolving such Claims; provided, however, that Metro may release such funds if the Contractor gives Metro reasonable assurance that the Metro's interests will be protected. Metro shall, at its sole discretion, determine whether such assurance is reasonable.

Claims against the indemnified parties by any employee of the Contractor, its Subcontractors, Suppliers, anyone directly or indirectly employed by any of them, and/or anyone for whose acts any of them may be liable shall not in any way limit the Contractor's indemnification obligation as set forth above, including the amount and/or type of damages, compensation, and/or benefits payable by or for the Contractor or its Subcontractors under workers' compensation acts, disability benefit acts, and/or other employee benefit acts and/or insurances.

GC-37-B Third Party Liability

Nothing contained in the Contract or CWO is intended to or shall have the effect of creating any rights in any third party against Metro. The inclusion of the Contract or any part thereof in any other document shall not be deemed to be creating or incorporating any obligation, duty, or liability on the part of Metro. The Contractor shall indemnify the AUTHORITY in accordance with the provisions of this Article against any claim made by any third party claiming rights under the Contract.

GC-37-C Joint Severable Liability

If the Contractor is a joint venture or partnership, each venturer or partner shall be jointly and severally liable for any and all of the duties and obligations of the Contractor that are assumed under or arise out of the Contract. Each of such venturers or partners waives notice of the breach or non-performance of any undertaking or obligation of the Contractor contained in, resulting from or assumed under the Contract, and the failure to give any such notice shall not affect or impair such venturer's or partner's joint and several liability hereunder.

GC-37-D Professional Liability

The Contractor shall be responsible for the professional quality, technical accuracy, completeness and coordination of all Work furnished by the Contractor (including the Work performed by Subcontractors on the basis provided herein) under the Contract or CWO. In addition to any other remedies provided Metro under the Contract, CWO or at law, the Contractor or Subcontractor shall correct or revise at no additional cost or fee to Metro any defective Work caused by the Contractor's or Subcontractor's negligent acts, errors or omissions in the performance of the Work hereunder. Neither Metro's inspection of, nor failure to inspect, review, accept, make payment for, any of the Work required under the Contract shall be construed to relieve the Contractor or Subcontractor of its obligations and responsibilities under the Contract or CWO for any negligent acts, errors and omissions in its performance of Work hereunder, nor operate as a waiver of any of Metro's rights under the Contract or of any cause of action arising out of the performance of the Contract. The Contractor or Subcontractor shall be and remain liable to Metro in accordance with applicable law for all damages to Metro caused by any failure of the Contractor or Subcontractor to comply with the terms and conditions of the Contract or CWO, or by the Contractor's or Subcontractor's negligent acts or errors or omissions in the performance of the Contract or CWO. With respect to the performance of Work by Subcontractors, the Contractor shall use its professional judgment, care and prudence in approving and accepting such Work but shall also take all action necessary to ensure correctness/accuracy of Subcontractors work. The Contractor warrants that the Work performed hereunder is of high professional quality and has been performed in full conformity with all codes, rules, regulations and statutory requirements.

In the event that the Contractor fails to perform its obligations under this Article (or under any other warranty or guarantee under the Contract) within the specified time and to the reasonable satisfaction of Metro, Metro shall have the right to correct and/or cause to be re-performed any defective or non-conforming Work and any Work of third parties damaged by such defective or non-conforming Work or the correction or re-performance thereof. The Contractor shall be obligated to fully reimburse Metro upon demand for any expenses incurred hereunder.

GC-37-E Investigation Of Potential Negligence

Contractor shall pay for all costs associated with its investigation of any negligence alleged against it under the terms and conditions of the Contract, unless there is a finding that the Contractor was not negligent; in which case Metro shall only pay for the reasonable cost of the Contractor's staff time to investigate the alleged negligence. Where it has been determined Contractor was in fact negligent, Contractor shall be responsible for and charged with Metro's staff time to investigate or review any alleged negligence by the Contractor, or any construction change order request, request for information, or claim related thereto, which shall not include third party costs.

The Contractor shall be a participant in the review of any construction change order request, request for information, or claim which alleges or involves potential

Contractor negligence, and shall not be responsible for or charged with any claims for delay by the Construction Manager or any construction Contractor unless the Contractor has been given a reasonable opportunity to participate in the review.

GC-37-F The Contractor acknowledges that the rights and remedies of the AUTHORITY specified in this Article are in addition to and do not limit any rights or remedies of Metro, afforded by the Contract or by law.

GC-37-G Warranty

Contractor Warranties: Contractor warrants that: it is aware of and understands the hazards which are presented to persons, property and the environment in the performing of transportation, storage, remediation and disposal Work as described within the Scope of Work of the Contract or CWO. It will transport, store, remediate and dispose of such materials in full compliance with all applicable governmental laws, regulations and orders. If the Scope of Work requires off-site storage or disposal, the selected storage and disposal facilities described in the work plan are now appropriately licensed and permitted to store and dispose of the waste, materials or hazardous substances detailed within the work plan. In the event the storage or disposal facility loses its permitted status hereafter during the terms of the Contract or CWO, Contractor will promptly notify Metro of such loss.

GC-37-H Indemnification - Environmental Impairment Losses

Environmental Impairment Losses (in addition to the indemnification provisions of the Contract). It is agreed that the Contractor, at the Contractor's sole cost and expense, shall indemnify and hold harmless Metro from and against the full amount of any and all present and future Environmental Impairment Losses that may arise out of the negligent performance of the activities or Work provided by the Contractor under the Contract or CWO. The term "Environmental Impairment Losses" shall mean any and all loss, liability, expense or damage (including, without limitation, all attorneys' fees and costs and all other professional or contractors' fees and costs), incurred by Metro under federal, state or local environmental law as a result of the activities conducted by the Contractor under the Contract or CWO.

GC-37-I Environmental Indemnity

In addition to any other indemnification provisions of the Contract, Contractor shall indemnify, defend and hold harmless Metro, its subsidiaries, and all of their officials, officers, agents, employees, and contractors, from and against any and all present and future liability, loss, cost, damage, and expense of every kind and nature, including, but not limited to, clean up costs, releases or substances resulting from acts of Contractor, failure to recognize or report the existence, quantity, or location of substances, remedial work required under any federal, state, or local law, regulation, or ordinance, contractors' fees, and attorneys' fees, resulting, directly or indirectly, from any negligent act or omission of Contractor, or any employee, Subcontractor, or Supplier of Contractor, in the performance

or failure to perform any work carried out, wholly or in part, pursuant to the Contract or CWO.

GC-38 RIGHTS IN TECHNICAL DATA, PATENTS AND COPYRIGHTS*

- GC-38-A** All documents and materials prepared or developed by the Contractor and its subcontractors pursuant to the Contract shall become the property of Metro without restriction or limitation on their use and shall be made available upon request, to Metro at any time. Original copies of such shall be delivered to Metro upon completion of the Work or termination of the Work. The Contractor shall be permitted to retain copies of such items for the furtherance of its technical proficiency; however, publication of this material is subject to the written approval of Metro.
- GC-38-B** Metro shall have the right to use, duplicate, modify or disclose the technical data and the information conveyed therein, in whole or in part, in any manner whatsoever, and to have or permit others to do so except as limited by the Article entitled PUBLIC RECORDS ACT herein.
- GC-38-C** The Contractor shall agree to grant to Metro and to its officers, agents, and employees acting within the scope of their official duties, a royalty-free license to publish, translate, reproduce, deliver, and use as they deem fit all technical data covered by copyright supplied for the Contract. No such copyrighted matter shall be included in technical data furnished hereunder without the written permission of the copyright owner for Metro to use such in the manner herein described.
- GC-38-D** The Contractor warrants that the Work and Goods used in providing the Work shall be delivered free of any rightful claim of any third party for infringement of any United States patent or copyright. If a suit or proceeding based on a claimed infringement of a patent or copyright is brought against Metro, the Contractor shall, at its own expense, defend or settle any such suit or proceeding if authorized to do so in writing by Metro, and indemnify and hold harmless Metro, its subsidiaries, agents and employees from all liability, damages, costs, and expenses associated therewith, including, but not limited to, defense costs and attorneys' fees.

When use of these Goods and/or processes is judged to be an infringement and such use is banned, the Contractor, at its own expense, shall, with the concurrence of Metro, do one of the following:

1. Secure for Metro the right to continue using said Goods and/or processes, by suspension of the injunction or by procuring a license(s);
2. Replace said Goods and/or processes, with non-infringing Goods and/or processes;
3. Modify said Goods and/or processes, so that they become non-infringing; or
4. Remove said Goods and/or processes, and refund the sum paid therefor without prejudice to any other rights of Metro.

The preceding subarticles shall not apply to Goods and/or processes furnished to the Contractor by Metro.

For Metro provided software, Metro, at its own cost, shall obtain any required license agreement(s). Metro shall indemnify, hold harmless and defend the Contractor from and against any and all Liability, damages, costs, and expenses, including but not limited to, defense costs and attorneys' fees, for or by any reason of any actual or alleged infringement of any United States patent or copyright, or any actual or alleged trade secret disclosure, arising from or related to the operation and utilization of Metro provided software, except for the unauthorized use of Metro provided software by the Contractor, its Director, Officers, employees, agents or representatives.

GC-39 SOFTWARE LICENSING AGREEMENT AND PROVISIONS FOR USE*

GC-39-A The Terms Used In This Article Are Defined As Follows:

1. Software: The computer programs and products required to be developed and delivered by the Contractor to Metro under the Contract, in object code (but excludes commercial software developed at private expense and not in the public domain).
2. Source Code Materials: A human-readable copy of the Software and related materials and documentation generated in preparing the Software, including programmer notes, flow charts, logic diagrams, and listings.
3. Documentation: Systems and user manuals sufficient to enable a person skilled in the applicable art to operate, maintain, and support the Software for its intended purposes.

GC-39-B The Contractor shall deliver to Metro the Software, Source Code Materials, and Documentation, in such tape, disk, or hardcopy format as Metro may designate.

GC-39-C The Contractor shall retain ownership of the Software, Source Code Materials, and Documentation with the right to exploit the same, subject to Metro's rights as herein provided. Metro shall place such copyright notices affirming the Contractor's ownership rights as the Contractor may reasonably require on all materials licensed hereunder which are reproduced by Metro.

GC-39-D The Contractor hereby grants to Metro a royalty-free, paid-up, non-exclusive license, in perpetuity, to use duplicate, and disclose the Software, Source Code Materials, and Documentation, and to make modifications of and enhancements to the Software, and permit others (who sign standard nondisclosure agreements) to do the same, but only for governmental purposes and not for any commercial purposes.

GC-39-E Metro shall hold the Software, Source Code Materials, and Documentation in confidence, shall use and disclose them only as expressly authorized herein or as required by law and only to its employees, agents or sublicensees to whom disclosure is necessary or appropriate for the performance and exercise of its

rights hereunder, and shall take reasonable steps to ensure that unauthorized persons will have no access to them.

GC-39-F The Contractor warrants that the Software will perform according to the specifications set forth in the Contract, that it is owner of the Software, Source Code Materials, and Documentation that it has the right to convey and grant the license herein granted to Metro, and that Metro's use thereof as herein contemplated will not infringe any third party's proprietary rights in the United States. The foregoing warranties shall not apply to the extent the Software is modified by Metro.

GC-39-G Upon Metro's request the Contractor shall generate modifications of and enhancements to the Software not required by the Contract, at the Contractor's rates charged for comparable Work to its most favored customers.

GC-40 AGENT TO ACCEPT SERVICE

The Contractor shall maintain within Los Angeles County a duly authorized agent as identified in the Article entitled NOTICE AND SERVICE THEREOF of the Special Provisions to accept service of legal process on its behalf, and shall keep Metro advised of such authorized agent name and address during the duration of the Contract and for three (3) years after Final Payment, or as long as the Contractor has warranty obligations under the Article entitled WARRANTY herein, whichever period terminates later. In the event that no such duly authorized agent is on file with Metro, the Contractor agrees that the Secretary of State of the State of California shall be the Contractor's authorized agent for service of legal process.

GC-41 CONFLICT OF INTEREST*

GC-41-A Contractor warrants that it has not employed or retained any company or person, other than a bonafide employee working solely for Contractor, to solicit or secure the Contract and that it has not paid or agreed to pay any company or person, other than a bona fide employee working solely for Contractor, any fee, commission, percentage, brokerage fee, gifts or any other consideration, contingent upon or resulting from the award or making of the Contract. For breach of this warranty, or violation of any other prohibition in this Article, Metro shall have the right to terminate the Contract for failure of Contractor to fulfill its Contract obligations.

GC-41-B Contractor agrees that, for the term of the Contract, no member, officer, or employee of Metro, or of a local public body during their employment and for one (1) year thereafter, shall have any interest, direct or indirect, in the Contract, or to any benefit arising thereof as prohibited by Government Code § 1090 and 87100.

GC-41-C The employment by Contractor of personnel on the payroll of Metro for the performance of Work under the Contract will not be permitted, even though such employment may be outside of the employee's regular working hours or on Saturdays, Sundays, holidays, or vacation time. The employment by the Contractor of personnel who have been on Metro payroll within one (1) year prior

to the date of Contract award, where such employment is caused by and/or dependent upon Contractor securing the Contract or a related contract with Metro, is also prohibited.

GC-41-D Neither the Contractor nor its employees nor its subcontractors or their employees shall give or offer to give any campaign contribution to any member of Metro in violation of Government Code Section 84308.

GC-41-E The Contractor shall not be permitted to participate in any capacity in contracts, subcontracts or proposals (solicited or unsolicited) which may arise from its performance under the Contract and from any solicitations relating to the Project.

GC-42 COVENANT AGAINST CONTINGENT FEES*

GC-42-A The Contractor warrants that no person or Authorized Representative has been specifically employed or retained to solicit or obtain the Contract in exchange for a contingent fee, except a bona fide employee or Agent. A breach or violation of this warranty shall be considered a breach of Contract pursuant to the Article entitled TERMINATION FOR DEFAULT herein. In addition to any rights and remedies otherwise provided for in the Contractor by law, Metro may deduct from the TCP or consideration, or otherwise recover, the full amount of the contingent fee.

GC-42-B "Bona fide Agent", as used in this Article, means an established commercial or selling entity that is maintained by the Contractor for the sole purpose of securing business and that neither exerts nor proposes to exert improper influence to solicit or obtain Metro contract(s) nor holds itself out as being able to obtain any Metro contract(s) through improper influence.

GC-42-C "Bona fide employee", as used in this Article, means a person who is employed by the Contractor and subject to the Contractor's supervision and control as to time, place, and manner of performance and who neither exerts nor proposes to exert improper influence to solicit or obtain Metro contract(s) nor holds itself out as being able to obtain any Metro contract(s) through improper influence.

GC-42-D "Contingent fee", as used in this Article, means any commission, percentage, or other sum that is payable only upon success in securing an Metro contract.

GC-42-E "Improper influence," as used in this Article, means any influence that induces or tends to induce an Metro employee, officer, Contractor, Subcontractor, Authorized Representative, or Consultant to give consideration or to act regarding an Metro Contract on any basis other than the merits of the matter.

GC-43 NO WAIVER

GC-43-A Failure of Metro to enforce at any time, or from time to time, any provision of the Contract shall not be construed as a waiver thereof.

No waiver by Metro of any breach of any provision of the Contract shall constitute a waiver of any other breach or of such provision.

Failure or delay by Metro to insist upon strict performance of any terms or conditions of the Contract, or to exercise any rights or remedies provided herein by law, shall not be deemed a waiver of any right of Metro to insist upon strict performance of the Contractor's obligations set forth in the Contract, or any of its rights or remedies as to any prior or subsequent default hereunder.

GC-44 CONFIDENTIALITY*

Contractor agrees that for and during the entire term of the Contract, any information, data, figures, records, findings and the like received or generated by the Contractor in the performance of the Contract, shall be considered and kept as the private and privileged records of Metro and will not be divulged to any person, firm, corporation, or other entity except on the direct authorization of Metro. Further, upon termination of the Contract for any cause, Contractor agrees that it will continue to treat as private and privileged any information, data, figures, records and the like, and will not release any such information to any person, firm, corporation or other entity, either by statement, deposition, or as a witness, except upon direct written authority of Metro.

The Contractor shall not publish information or technical data acquired or generated by the Contractor in performing the Contract until such time as such information or technical data is released in published reports by Metro.

GC-45 SAFETY AND LOSS PREVENTION *

This Article is to be construed in its broadest sense for the protection of persons and property by the Contractor and no action or omission by Metro, the Contracting Officer, any Authorized Representative or any other person shall relieve the Contractor of any of its obligations and duties hereunder.

A. Metro's Safety Principles

1. Safety is a 24/7 priority
2. Safety is everyone's responsibility
3. Accidents and injuries are preventable
4. Working safely is a condition of employment
5. Training is essential for good safety performance
6. Management is accountable for safety

B. Contractor Responsibilities

The Contractor is responsible for:

1. Complying with all applicable safety Laws
2. Enforcing Worksite safety practices; and

3. The discovery, determination and correction of any unsafe conditions related to the Contractor's performance of the Work or Goods supplied by the Contractor on Metro property.
4. The Contractor shall cooperate and coordinate with Metro and with other METRO Contractors on safety matters and shall promptly comply with any specific safety instructions or directions given to the Contractor by METRO.

C. Safety Practices

1. The Contractor shall inform its personnel of METRO safety practices and the requirements of Metro's safety program identified in [Metro Safety Manual for Other Than Major Construction](#).
2. If any of the Contractor's personnel are required to visit any Worksites, the Contractor shall furnish suitable safety equipment and enforce the use of such equipment by those personnel. The Contractor shall cooperate and coordinate with Metro and with other Metro Contractors on safety matters and shall promptly comply with any specific safety instructions or directions given to the Contractor by Metro.

GC-46

ENGLISH REQUIREMENTS *

At all times, all Contractor personnel on site must have sufficient knowledge of the English language to comprehend safety related directions and requirements. At all times the Contractor shall have a lead representative on site who has sufficient comprehension of the English language to read, write, speak and understand all job related directions and discussions.

End Of General Conditions (Services)

COMPENSATION & PAYMENT PROVISIONS (FIRM FIXED PRICE)

Note:

Articles flagged with an asterisk (*) are Flow-down requirements as defined in Article SUBCONTRACTORS AND SUPPLIERS in Contract Document GENERAL CONDITIONS.

CP-01 BASIS OF COMPENSATION *

Contractor will be paid the Contract Price in accordance with the following Articles, the Payment Schedule in the Article entitled COMPENSATION in the Form of Contract and all other applicable terms and conditions of the Contract.

CP-02 MILESTONE PAYMENTS

A. Applicability

This Article applies only if the Payment Schedule in the Contract provides for Milestone Payments.

B. Definition

A Milestone Payment is a payment of a portion to the Contract Price for completion of the Work based upon the Payment Schedule defined below.

C. Application for Progress Payment

Contractor's Applications for Progress Payments ("Applications") shall contain:

1. The original and two copies of the invoice, dated and identifying the Contract Number;
2. A description of the Work completed and how the Milestone Payment was calculated;
3. Certification or proof from subcontractors / suppliers that payments have been made to them for the portion of their work that has been accepted by LACMTA and for which Contractor has been paid;
4. Any other documentation Metro requires to process the Progress Payment;
5. The Contractor's signature and certification that the Work has been performed in accordance with the Contract, using the form attached hereto as Attachment 1; and
6. Signature of Metro's Authorized Representative acknowledging that the Work described in the Application has been done in accordance with the Contract.
7. Certification for Request for Payment attached as Exhibit 1

D. Terms of Payment

1. Contractor shall submit the Application to Metro, based on the Payment Schedule.
2. Metro will make Milestone Payments within thirty (30) days after it's receipt of an undisputed and properly submitted Application. Upon receipt of an Application, Metro shall:
 - a. Review the Application to determine if it is complete and meets Contractual requirements.
 - b. Return any Application that is not complete or does not meet Contractual requirements, setting forth in writing the reasons for the determination.
 - c. No Milestone Payments shall be made for Work not performed in accordance with the Contract.

E. The Contractor shall be paid for the Milestone Payments for Earned Value Categories listed below upon completion and approval of the milestone requirements as follows:

1. LACMTA will make payments for the Price Proposal Items as provided in Price Proposal Form (PF-1), Contract Price Summary, with the payment schedule as described below.
2. Milestone Payments are generally listed in the sequence of the Work to be performed. LACMTA at its discretion may elect to pay a Milestone Payment out of sequence if Contractor has completed Work for that portion of the Milestone. LACMTA also at its discretion may elect to make partial payment for a Milestone Payment if it is determined that a discrete portion of the Work has been completed and the remaining portion of the milestone does not have any material impact on the schedule or quality of the Work.
3. Title to material included in any Milestone payment request shall pass to LACMTA upon payment by LACMTA. Said title shall be free of all encumbrances. However, such transfer of title shall not relieve the Contractor of its responsibility for the furnishing, installation, fabrication or inclusion of said materials as a deliverable element of Vehicles procured in accordance with the requirements of the Contract.

4. Milestone Payments for total price of Price Proposal Form (PF-1), Contract Price Summary are specified below as percentages of the total price for each Milestone listed. Proposed Deviations from Non-Technical Terms and Conditions, Proposers may propose alternate Milestone Payments for consideration by LACMTA.

The LACMTA shall make milestone payments for the Vehicles according to the following schedule:

Ten percent (10%) of the Total Price for the Base Vehicles will be paid as a milestone payment following:

A. Pre-Production Deliverables (4% of Total Base Vehicle Price)

1. Completion of the initial Pre-Production Meeting with receipt of bilaterally approved minutes, and a detailed itemization of significant changes from manufacturers standard CNG configuration (this shall specifically include a listing of all major system and subsystem components and any structural modifications made to comply with contractual requirements).
2. Receipt and acceptance of Production Schedule and Critical Path Milestone schedule.
3. Receipt and acceptance of the Contractor's Quality Assurance Manual and ISO 9001 Quality Assurance Procedures.
4. Receipt and acceptance of the Contractor's Warranty Plan.

B. Pilot Bus Acceptance (3% of the Total Base Vehicle Price)

1. Pilot Bus as required under SP-06.
2. Draft manuals if not previously delivered.
3. Any other outstanding Contract Deliverables required prior to Pilot Bus acceptance.
4. Receipt of In-Process and As Built Drawings (TS-5.6.8)
5. Mutually agreed upon action items for the First Article Vehicle.

C. First Article Bus Acceptance (3% of the Total Base Vehicle Price)

1. First Article Bus as required under SP-08.
2. Final manuals if not previously delivered.
3. Any other Contract Deliverables required prior to First Article Bus Acceptance.
4. Mutually agreed upon action items for Production Buses.

Note: First Article Milestone Payment will only apply to 1 vehicle. If additional First Article Inspections are required (see SP-22, Continuity of Production) then such buses will be paid in accordance with Article D and E listed below.

D. Milestone Payment for Production Vehicles (This payment shall **NOT** apply to the Pilot Vehicle or First Article Vehicle.)

1. **For 40' and 60' CNG Buses** - Ninety percent (90%) of the Total Price of each Production Vehicle including Option Vehicles will be paid within 30 days after Acceptance of each Vehicle.

2. **For 40' and 60' Zero Emission (ZE) Buses**

a. Eighty percent (80%) of the Total Price of each Production Vehicle in the Base Order, including Option Vehicles, will be paid within 30 days after Acceptance of each Vehicle. (This payment shall not apply to the Pilot Vehicle or First Article Vehicle.

b. Ten percent (10%) of the Total Price of each Production Vehicle in the Base Order, including Option Vehicles, will be paid, upon compliance with all of the following conditions:

- After completion of 15,000 miles in service
- All pending warranty/technical/Emission issues closed
- Sustained 75% or better vehicle availability during 30 days immediately prior to payment

3. **For 40' and 60' CNG and ZE Buses**

Withhold – Metro reserves the right to withhold payments from the amount due to the Contractor equivalent to the dollar value of the:

- Labor commitment that is not attained by the Contractor pursuant to the Contractor's Local Employment Program (SP-38). The withheld amount shall be released upon Contractor's proof of attainment of its Labor Employment Program commitments.
- Warranty Liquidated Damages (SP40.20) accrued due to Contractor's failure to meet the warranty requirements.

E. Milestone Payments for total price of Price Proposal Form (PF-1), Contract Price Summary, Item 2, Spare Parts, from Schedule A, Form PF-2, shall be made upon delivery and acceptance of spare parts to LACMTA. The spare parts shall be delivered in partial separate shipments and shall be of the latest configuration. The Contractor shall submit for LACMTA's approval a list of spare parts to be delivered from the total list of spare parts on Form PF-2, prior to any shipment. The Contractor shall furnish to LACMTA at the time of the shipment, an itemized breakdown of the quantities and prices of items shipped. The

shipments shall be made thirty (30) days prior to the delivery of the First Article Vehicle.

- F. Milestone Payments for total price of Price Proposal Form (PF-1), Contract Price Summary, Item 3, Special Tools, from Schedule B, Form PF-3, shall be made upon delivery and acceptance of special tools to LACMTA. The special tools shall be delivered in partial separate shipments and shall be of the latest configuration. The Contractor shall submit for LACMTA's approval a list of special tools to be delivered from the total list of special tools on Form PF-3, prior to any shipment. The Contractor shall furnish to LACMTA at the time of the shipment, an itemized breakdown of the quantities and prices of items shipped. The shipments shall be made thirty (30) days prior to the delivery of the First Article Vehicle.
- G. Milestone Payments for total price of Price Proposal Form (PF-1), Contract Price Summary, Item 4, Diagnostic Test Equipment (DTE) for base buy, from Schedule C, Form PF-4, shall be made upon delivery and acceptance of DTE to LACMTA. The DTE shall be delivered in partial separate shipments and shall be of the latest configuration. The Contractor shall submit for LACMTA's approval a list of DTE to be delivered from the total list of DTE on Form PF-4, prior to any shipment. The Contractor shall furnish to LACMTA at the time of the shipment, an itemized breakdown of the quantities and prices of items shipped. The shipments shall be made thirty (30) days prior to the delivery of the First Article Vehicle.
- H. Milestone Payments for total price of Price Proposal Form (PF-1), Contract Price Summary, Item 5, Training Aids, from Schedule D, Form PF-5, shall be made upon delivery and acceptance of DTE to LACMTA. The Training Aids shall be delivered in partial separate shipments and shall be of the latest configuration. The Contractor shall submit for LACMTA's approval a list of Training Aids to be delivered from the total list of Training Aids on Form PF-5, prior to any shipment. The Contractor shall furnish to LACMTA at the time of the shipment, an itemized breakdown of the quantities and prices of items shipped. The shipments shall be made thirty (30) days prior to the delivery of the First Article Vehicle.
- I. Milestone payments for total price of Price Proposal Form (PF-1), Contract Price Summary, Item 6, Manuals (Technical Publications) are specified below as percentages of the total price for each milestone listed.

Milestone	Description	Milestone Percentage	Cumulative Percentage
A)	Approval of each category of draft manuals listed in TS- 5.6.4.	50	50
B)	Approval and acceptance of each category of final	50	100

Milestone	Description	Milestone Percentage	Cumulative Percentage
	manuals listed in TS-5.6.4.		

- J. Full payment for Price Proposal Form (PF-1), Contract Price Summary, **Item 7, Performance Bond** shall be made upon providing the executed certificate.
- K. Milestone payments for total price of Price Proposal Form (PF-1), Contract Price Summary, Item 8, Training is specified below as percentages of the total price for each milestone listed.

Milestone	Description	Milestone Percentage	Cumulative Percentage
A)	Approval of Training Program Curriculum and schedule (TS-5.6.1).	10	10
B)	Approval of training materials, manuals, guides and aids (TS-5.6.1, TS 5.6.2 and TS- 5.6.3).	30	40
C)	Successful completion of operating and maintenance training programs (TS 5.6).	60	100

- L. Milestone payments for total price of Price Proposal Form (PF-1), Contract Price Summary, **Item 9, Vehicle Delivery Charge** is 100% of the total price payable 30 days after acceptance of each Vehicle including Option Vehicles.

CP-03 PAYMENT TO SUBCONTRACTORS *

A. Applicability

This Article applies only if the Contractor has employed Subcontractors.

B. Requirements

1. Progress Payments - Contractor shall pay each Subcontractor under this Contract for satisfactory performance of its Subcontract no later than seven (7) days after its receipt of each Progress Payment from Metro.

2. Final Payment to Subcontractors - The Contractor shall pay to each Subcontractor all amounts it has retained from payments under the Subcontract within seven (7) days after the Subcontractor's Work is satisfactorily completed.
3. Delay in Payment – Contractor shall not delay payment beyond the seven (7) day time limit except for good cause, and only upon the prior written approval of Metro.

C. Failure to Comply

If Metro determines that the Contractor has failed to comply with this Article, Metro may give written notice to the Contractor and the Contractor's Surety describing the default, that the default shall be cured, and if the default is not cured as provided the Article entitled TERMINATION FOR DEFAULT in the GENERAL CONDITIONS of this Contract, the Contract may be terminated for default as provided therein, or Metro may exercise any other remedy it has under the Contract or Law.

CP-04 PAYMENT OF TAXES *

Unless otherwise specifically provided in this Contract, the Contract Price includes compensation for all taxes the Contractor is required to pay by Laws in effect on the date the Contractor's bid was opened. The Contractor shall pay all federal, state, and local taxes, and duties applicable to and assessable against any Work, including but not limited to retail sales and use, transportation, export, import, business, and special taxes. The Contractor shall ascertain and pay the taxes when due. The Contractor will maintain auditable Records, subject to Metro reviews, confirming that tax payments are current at all times.

CP-05 FINAL PAYMENT *

A. Final Acceptance

After Final Acceptance of the Work, as provided in the General Conditions of this Contract, Final Payment will be made as follows:

1. Prior to Final Acceptance of the Contract, as provided in the General Conditions of this Contract, the Contractor shall prepare and submit an Application for Final Payment to Metro including:
 - a. The proposed total amount due the Contractor, segregated by items on the Payment Schedule, Amendments, Change Orders, and other bases for payment;
 - b. Deductions for prior Progress Payments;
 - c. Amounts retained;

- d. List of Claims the Contractor is filing concurrently with the Application for Final Payment, or a statement that no Claims will be filed with the Application for Final Payment; and
 - e. List of pending unsettled Claims, stating claimed amounts.
- 2. Prior Progress Payments shall be subject to correction in Metro's review of the Application for Final Payment. Claims filed with the Application for Final Payment, or at any time thereafter prior to Final Payment, must be otherwise timely under the Contract and applicable Law.
- 3. Metro will review the Contractor's Application for Final Payment will forward any required changes or corrections to the Contractor. Within ten (10) days after receipt of required changes from Metro, the Contractor will make the changes, and, if applicable, list Claims that will be filed as a result of the required changes, and shall submit the revised Application for Final Payment. Upon acceptance by Metro, the revised Application for Final Payment will become the approved Application for Final Payment.
- 4. If no Claims have been filed with the initial or any revised Application for Final Payment and no Claims remain unsettled within thirty (30) days after Final Acceptance of the Work by Metro, and agreements are reached on all issues regarding the Application for Final Payment, Metro, in exchange for an executed release, satisfactory in form and substance to Metro, will pay the entire sum found due on the approved Application for Final Payment, including the amount, if any, allowed on settled Claims.
- 5. The release from the Contractor shall be from any and all Claims arising under the Contract, except for Claims that with the concurrence of Metro are specifically reserved, and shall release and waive all unreserved Claims against Metro and its officers, directors, employees and Authorized Representatives. The release shall be accompanied by a certification by the Contractor that:
 - a. It has resolved all Subcontractor, Supplier and other Claims that are related to the settled Claims included in the Final Payment;
 - b. It has no reason to believe that any party has a valid Claim against the Contractor or Metro which has not been communicated in writing by the Contractor to Metro as of the date of the Certificate;
 - c. All warranties are in full force and effect; and
 - d. The releases and warranties shall survive final payment.
- 6. If any Claims remain open, Metro may make final Payment subject to resolution of those Claims. Metro may withhold from the Final Payment an amount not to exceed one hundred fifty percent (150%) of the amount of the open Claims.

B. Discovery of Deficiencies *

Notwithstanding Metro's acceptance of the Application for Final Payment and irrespective of whether it is before or after Final Payment has been made, Metro shall not be precluded from subsequently showing that:

1. The true and correct amount payable for the Work is different from that previously accepted;
2. The previously accepted Work did not conform to the Contract requirements; or
3. A previous payment, or portion thereof, for Work was improperly made.

Metro shall not be estopped from demanding and recovering damages from the Contractor, as appropriate, under any of the foregoing circumstances as permitted under the Contract or applicable Law.

CP-06

AUDIT REQUIREMENTS *

A. Applicability

This Section applies to the Contractor, its Subcontractors and Suppliers. The Contractor, its Subcontractors and Suppliers shall be subject to audit at any reasonable time by the Authorized Auditors for;

1. Any Costs proposed for a Modification, or
2. Defective Cost or pricing on the Contract including any Modification.

B. Defined Terms

Audit: audit, examine, verify, review, excerpt, vouch or transcribe Contractor's, Subcontractors' or Suppliers' Records.

Authorized Auditors: Metro employees, any firms appointed by Metro or other authorized agencies acting as agents of a Governmental Entity. For federally funded Contracts, Authorized Auditors shall also include the FTA Administrator, the Comptroller General of the United States, or any of their duly authorized representatives.

Costs: Amounts (both direct and indirect) claimed to be due and payable, or anticipated to be incurred in performing the proposed Modification.

Records: All of the Contractor's, Subcontractors' or Suppliers' Cost or pricing data supporting the Modification or Element thereof, including but not limited to books, data, Records, documents, reports, computations and projections, accounting procedures and practices and other evidence, in all forms (e.g. paper or machine readable media such as disk, tape, etc.) or types (e.g., databases, applications software, database management software, utilities, etc.), sufficient to properly reflect the performance of the

Work and all Costs claimed to have been incurred or anticipated to be incurred in performing the Work on a proposed Modification. Any information provided by the Contractor, Subcontractor or Supplier on machine-readable media shall be provided in a format accessible and readable by the Authorized Auditors. The detail and depth of Records required as backup support for Audits shall be that which adequately establishes and maintains visibility of both allowable, and identified unallowable costs including directly associated costs.

Reproduce: copy, download, transcribe, print etc. by any means whatsoever free of charge.

C. Access

1. Records

Upon reasonable written advance notice to the Contractor, Subcontractors or Suppliers, with a copy sent to the Contractor's Authorized Representative, the Authorized Auditors shall have access during Contractor's normal business hours to all Records related to Costs or performance of the proposed Modification for the purpose of Auditing.

2. Worksites

For any federally funded major capital project, the Authorized Auditors shall include the FTA Administrator or his authorized representatives including any PMO Contractor. Access shall include the Worksite.

D. Records Retention

The Contractor, Subcontractors and Suppliers shall maintain all Records required under this Contract for a period of not less than three years after the date of Termination, in whole or in part or Final Payment, whichever is later. In the event of litigation or settlement of claims arising from the performance of this Contract, the Contractor, Subcontractor and Suppliers shall maintain all Records related to this Contract until Metro or any Governmental Agency or their duly authorized representatives have disposed of all such litigation, appeals, claims or exceptions related thereto.

E. Reproduction of Records

The Authorized Auditors shall have the right to Reproduce any Contractor, Subcontractor or Supplier Records related to Costs proposed for a Modification. The Contractor, Subcontractor or Supplier shall make said evidence (or to the extent accepted by the Authorized Auditors, photographs, micro-photographs or other authentic reproductions thereof) available to the Authorized Auditors at the Contractor's offices at all reasonable times and without charge.

F. Modifications

The Contractor, Subcontractors or Suppliers shall maintain and segregate Cost and pricing data and Records sufficient to properly reflect all direct and indirect Costs of whatever nature claimed to have been incurred or anticipated to be incurred in connection with a Modification to the Contract.

G. Defective Cost and Pricing Data

FAR 52-215-10 Price Reduction for Defective Cost or Pricing Data and 52.215-11 Price Reduction for Defective Cost or Pricing Data-Modifications shall apply to this Contract. The term Government referred to in the FAR clauses shall include Metro for purposes of this Contract.

H. Disposition of Audit Findings

The Contracting Officer may use all evidence in the Records including the Audit findings to:

1. Negotiate Modifications, or
2. Demand payment from the Contractor or adjust any Contractor's invoice to:
 - a. Reduce amounts found by the Contracting Officer to be unallowable costs; or
 - b. Adjust for prior overpayments or underpayments.

CP-07

LIQUIDATED DAMAGES

If the Work and specified portions of the Work are not completed and delivered according to the delivery schedule within the number of days set forth in Section SP-10 of the Special Provisions, damage will be sustained by LACMTA. It is and will be impracticable to ascertain the actual damage which LACMTA will sustain. Damage to LACMTA in the case of failure by the Contractor to complete specified portions of Work within the time as required therefore by the terms of this Contract will include, but not be limited to, the following:

1. Delays in the completion and operation of LACMTA's Transit System;
2. Unreasonable inconvenience to the public;
3. Loss of revenue;
4. Increased costs of Contract administration; and
5. Delays and increased costs to other Contractors.

In the event of and by reason of such delay, subject to the provisions of Section GC-20 of the General Conditions entitled EXTENSION OF TIME, the Contractor shall pay to LACMTA the amount set forth in these provisions as liquidated

damages for each day's delay or fraction thereof in completion of the Work as specified in the Special Provisions. LACMTA may deduct the sum of liquidated damages from any monies due or that may become due the Contractor, or if such monies are insufficient, the Contractor or its surety shall pay to LACMTA any deficiency. The remedies provided herein are not exclusive, and are in addition to other rights and remedies provided by law or under this Contract.

A. Just Compensation

In lieu of actual damages, in the event of late submittal, delivery, or acceptance of any deliverables, including vehicles, explicitly noted in Section SP-8, the Contractor agrees to pay LACMTA an amount of money as a reasonable estimate of just compensation for damages contemplated in this Article.

- B. The Contractor agrees to make payment in the above amounts in the event of late delivery, and agrees that LACMTA may withhold monies for such from any funds due.

C. Limitations of Liability

Liquidated Damages for late delivery of buses will be limited, for all causes, to a maximum of ten (10) percent of the total price of the Contract.

D. LACMTA Rights

Application of the "Liquidated Damages" provisions of the Contract in no way alters LACMTA's rights under the TERMINATION FOR DEFAULT - DAMAGES FOR DELAY - TIME EXTENSIONS Article of the General Conditions.

Contract No.: OP28367-000
FORTY-FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZERO EMISSION BUS
PROCUREMENT

EXHIBIT 1 - PAYMENT CERTIFICATION

1. I hereby certify to the best of my knowledge and belief that:
 - A. This Payment Request represents a true and correct statement of the Work performed;
 - B. The Work completed to date under this Contract is in full accordance with the terms of the Contract; and
 - C. All Subcontractors and/or Suppliers who have performed Work on the project through the closing date of the prior Payment Request have been paid their proportionate share of all previous payments from Metro.
2. I understand that it is a violation of both the federal and California False Claims Acts to knowingly present or cause to be presented to Metro a false claim for payment or approval. A claim includes a demand or request for money. It is also a violation of the False Claims Acts to knowingly make use of a false Record or statement to get a false claim paid. The term "knowingly" includes either actual knowledge of the information, deliberate ignorance of the truth or falsity of the information, or reckless disregard for the truth or falsity of the information. Proof of specific intent to defraud is not necessary under the False Claims Acts. I understand that the penalties under the Federal False Claims Act and State of California False Claims Act are non-exclusive, and are in addition to any other criminal and/or civil remedies which Metro may have either under contract or law.

I certify under penalty of perjury, under the laws of the State of California, that the foregoing is true and correct

Firm: _____

Signature: _____

Name of Certifying Official: _____

Title: _____

Date of Execution: _____

END OF COMPENSATION & PAYMENT PROVISIONS

GROUP A - U- 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 (SECOND BEST AND FINAL OFFER)

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

RFP No.: **OP28367**

RFP Title: **FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT**

1.0 CONTRACT FOR 295 BUSES (BASE BUY)		Taxable			
No.	Qty.	Description of Item	Unit Price	Unit Price	Total Price
1	295	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A**	\$595,632.00	\$615,372.00	\$181,534,740.00
1a	Lot	Manuals (Base Buy) (TS 5.9.4)	\$2,281.50	Lump Sum	\$23,400.00
1b	295	Vehicle Delivery Charge for Base Buy	Value of all taxable delivery charges per bus**	\$275.00	\$81,125.00
1c	Tax (Base Buy)		9.75%	\$58,074.12	\$17,134,146.90
2	Lot	Reserved			
3	Lot	Reserved			
4	Lot	Reserved			
5	Lot	Reserved			
6	Lot	Reserved			
7	Lot	Performance Bond (Base Buy)		Lump Sum	\$119,336.00
8	1,000	Total Training Hours for Base Buy***		\$175,000.00	
8a	900	Contractor (Proposer/Prime) Base Buy		\$175.00	\$157,500.00
8b	100	Subcontractor/Supplier Base Buy		\$175.00	\$17,500.00
9	295	Reserved		\$	
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "9") to be the BASIS for Price Proposal evaluation					
In U.S. Dollars Using Words:				ONE HUNDRED & NINETY-NINE MILLION SIXTY-SEVEN THOUSAND SEVEN HUNDRED FOU	
				In U.S. Dollars Using Figures:	
				\$199,067,747.90	

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - U - 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
(SECOND BEST AND FINAL OFFER)

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

RFP No.: **OP28367**

RFP Title: **FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT**

		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles*	\$595,632.00	\$187,688,460.00
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$2,281.50	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy	\$0.00	\$0.00
10c		Value of all taxable delivery charges per bus**	\$275.00	\$83,875.00
11		Tax (Option Buy)	9.75%	\$17,714,888.10
12		Reserved	\$	\$
13		Performance Bond for Option Buy***		
13a	500	Total Training Hours for Option Buy****	\$87,500.00	\$123,421.00
13b	450	Contractor (Proposer/Prime) Option Buy	\$175.00	\$78,750.00
13c	50	Subcontractor/Supplier Option Buy	\$175.00	\$8,750.00
14		Reserved	\$	\$

2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation

In U.S. Dollars Using Words:

TWO-HUNDRED FIVE MILLION SEVEN-HUNDRED TWENTY-ONE THOUSAND FIVE-HUNDRED FORTY-FOUR DOLLARS & TEN CENTS

In U.S. Dollars Using Figures: \$205,721,544.10

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - U. 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 (SECOND BEST AND FINAL OFFER)

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

RFP No.: **OP28367**

RFP Title: **FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION				Unit Price	Total Price
No.	Qty.	Description of Item			
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)			\$8,370.00
15a		Direct Materials/Equipment	\$5,750.00		
15b		Labor Installation Costs	\$620.00		
15c		Non Recurring Cost	\$0.00		
15d		Other Costs (Identify)	\$0.00		
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)			\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00		
16b		Labor Installation Costs	\$1,020.00		
16c		Non Recurring Cost	\$0.00		
16d		Other Costs (Identify)	\$0.00		
17	600	Reserved***			
17a	295	Reserved			
17b	305	Reserved			
18	600	25-Year Certified CNG Tanks			\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$870.00		
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$870.00		
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)			\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00		
19b	295	Labor Installation Costs for Base Buy APC	\$460.00		
19c	295	Non Recurring Cost for Base Buy APC	\$		
19d	295	Other Costs (Identify) for Base Buy APC	\$		
		Total for Base Buy APC	\$4,596.00		
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles	\$4,136.00		
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles	\$460.00		
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles	\$		
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles	\$		

GROUP A - UP TO 300 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 (SECOND BEST AND FINAL OFFER)

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

RFP No.: **OP28367**

RFP Title: **FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT**

		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,598.00	
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)			\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System		\$869.00	
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System		\$96.00	
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System		\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System		\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00	
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$869.00	
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$96.00	
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00	
21	600	USB Ports for Passenger Charging Only			\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00	
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00	
22	600	Optional Wireless Stop Request Switches (Bus set)			\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00	
22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00	
23	600	Optional Full Color Destination Sign Sets (TS 86.3)			\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00	
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00	
24	Lot	Spare Parts (From Schedule A, Form PF-2)			\$2,237,868.85
25	Lot	Special Tools (Schedule B Form PF-3)			\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)			\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)			\$958,460.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.					
In U.S. Dollars Using Words: TEN-MILLION EIGHT-TWO THOUSAND NINE-HUNDRED EIGHTY-EIGHT DOLLARS & SIXTY-F					

GROUP A - UFG 300 40' CNG BUSES.
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.

RFP No.: OP28387

RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

In U.S. Dollars Using Figures: \$10,082,988.65

**** Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:

ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Grams per brake horsepower-hour	Oxides of Nitrogen (NOx)	Particulate Matter (PM) grams per brake horsepower hour
0.02		0.01

4.0 CONTRACT FOR BASE BUY, OPTION BUY, AND OPTIONAL VEHICLE CONFIGURATION

No.	Qty.	Description of Item	Total Price
1.0	Total Price for CONTRACT for 295 Base Buy Buses to be the BASIS for Price Proposal evaluation		\$199,067,747.90
2.0	Total Price for CONTRACT for 150 Up to 305 Option Buy Buses to be the BASIS for Price Proposal evaluation		\$205,721,544.10
3.0	Total Price for OPTIONAL VEHICLE CONFIGURATION for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation		\$10,082,988.65
4.0	Total Price for CONTRACT for 295 Base Buy Buses, for 150 up to 305 Option Buy Buses, and Optional Vehicle Configuration for Optional Equipment combined to be the overall BASIS for Price Proposal evaluation		

In U.S. Dollars Using Words:

FOUR-HUNDRED FOURTEEN MILLION EIGHT-HUNDRED SEVENTY-TWO THOUSAND TWO-HUNDRED EIGHT DOLLARS & SIXTY-FIVE CENTS
In U.S. Dollars Using Figures: \$414,872,280.65

(Signature of Person Executing Proposal)

4/5/2017

Date

TONY WAYNE VICE PRESIDENT & GENERAL MANAGER

Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES

FORM PF-1A (CNG - 40')

SUBSYSTEM EQUIPMENT

(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC

RFP No. OP28367

BASE BUY		
NO.	DESCRIPTION OF ITEM	
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **	
1.1 TS 9.	Propulsion Power Assembly (PPA)***	\$18,372
1.2 TS 9.	Engine	\$60,324
1.3 TS 10.	Cooling System	\$12,650
1.4 TS 18.	Fuel System	\$68,300
1.5 TS 31.	Suspension	\$19,950
1.6 TS 33.	Steering System	\$4,950
1.7 TS 37.	Brakes	\$3,260
1.8 TS 39.	Pneumatic System	\$6,850
1.9 TS 42.	Charging System	\$36,800
1.10 TS 44.	Multiplex Control System	\$24,200
1.11 TS 54.	HVAC Climate Control System	\$29,450
1.12 TS 78.	Passenger Seats	\$28,955
1.13 TS 80.	Doors	\$14,830
1.14 TS 81.	Accessibility Provisions	\$19,740
1.15 TS 86.	Communications	\$3,244
1.16 TS 11	Transmission	\$21,028
1.99	All other bus subsystem equipment not included above	\$242,469
TOTAL CNG BUS PRICE		\$615,372

* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 1 - Base Buy

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line item Nos. 1a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.

3. *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40')
SUBSYSTEM EQUIPMENT
(SECOND BEST AND FINAL OFFER)

OPTION BUY	
NO.	DESCRIPTION OF ITEM
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **
2.1 TS 9.	Propulsion Power Assembly (PPA)***
2.2 TS 9.	Engine
2.3 TS 10.	Cooling System
2.4 TS 18.	Fuel System
2.5 TS 31.	Suspension
2.6 TS 33.	Steering System
2.7 TS 37.	Brakes
2.8 TS 39.	Pneumatic System
2.9 TS 42.	Charging System
2.10 TS 44.	Multiplex Control System
2.11 TS 54.	HVAC Climate Control System
2.12 TS 78.	Passenger Seats
2.13 TS 80.	Doors
2.14 TS 81.	Accessibility Provisions
2.15 TS 86.	Communications
2.16 TS 11	Transmission
2.99	All other bus subsystem equipment not included above
TOTAL CNG BUS PRICE OPTION QUANTITY	
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 10 - Option Buy)	
\$615,372	

- Notes:** 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
2. Price for line item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99


 (Signature of Person Executing Proposal)

TONY WAYNE NICE PRESIDENT & GENERAL MANAGER
 Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
LOW NOX ENGINE					
1	Ea.	Propulsion Power Assembly (See Definition in SP-1)	3	\$86,270.00	\$258,810.00
2	Ea.	Air Compressor	5	\$6,760.00	\$33,800.00
3	Ea.	Turbo	3	\$1,982.00	\$5,946.00
4	Ea.	EGR Cooler	20	\$1,110.47	\$22,209.40
5	Ea.	EGR Valve	10	\$610.68	\$6,106.80
6	Ea.	Delta P Sensor	10	\$347.66	\$3,476.60
7	Ea.	Mass. Air Flow Sensor	10	\$1,067.56	\$10,675.60
8	Ea.	Oxygen Sensor	20	\$223.61	\$4,472.20
9	Ea.	Catalyst	5	\$3,574.95	\$17,874.75
10	Ea.	Cylinder Head	5	\$4,513.81	\$22,569.05
11	Ea.	Pistons Kits	60	\$325.00	\$19,500.00
12	Bus Set	Rod Bearings	10	\$64.00	\$640.00
13	Bus Set	Main Bearing	10	\$219.27	\$2,192.70
14	Ea.	Liners	60	\$191.87	\$11,512.20
15	Ea.	Head Gasket	5	\$428.75	\$2,143.75
16	Ea.	Upper Gasket Set	5	\$844.99	\$4,224.95
17	Ea.	Oil Pan Gasket	20	\$133.60	\$2,672.00
18	Ea.	Stiffener Plate Gasket	20	\$92.85	\$1,857.00
19	Ea.	Oil Pan	5	\$505.51	\$2,527.55
20	Ea.	Throttle Actuator	5	\$574.16	\$2,870.80
21	Ea.	Fuel Control Valve	10	\$1,429.19	\$14,291.90
22	Ea.	Ignition Control Module	10	\$1,648.45	\$16,484.50
23	Ea.	Ignition Coils	120	\$175.23	\$21,027.60
24	Ea.	Engine Harness	5	\$1,493.62	\$7,468.10
25	Ea.	Ignition Harness	10	\$167.53	\$1,675.30
26	Ea.	Oil Cooler	5	\$179.73	\$898.65
27	Ea.	Lube Pump	5	\$275.51	\$1,377.55
28	Ea.	Front Crank Seal	10	\$30.54	\$305.40
29	Ea.	Rear Seal	10	\$28.65	\$286.50
30	Ea.	Water Pump	10	\$175.03	\$1,750.30
31	Ea.	Vibration Damper	10	\$344.21	\$3,442.10
32	Ea.	Belt Tensioner (If applicable)	20	\$145.47	\$2,909.40
33	Ea.	Coolant Temperature Sensor	20	\$11.21	\$224.20
34	Ea.	Oil Pressure Sensor	10	\$98.10	\$981.00
35	Ea.	Fuel Pressure Sensor	10	\$144.34	\$1,443.40
36	Ea.	Low Fuel Pressure Regulator	10	\$1,222.22	\$12,222.20
37	Ea.	Engine Cradle	5	\$1,420.00	\$7,100.00
38	Ea.	Belt Guard	5	\$358.80	\$1,794.00
39	Ea.	Complete Engine Package (See definition in TS-2)	4	\$66,430.00	\$265,720.00
40	Bus Set	Spark Plugs	15	\$42.02	\$630.30
41	Bus Set	Adaptation Kit (Eng to Trans)	3	\$1,066.00	\$3,198.00
42	Ea.	PPA Dollies	8	\$685.00	\$5,480.00
COOLING SYSTEM					
1	Ea.	Radiator Packages (See definition in TS-2)	5	\$7,715.00	\$38,575.00
2	Ea.	Thermal Management Controllers	5	\$598.32	\$2,991.60
3	Bus Set	Fan Resistors	20	\$48.60	\$972.00
4	Bus Set	CAN Interface Cables	5	\$101.25	\$506.25
5	Ea.	Fan Reversal LED Panel	5	\$593.39	\$2,966.95
6	Ea.	Fan Assembly	30	\$40.66	\$1,219.80
7	Ea.	Coolant Reservoir	10	\$556.20	\$5,562.00
8	Ea.	Transmission Cooler	10	\$648.00	\$6,480.00
9	Bus Set	Pressure Relief Valve	20	\$23.85	\$477.00
10	Ea.	Radiator Cap	30	\$5.27	\$158.10
11	Ea.	Coolant Overflow Tank	10	\$36.29	\$362.90

PRICING FORM
PF2 - CNG 40'
SCHEDULE A - SPARE PARTS
Amendment 22 - Attachment 2

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
CHARGING SYSTEM					
1	Ea.	Alternator	10	\$9,750.00	\$97,500.00
2	Ea.	Voltage Regulators	10	\$351.00	\$3,510.00
3	Ea.	Batteries	40	\$203.77	\$8,150.80
4	Ea.	Battery Equilizer	20	\$418.50	\$8,370.00
5	Ea.	Battery Disconnect	10	\$31.82	\$318.20
6	Ea.	Battery Separator	5	\$297.00	\$1,485.00
7	Ea.	Power Distribution Panel in Battery Compartment	5	\$267.30	\$1,336.50
8	Ea.	Low Voltage Disconnect	10	\$44.55	\$445.50
9	Ea.	Circuit Breaker 80A	20	\$31.59	\$631.80
10	Ea.	Circuit Breaker 100A	20	\$39.15	\$783.00
11	Ea.	Circuit Breaker 120A or 130A, whichever applies	20	\$49.95	\$999.00
12	Bus Set	Fuse and Circuit Breaker Panels	5	\$310.50	\$1,552.50
SUSPENSION					
1	Bus Set	Air Ride Beams	10	\$2,310.00	\$23,100.00
2	Bus Set	Air Bags	20	\$672.00	\$13,440.00
3	Ea.	Front Axle	10	\$4,879.85	\$48,798.50
4	Ea.	Rear Axle	10	\$3,946.07	\$39,460.70
5	Bus Set	Radius Rods	5	\$412.80	\$2,064.00
6	Bus Set	Shocks	10	\$383.68	\$3,836.80
7	Bus Set	Leveling Valve Front	10	\$191.81	\$1,918.10
8	Bus Set	Leveling Valve Rear	10	\$191.81	\$1,918.10
DRIVE TRAIN					
1	Ea.	Transmission	5	\$21,028.00	\$105,140.00
2	Ea.	TCM Programmed	5	\$611.00	\$3,055.00
3	Ea.	Adaptation Kit (Trans to Eng)	2	\$1,066.00	\$2,132.00
4	Ea.	Drive Shaft	10	\$544.00	\$5,440.00
5	Ea.	Differential	15	\$6,972.00	\$104,580.00
STEERING SYSTEM					
1	Bus Set	Steering Gear and Linkage	10	\$1,172.50	\$11,725.00
2	Ea.	Steering Column	10	\$596.77	\$5,967.70
3	Ea.	Steering Shaft	10	\$135.30	\$1,353.00
4	Ea.	Steering Box Assembly	10	\$277.78	\$2,777.80
5	Ea.	Power Steering Gear Assembly	10	\$893.97	\$8,939.70
PNEUMATIC SYSTEM					
1	Bus Set	Air Tanks (Complete Sets)	10	\$352.00	\$3,520.00
2	Ea.	Air Dryer	10	\$400.66	\$4,006.60
3	Ea.	Air Governor	10	\$68.80	\$688.00
4	Bus Set	Pressure Reducing Valves	10	\$28.80	\$288.00
5	Bus Set	Check Valves	10	\$57.60	\$576.00
6	Bus Set	Brake Control Valve	10	\$46.40	\$464.00
7	Bus Set	Brake Pedal Valve	10	\$134.54	\$1,345.40
8	Bus Set	Quick Release Valve	10	\$17.60	\$176.00
9	Bus Set	Parking Relay Valve	10	\$57.60	\$576.00
10	Bus Set	Parking Control Valve	10	\$46.40	\$464.00
11	Bus Set	Air Brake Tubing	10	\$134.54	\$1,345.40
12	Bus Set	Solenoid Valve Assembly	10	\$17.60	\$176.00
FUEL SYSTEM					
1	Bus Set	Fuel Cylinder Assembly	2	\$68,300.00	\$136,600.00
2	Ea.	Fill Manifold	2	\$592.00	\$1,184.00

PRICING FORM
PF2 - CNG 40'
SCHEDULE A - SPARE PARTS
Amendment 22 - Attachment 2

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
3	Bus Set	Shut Off Valve Assembly	5	\$440.00	\$2,200.00
4	Bus Set	PRD'S	10	\$134.40	\$1,344.00
5	Ea.	High Fuel Pressure Regulator	20	\$600.00	\$12,000.00
6	Bus Set	Defueling Valves	5	\$1,560.00	\$7,800.00
7	Ea.	Low/High Pressure Filer Assembly	5	\$704.00	\$3,520.00
8	Bus Set	Fuel Pressure Gauges	10	\$88.00	\$880.00
9	Bus Set	Defueling Switches	5	\$41.60	\$208.00
10	Bus Set	Manifold Shut Off Valve Assembly	10	\$325.00	\$3,250.00
11	Bus Set	Solenoid Valve Assembly	10	\$376.00	\$3,760.00
12	Bus Set	Fuel Line Assembly	10	\$576.00	\$5,760.00
13	Ea.	Low Pressure Sensor	20	\$144.00	\$2,880.00
14	Ea.	Proximity Switch @ the Fuel Fill Door	20	\$7.94	\$158.80
15	Bus Set	Fuel Line Assembly	5	\$576.00	\$2,880.00
16	Bus Set	Vent Tubes	5	\$137.60	\$688.00
17	Ea.	Control Harness	5	\$240.00	\$1,200.00
18	Ea.	Proximity Switch @ the Fast Fill Recepticle	20	\$7.94	\$158.80

DOORS

1	Bus Set	Complete Base Plate and Operator Assembly	5	\$1,920.00	\$9,600.00
2	Bus Set	Front/Rear Turning Shaft Assembly	5	\$1,864.00	\$9,320.00
3	Bus Set	Door Panels	5	\$6,387.00	\$31,935.00
4	Bus Set	Door Glass	2	\$1,816.00	\$3,632.00

BODY INTERIOR

1	Bus Set	Interior AVA Sign Assembly	5	\$1,580.00	\$7,900.00
2	Ea.	Destination Sign Controller	2	\$512.00	\$1,024.00
3	Ea.	Next Stop Sign	5	\$256.00	\$1,280.00
4	Bus Set	Interior Speaker Assembly	10	\$192.00	\$1,920.00
5	Ea.	Microphone Hand Set	5	\$92.80	\$464.00
6	Ea.	Visor/Sun Shade(s) Front & Side	10	\$316.80	\$3,168.00
7	Bus Set	Access Panels	5	\$960.00	\$4,800.00
8	Bus Set	Light Covers	5	\$916.80	\$4,584.00
9	Bus Set	Modesty Panels	10	\$880.00	\$8,800.00
10	Bus Set	Ceiling Panels	10	\$1,472.00	\$14,720.00
11	Bus Set	Side Wall Trim Panel	10	\$480.00	\$4,800.00
12	Bus Set	Floor Covering	5	\$2,470.00	\$12,350.00
13	Bus Set	Wheelchair Securement Devices	5	\$1,248.00	\$6,240.00
14	Bus Set	Passenger Seat	4	\$34,087.00	\$136,348.00
15	Bus Set	Seat Track	2	\$388.00	\$776.00
16	Ea.	Operator Seat	5	\$2,680.00	\$13,400.00
17	Ea.	Farebox Grabrail	4	\$248.00	\$992.00
18	Bus Set	Manual Release Mechanism	6	\$47.00	\$282.00
19	Bus Set	Passenger Hand Strap	10	\$496.00	\$4,960.00
20	Ea.	HVAC Return Grill	5	\$390.00	\$1,950.00

BODY EXTERIOR

1	Bus Set	Passenger Windows	2	\$14,186.40	\$28,372.80
2	Bus Set	Replacement Pass Side Window Glass (if not bonded)	2	\$4,560.00	\$9,120.00
3	Bus Set	Side Window Film or Guards	5	\$1,847.00	\$9,235.00
4	Bus Set	Windshield	3	\$680.00	\$2,040.00
5	Bus Set	Operator Window	2	\$1,139.68	\$2,279.36
6	Bus Set	Access Door Set (excluding engine door and HVAC access door)	3	\$2,180.00	\$6,540.00
7	Ea.	Engine Door	2	\$623.00	\$1,246.00
8	Ea.	HVAC Rear Attic Door	2	\$428.80	\$857.60
9	Ea.	Bike Rack	2	\$1,469.00	\$2,938.00
10	Ea.	Emergency Roof Hatch	2	\$249.20	\$498.40
11	Bus Set	Windshield Wiper Assy.	3	\$766.96	\$2,300.88
12	Ea.	Windshield Washer Reservoir	2	\$52.80	\$105.60
13	Bus Set	Mirrors	4	\$971.28	\$3,885.12
14	Bus Set	Bumper	3	\$2,208.00	\$6,624.00
15	Bus Set	Mud Guards	3	\$104.00	\$312.00

PRICING FORM
PF2 - CNG 40'
SCHEDULE A - SPARE PARTS
Amendment 22 - Attachment 2

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
16	Ea.	Head Lights	10	\$742.00	\$7,420.00
17	Bus Set	Front Turn Signal	10	\$54.40	\$544.00
18	Bus Set	Side Marker Lights	10	\$128.00	\$1,280.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
19	Bus Set	Rear Door Lights	10	\$64.00	\$640.00
20	Bus Set	Under Hood Hazard Lights	10	\$115.20	\$1,152.00
21	Ea.	License Plate Installation	5	\$20.80	\$104.00
22	Bus Set	CNG Tank Cover Installation	4	\$3,800.00	\$15,200.00
23	Bus Set	Exterior Trim (including fender skirts, exit door trim and trim pieces covering joints between body panels)	4	\$1,387.00	\$5,548.00

CLIMATE CONTROL SYSTEM

1	Ea.	Compressor	2	\$6,800.00	\$13,600.00
2	Ea.	Controller	2	\$300.00	\$600.00
3	Ea.	Evaporator	2	\$6,300.00	\$12,600.00
4	Ea.	Condensor	2	\$410.25	\$820.50
5	Ea.	Blower Assembly	4	\$555.00	\$2,220.00
6	Ea.	Thermostat	2	\$55.79	\$111.58
7	Ea.	Marine Pump	3	\$603.00	\$1,809.00

WHEELCHAIR

1	Bus Set	Ramp Assembly	3	\$7,995.00	\$23,985.00
2	Bus Set	Valve Assembly	2	\$87.00	\$174.00
3	Bus Set	Electrical Harness	2	\$348.40	\$696.80
4	Ea.	Ramp	2	\$7,995.00	\$15,990.00
5	Ea.	Controller	2	\$707.38	\$1,414.76
6	Ea.	Motor	3	\$819.00	\$2,457.00

BRAKES

1	Bus Set	Pressure Switches (include all for each Bus Set)	10	\$585.00	\$5,850.00
2	Bus Set	Protection Valve	10	\$84.00	\$840.00
3	Bus Set	Brake Air Chamber	10	\$269.70	\$2,697.00
4	Bus Set	Brake Wear Indicator	5	\$390.00	\$1,950.00
5	Ea.	ABS Electronic Control Unit	5	\$388.50	\$1,942.50
6	Ea.	ABS Harness	2	\$367.50	\$735.00
7	Bus Set	ABS Sensor	5	\$295.50	\$1,477.50

MULTIPLEX CONTROLS SYSTEM

1	Ea.	Event Data Recorder	2	\$2,200.00	\$4,400.00
2	Ea.	DVR	2	\$5,535.40	\$11,070.80
3	Bus Set	Complete Bus Wiring Harnesses	2	\$21,071.15	\$42,142.30
4	Bus Set	Communication Module (Gateway Module)	10	\$3,630.00	\$36,300.00
5	Bus Set	Multiplex Module	10	\$6,610.81	\$66,108.10
6	Bus Set	Wheels	5	\$2,860.00	\$14,300.00

Total Unit Price \$508,812.21

TOTAL PARTS BUY \$2,237,668.65

In U.S. Dollars Using Words:

TWO-MILLION TWO-HUNDRED THIRTY-SEVEN THOUSAND SIX-HUNDRED SIXTY-EIGHT DOLLARS &

Authorized Signature

4/5/2017

Date

TONY WAYNE

Print Name

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-3 (CNG -40') - SCHEDULE B OF PRICES SPECIAL TOOLS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)


Proposer: ELDORADO NATIONAL(CALIFORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
<u>TOWING</u>					
1	Set	Special Towing Equipment Adapters (TS 25) Note: Make sure towing equipment can do front lift and flat towing	15	\$386.00	\$5,790.00
1	Set	Rear recovery devices / tie downs (TS 25)	2	\$505.00	\$1,010.00

<u>DOLLIES</u>					
1	Ea.	PPA Dollies	2	\$455.00	\$910.00

<u>OTHER SPECIAL TOOLS</u>					
OEM to identify and recommend unit(s) required				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
Total Unit Price				\$1,346.00	
				<u>TOTAL BUY</u>	<u>\$7,710.00</u>

In U.S. Dollars Using Words:
SEVEN-THOUSAND SEVEN-HUNDRED TEN DOLLARS


 Authorized Signature

4/5/2017
 Date

TONY WAYNE
 Print Name

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-4 (CNG-40') - SCHEDULE C OF PRICES DIAGNOSTIC TEST EQUIPMENT (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFOORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') AND SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
<u>ENGINE/TRANSMISSION (TS 5.6.5)</u>					
1	Ea.	Engine Diagnostic software, including necessary cables and connectors	30	\$1,170.00	\$35,100.00
2	Ea.	Transmission diagnostic software, including necessary cables and connectors	30	\$1,170.00	\$35,100.00
3	Ea.	Nexiq Technologies USB Link PC to Vehicle Interface	30	\$774.00	\$23,220.00
4	Ea.	ABS diagnostic software, including necessary cables and connectors	30	\$1,370.00	\$41,100.00
5	Ea.	Engine Cooling Diagnostic or Programming Software	30	\$0.00	\$0.00
<u>ELECTRICAL SYSTEM (TS 5.6.5)</u>					
1	Ea.	Multiplex System PC software and connection kit	30	\$332.00	\$9,960.00
<u>INTERIOR (TS 5.6.5)</u>					
1	Ea.	Video Security Diagnostic Kits	30	\$105.00	\$3,150.00
2	Ea.	Destination Sign Diagnostic Equipment	30	\$0.00	\$0.00
<u>HEATING VENTILATION/AIR CONDITIONING (HVAC) (TS 5.6.5)</u>					
1	Ea.	A/C Interface Software and cable	30	\$585.00	\$17,550.00
<u>DIAGNOSTIC PCs SPECIFICATIONS (TS 5.6.5)</u>					
1	Ea.	Diagnostic Laptop PC (See TS 5.6.6 for Specifications)	30	\$2,925.00	\$87,750.00
<u>DOOR DIAGNOSTIC TOOLS AND EQUIPMENT (TS 5.6.5)</u>					
1	Ea.	Door System Diagnostic/Programming Software, tools and equipment	30	\$905.00	\$27,150.00
<u>COMMUNICATIONS (TS 86.1)</u>					
1	Ea.	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1	1	\$74,930.00	\$74,930.00
Total Unit Price				\$84,266.00	
				<u>TOTAL BUY</u>	<u>\$355,010.00</u>

In U.S. Dollars Using Words:

THREE-HUNDRED FIFTY-FIVE THOUSAND & TEN DOLLARS


Authorized Signature

4/5/2017

Date

TONY WAYNE

Print Name

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-5 (CNG - 40')- SCHEDULE D OF PRICES TRAINING AIDS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.
RFP No.: OP28367
RFP Title: FORTY FOOT (40') & SIXTY FOOT (60') LOW FLOOR CNG OR ZEB BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
1	Ea.	One complete running engine and transmission assembly, including cooling and fueling systems, mounted on a suitable roll around stand (TS 5.6.3 a.)	1	\$193,200.00	\$193,200.00
2	Ea.	Static Transmission Assembly Note: If the Contractor is offering an Allison B400 transmission, a visual transmission is not required (TS 5.6.3 b.)	1	\$0.00	\$0.00
3	Ea.	Complete Static Front Axle Assembly TS 5.6.3.c.	1	\$16,400.00	\$16,400.00
4	Ea.	Complete Static Rear Axle Assembly TS 5.6.3.d.	1	\$18,500.00	\$18,500.00

ATECH ELECTRICAL TRAINING BOARDS - General Electrical Training (TS 5.6.3 e.)

1	Kit	GM Specialized Electronic Trainer	10	\$2,100.00	\$21,000.00
2	Kit	GM Electronic Instructor's Guide (Books Only - Stages 1, 2, & 3)	10	\$95.00	\$950.00
3	Kit	4 Resistors	10	\$35.00	\$350.00
4	Kit	Dual Filament Light	10	\$46.00	\$460.00
5	Kit	Horn	10	\$121.00	\$1,210.00
6	Kit	Blank Board	10	\$24.00	\$240.00

SYSTEM SIMULATION TRAINING BOARDS

1	Ea.	Anti-Lock Brake/Air Brake Board (TS 5.6.3.f.)	1	\$32,000.00	\$32,000.00
2	Ea.	Electric Air Conditioning Training Simulator Module (TS 5.6.3.g.)	1	\$29,700.00	\$29,700.00
3	Ea.	Fire Suppression (TS 5.6.3.h.)	1	\$7,200.00	\$7,200.00
4	Ea.	Video Security System (TS 5.6.3.i.)	1	\$9,250.00	\$9,250.00
5	Ea.	Destination Sign (TS 5.6.3.j.)	1	\$6,000.00	\$6,000.00
6	Ea.	Multiplex Electrical Training Board (TS 5.6.3.k.)	2	\$23,500.00	\$47,000.00

E-LARNING INTERACTIVE TRAINING MEDIA (TS 5.6.3)

1	Hr.	Module 1	6	\$23,000.00	\$138,000.00
2	Hr.	Module 2	3	\$23,000.00	\$69,000.00
3	Hr.	Module 3	3	\$23,000.00	\$69,000.00
4	Hr.	Module 4	2	\$23,000.00	\$46,000.00
5	Hr.	Module 5	4	\$23,000.00	\$92,000.00
6	Hr.	Module 6	2	\$23,000.00	\$46,000.00
7	Hr.	Module 7	2	\$23,000.00	\$46,000.00
8	Hr.	Module 8	1	\$23,000.00	\$23,000.00
9	Hr.	Module 9	1	\$23,000.00	\$23,000.00
10	Hr.	Module 10	1	\$23,000.00	\$23,000.00

TOTAL BUY \$958,460.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-5 (CNG - 40')- SCHEDULE D OF PRICES TRAINING AIDS (OPTIONAL)
(SECOND BEST AND FINAL OFFER)

In U.S. Dollars Using Words:

NINE-HUNDRED FIFTY-EIGHT THOUSAND FOUR-HUNDRED SIXTY DOLLARS



Authorized Signature

4/5/2017

Date

TONY WAYNE

Print Name

EXHIBIT B - STATEMENT OF WORK

Reference Volume II – Technical Specifications (TS)

- Technical Specifications – 40 Foot CNG dated February 28, 2017



Offeror's Response – PR 2.7 Local Employment Program-BAFO No. 2

TAB 9: The Proposer shall provide a Local Employment Plan (LEP) setting forth its specific commitments for creating new employment opportunities for Local Workers...:

ElDorado National (California), Inc. (ENC) is a state of California Corporation with all of its operational facilities including, manufacturing, engineering, purchasing, aftermarket parts, warranty and service support, etc. located in Riverside, CA.

ENC understands that LACMTA's Local Employment Program as identified in SP-38 is a voluntary program with 50 bonus points possible during the scoring of proposals. At time of Best and Final Offer (SECOND BAFO), ~~ENC is submitting all of the required documents in an effort to be in compliance with the required Local Employment Plan and Local Facility Capital Investments and thus, be able to take advantage of the potential 50 bonus points available.~~ ENC is submitting the relevant Labor Value and Manpower Summary Forms as well as documents addressing the eight (8) questions under PR 2.7 which can be found below and on the accompanying pages.

ENC submits its Local Employment Plan and Local Facility Capital Investments in an effort to be in full compliance with all Local Employment Plan requirements and thus, be able to take full advantage of the potential 50 bonus points available during the evaluation.

ENC's Local Employment Program as noted below is being submitted in a separately sealed envelope and marked accordingly.

PR 2.7 Local Employment Plan – Overview

ENC commits to:

- Total Local Worker's Wages and Benefits From 2017 thru contract completion-
 - \$42.2 m
- Total Capital Improvements of:
 - \$3.7 m
- Total Training and Certification program of:
 - \$210 k



Offeror's Response – PR 2.7 Local Employment Program-BAFO No. 2

PR 2.7 Local Employment Plan – Q&A

1. **Question:** Demonstrate our understanding of employment and job market conditions in California including, an understanding of and plans for coordinating with applicable publicly and privately funded workforce development groups in the hiring of local workers.

Response: ENC has a long standing and well established relationship with the local workforce. We assess wages yearly to insure competitive pay scales for both skilled and entry-level positions. ENC's entry level wages are near the 25th percentile for Riverside County as well as all other direct skilled and unskilled positions. ENC is also partnered with several local labor and staffing agencies to help offset our training pool and direct hire needs. ENC is committed to the training and development of our employees and offer certification programs for our welders and painters as well as on-the-job training of 160 hours for all shop floor positions. Between these two programs ENC estimates it will spend \$210 k on training and development for Metro's bus order fulfillment.

2. **Question:** Provide a commitment to hire Disadvantaged Workers that equals a total of 10% of the total wages and benefits for all Local Workers.

Response: While ENC does not have a formal hiring policy for hiring Disadvantaged workers, we do provide an ADA accessible facility and currently meet Metro's requirement of hiring 10% disadvantaged workers. ENC will remain committed to the hiring of disadvantaged worker throughout Metro's order.

3. **Question:** Provide the estimated number of California Resident FTE jobs proposed in the Local Employment Plan, its direct dollar value specific to the contract. Identify the estimated number of jobs by trade or craft.

Response: There will be an estimated 83 additional positions added to ENC's Riverside California's manufacturing facility and the direct dollar value will be an estimated \$5.7 m over the course of the contract. See the Local Employment Plan, locations tab, column G for number of hires by category. It is ENC's full intention to continue employing these additional positions after the Metro's contract is fulfilled.

4. **Question:** Describe the quality and range of California employment opportunities included in the proposed Local Employment Plan.

Response: ENC's workforce is totally California based. All professional and manufacturing positions (except national regional sales) are from California so the quality and range of local employment is extensive (see attached set of job descriptions for each additional position). Furthermore ENC's vendor base is in Southern California increasing the local labor advantage in both range and quality. It is ENC's full intention to continue employing these additional positions after the Metro's contract is fulfilled.

5. **Question:** Identify the location(s) of assembly and manufacture of the vehicles and describe any plans to build a new facility in California or invest in upgrades, repairs and renovations to an existing facility in California.

Response: All of our assembly is done in one facility located in Riverside, California. ENC's capital plan includes:

- \$2.8 m RCTO (thermal oxidizing unit) to our facility in preparation for the increased demand that LACMTA would place on our facility. The unit reduces the VOC emission by up to 98%, reducing ENC's carbon footprint and improving Southern California's air quality.



Offeror's Response – PR 2.7 Local Employment Program-BAFO No. 2

- \$170 k LED lighting upgrade
- \$100 k overhead crane upgrade
- \$100 k welding machine addition
- \$100 k brake press
- \$100 k material movers
- \$100 k air filtration/ventilation
- \$200 k in facility repairs/renovations (new exterior paint and interior finishes)

6. **Question:** Describe outreach and recruitment plans for the Local Employment Plan

Response: ENC's manufacturing recruitment plan consists of permanently hiring our current contract labor which serves as our training pool for permanent labor base. We then would use our local labor agencies to backfill our training pool. The professional recruitment plan is well established, as ENC partners with area colleges in an extensive internship program that has already filled 5 professional positions. We currently have 5 more interns working and training here to sustain our professional positions needs in the future.

7. **Question:** Describe our approach to encourage subcontractor and supplier participation in the Local Employment Plan.

Response: 49% of ENC's vendor base is located in Southern California which employs approximately 150 people. As ENC would grow our production by 25% with the LACMTA order it would logically progress to that local vendor base. Unfortunately they do not have the capacity to segregate the LACMTA's order volume from their regular production.

8. **Question:** Provide the name of the Plan Administrator and contact information including name, title, company, address, telephone and email.

Response:

Randy Troutman
Vice President of Operations

Eldorado National (California), Inc.,
9670 Galena Street
Riverside, CA 92509

P. 260-301-1660
Email- randy.troutman@eldorado-ca.com



Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

MAEL-007

Response Required: No

Date: November 8, 2017

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 1
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES**

Reference: Correspondence MAEL-002, 005; ENC Proposal/email – Passenger Seats dated 10/24/17

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan
Phil Rabottini

CDRL NO.: n/a
MAEL-007

DATE: November 8, 2017

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 1

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 1 to Contract No.: OP28367-000 is made effective on the 6th day of November 2017 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. MTA to procure line items under the Base Buy Vehicle Contract for Optional Vehicle Configuration, Special Tools and Diagnostic Equipment in the total amount of \$1,722,225 for an aggregate increase in the total Contract Price from \$199,067,748 to \$200,789,973. Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of ~~\$199,067,748~~ **\$200,789,973**, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. **Article I: CONTRACT DOCUMENTS ORDER OF PRECEDENCE** – Revise date on Special Provisions (Pro Form 089)

Special Provisions, (Pro Form 089, Dated ~~07/01/09~~ **04/11/16**)

3. Revise as SP-06 as follows:

SP-06 Pilot Vehicle

The Contractor shall produce ~~one~~ **Two (2)** Pilot Vehicles. ~~These is~~ **These** Pilot Vehicles shall be ~~one~~ **two** of the ultimate quantity of the Vehicle order. The Pilot Vehicles shall demonstrate that the Vehicles fully meet all requirements of the Contract.

~~The~~ **The** Pilot Vehicle ~~One~~ **One** shall be produced and delivered to LACMTA for a minimum of ninety (90) days prior to the initiation of any production activities for the remaining vehicles unless

otherwise authorized in writing by LACMTA. In the event that non-compliance is identified, LACMTA shall, to the extent practicable, notify the Contractor of said non-compliance. No later than the end of the ninety-day period, LACMTA shall issue a written report to the Contractor that advises the Contractor of any non-compliance issues and/or any proposed Modifications or changes required on the remaining Vehicles. Contractor shall perform the necessary corrective actions to address the non-compliance issues prior to acceptance of the Pilot Vehicle **One**. Upon LACMTA's acceptance of the Pilot Vehicle **One**, a Notice to Proceed shall be issued for Contractor to proceed with the manufacturing of the production vehicles.

In the event that the Pilot Vehicle **One** does not initially comply with all performance criteria contained in the Technical Specifications, LACMTA shall have the right to retain a portion of any Milestone Payment that may have been established for the Pilot Vehicle. The amount to be withheld shall be based on the lack of compliance and may equal up to the entire Milestone Payment amount for the Pilot Vehicle. This amount shall be withheld until compliance is demonstrated. In the event that the compliance is subsequently determined to be impossible to achieve, LACMTA may require all or a portion of the Milestone Payment for the Pilot Vehicle to be forfeited as a penalty for the non-compliance. The amount of the penalty shall be negotiated by the parties.

Pilot Vehicle Two shall remain in the possession of the Contractor. The Contractor shall utilize Pilot Vehicle Two for testing, validation of compliance with all performance criteria in the Technical Specifications, and shall conform to any corrective actions/changes required by LACMTA based on findings made on Pilot Vehicle One.

Milestone Payment on Pilot Vehicle Two shall be made upon delivery and acceptance as a production vehicle.

A summary of the changes to Contract Modification No. 1 is enclosed as Attachment I.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 22 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature

TONY WAYNE
Type or Print Name

11/6/17
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: 
Wayne Okubo
Director, Contract Administration

11/8/17
Date

CONTRACT NO.: OP28367-000 – ENC 40' CNG TRANSIT BUSES

Contract Modification No. 1

Attachment 1

Summary of Changes to Contract Volume I - Commercial Terms and Conditions

Ref #	Modification No.	Contract Section No.	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue
1	1		<p>Procure line items under the Base Buy Vehicle Contract for Optional Vehicle Configuration, Special Tools and Diagnostic Equipment in the total amount of \$1,722,225 for an aggregate increase in the total Contract Price from \$199,067,748 to \$200,789,973.</p> <p>ARTICLE IV: COMPENSATION</p> <p>A. Contract Price</p> <p>In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of \$200,789,973 \$199,067,748, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.</p> <p>Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.</p>
2	1	Vol. 1 Article V	<p>Revise date for Special Provisions</p> <p>ARTICLE I: CONTRACT DOCUMENTS ORDER OF PRECEDENCE</p> <p>A. This Contract includes this Form of Contract and the other following Contract Documents and Attachments, which are incorporated herein and made a part of this Contract.</p> <p>B. Except as otherwise specified herein, in the event of any conflict, the precedence of the Contract Documents shall be as follows:</p> <ol style="list-style-type: none">1. Form of Contract, (Pro Form 18, Dated 08/08/14)2. Regulatory Requirements, (Pro Form 039, Dated 02/03/16)3. Special Provisions, (Pro Form 089, Dated 07/01/09 04/11/16)4. General Conditions, (Pro Form 038, Dated 01/11/16)5. Compensation and Payment Provisions, Firm Fixed Price, (Pro Form 040, Dated 08/23/13)6. Technical Specifications, (Dated 08/10/17) <p>C. An Amendment or Change to this Contract shall take its precedence from the term it amends. All other documents and terms and conditions shall remain unchanged.</p>
3	1	Vol. 1 SP-06	<p>Change to two Pilot Vehicles</p> <p>SP-06 PILOT VEHICLE</p>

CONTRACT NO.: OP28367-000 – ENC 40' CNG TRANSIT BUSES

Contract Modification No. 1

Attachment 1

Summary of Changes to Contract Volume I - Commercial Terms and Conditions

Ref #	Modification No.	Contract Section No.	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue
			<p>The Contractor shall produce one Two (2) Pilot Vehicles. These is Pilot Vehicles shall be one two of the ultimate quantity of the Vehicle order. The Pilot Vehicles shall demonstrate that the Vehicles fully meet all requirements of the Contract.</p> <p>The Pilot Vehicle One shall be produced and delivered to LACMTA for a minimum of ninety (90) days prior to the initiation of any production activities for the remaining vehicles unless otherwise authorized in writing by LACMTA. In the event that non-compliance is identified, LACMTA shall, to the extent practicable, notify the Contractor of said non-compliance. No later than the end of the ninety-day period, LACMTA shall issue a written report to the Contractor that advises the Contractor of any non-compliance issues and/or any proposed Modifications or changes required on the remaining Vehicles. Contractor shall perform the necessary corrective actions to address the non-compliance issues prior to acceptance of the Pilot Vehicle One. Upon LACMTA's acceptance of the Pilot Vehicle One, a Notice to Proceed shall be issued for Contractor to proceed with the manufacturing of the production vehicles.</p> <p>In the event that the Pilot Vehicle One does not initially comply with all performance criteria contained in the Technical Specifications, LACMTA shall have the right to retain a portion of any Milestone Payment that may have been established for the Pilot Vehicle. The amount to be withheld shall be based on the lack of compliance and may equal up to the entire Milestone Payment amount for the Pilot Vehicle. This amount shall be withheld until compliance is demonstrated. In the event that the compliance is subsequently determined to be impossible to achieve, LACMTA may require all or a portion of the Milestone Payment for the Pilot Vehicle to be forfeited as a penalty for the non-compliance. The amount of the penalty shall be negotiated by the parties.</p> <p>Pilot Vehicle Two shall remain in the possession of the Contractor. The Contractor shall utilize Pilot Vehicle Two for testing, validation of compliance with all performance criteria in the Technical Specifications, and shall conform to any corrective actions/changes required by LACMTA based on findings made on Pilot Vehicle One.</p> <p>Milestone Payment on Pilot Vehicle Two shall be made upon delivery and acceptance as a production vehicle.</p>



Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

MAEL-010

Response Required: No

Date: December 15, 2017

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 2
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES**

Reference: PRICING FORMS (PF1/1A); MAEL-001; 004; ELMA-003; MAEL-009; ELMA-018

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan
Phil Rabottini

CDRL NO.: n/a

MAEL-010

DATE: December 15, 2017

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 2

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 2 to Contract No.: OP28367-000 is made effective on the 6th day of December 2017 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, November 6, 2017, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Change in the supplier for transmission from Allison to Voith for an aggregate decrease in the total Contract Price from \$200,789,973 to \$198,759,641. Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of ~~\$200,789,973~~ **\$198,759,641** inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. Revise SP-05 as follows:

SP-05 APPROVED SUBCONTRACTORS

Subcontractor	Services Performed	DBE/ MBE/ WBE
Valley Power Systems, Inc. VOITH Turbo, Inc.	Allison Transmission Voith DIWA.6 Transmission	

3. Revised Pricing Forms: PF 1, PF-1A and PF-2 as attached to this modification

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 2 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By: _____

Signature

Type or Print Name

Date

12/16/17

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: _____

Elizabeth Hernandez

Principal Contract Administrator

Date

12/15/17

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 2

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
1	295	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A*:	\$594,425.87	\$181,178,932
1a	Lot	Manuals (Base Buy) (TS 5.6.4)		\$23,400.00
1b	295	Vehicle Delivery Charge for Base Buy	\$2,281.50	\$81,125.00
1c		Tax (Base Buy)	9.75%	\$17,098,455.59
2	Lot	Reserved		
3	Lot	Reserved		
4	Lot	Reserved		
5	Lot	Reserved		
6	Lot	Reserved		
7	Lot	Performance Bond (Base Buy)		
8	1,000	Total Training Hours for Base Buy***	Lump Sum \$175,000.00	\$119,336.00
8a	900	Contractor (Proposer/Prime) Base Buy	\$175.00	\$157,500.00
8b	100	Subcontractor/Supplier Base Buy	\$175.00	\$17,500.00
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1	\$74,930.00	\$74,930.00
10a	15	Special Towing Equipment (TS 25)	\$386.00	\$5,790.00
10b		Tax	9.75%	\$564.53
11a	2	Rear Recovery Devices/Tie Downs (TS 25)	\$505.00	\$1,010.00
11b		Tax	9.75%	\$98.48

1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation

In U.S. Dollars Using Words: **ONE HUNDRED & NINETY-EIGHT MILLION SEVEN HUNDRED FIFTY NINE THOUSAND SIX HUNDRED FORTY ONE DOLLARS**

In U.S. Dollars Using Figures: **\$198,769,641**

NOTE * Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

LACMTA
 CONTRACT NO. OP28367-000
 GA12-93

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 2

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 2

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

2.0 CONTRACT FOR 150 UP TO 305 BUSES (OPTION BUY)				Taxable	
No.	Qty.	Description of Item	Unit Price	Unit Price	Total Price
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles *		\$594,426.00	\$187,320,630.00
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***		\$2,281.50	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy		\$0.00	\$83,875.00
10c		Tax (Option Buy)		9.75%	\$17,679,024.68
11		Reserved		\$	\$
12	Lot	Performance Bond for Option Buy***			\$123,421.00
13	500	Total Training Hours for Option Buy****		\$87,500.00	
13a	450	Contractor (Proposer/Prime) Option Buy		\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy		\$175.00	\$8,750.00
14		Reserved		\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation					
In U.S. Dollars Using Words:				In U.S. Dollars Using Figures:	
				\$205,317,851	

TWO-HUNDRED FIVE MILLION THREE HUNDRED SEVENTEEN THOUSAND EIGHT HUNDRED FIFTY ONE DOLLARS

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 2

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION			Unit Price	Total Price
No.	Qty.	Description of Item		
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)		\$6,370.00
15a		Direct Materials/Equipment	\$5,750.00	
15b		Labor Installation Costs	\$620.00	
15c		Non Recurring Cost	\$0.00	
15d		Other Costs (Identify)	\$0.00	
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)		\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00	
16b		Labor Installation Costs	\$1,020.00	
16c		Non Recurring Cost	\$0.00	
16d		Other Costs (Identify)	\$0.00	
17	600	Reserved****		
17a	295	Reserved		
17b	305	Reserved		
18	600	25-Year Certified CNG Tanks		\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$870.00	
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$870.00	
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)		\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00	
19b	295	Labor Installation Costs for Base Buy APC	\$460.00	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 2

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

19c	295	Non Recurring Cost for Base Buy APC	\$	
19d	295	Other Costs (Identify) for Base Buy APC	\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles		\$4,136.00
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles		\$460.00
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles	\$	
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles	\$	
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)		\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System	\$869.00	
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System	\$96.00	
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System	\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System	\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$869.00	
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$96.00	
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00
21	600	USB Ports for Passenger Charging Only		\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00

LACMTA

CONTRACT NO. OP28367-000

GA12-93

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 2

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

22	600	Optional Wireless Stop Request Switches (Bus set)			\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00	
22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00	
23	600	Optional Full Color Destination Sign Sets (TS 86.3)			\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00	
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00	
24	Lot	Spare Parts (From Schedule A, Form PF-2)			\$2,203,833.65
25	Lot	Special Tools (Schedule B Form PF-3)			\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)			\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)			\$958,460.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.					
In U.S. Dollars Using Words:					TEN-MILLION EIGHT-TWO THOUSAND NINE-HUNDRED EIGHTY-EIGHT DOLLARS & SIXTY-FIVE
					In U.S. Dollars Using Figures: \$10,049,153.65

Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:

ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx)	Particulate Matter (PM) grams
Grams per brake horsepower-hour	per brake horsepower hour
0.02	0.01

4.0 CONTRACT FOR BASE BUY, OPTION BUY, AND OPTIONAL VEHICLE CONFIGURATION	
No.	Description of Item
1.0	Total Price for CONTRACT for 295 Base Buy Buses to be the BASIS for Price Proposal evaluation
2.0	Total Price for CONTRACT for 150 Up to 305 Option Buy Buses to be the BASIS for Price Proposal evaluation
3.0	Total Price for OPTIONAL VEHICLE CONFIGURATION for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation
	Total Price
	\$198,759,641
	\$205,317,851
	\$10,049,154

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 2

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

4.0 Total Price for CONTRACT for 295 Base Buy Buses, for 150 up to 305 Option Buy Buses, and Optional Vehicle Configuration for Optional Equipment combined to be the overall BASIS for Price Proposal evaluation	

In U.S. Dollars Using Words:

FOUR-HUNDRED FOURTEEN MILLION ONE HUNDRED TWENTY SIX THOUSAND SIX HUNDRED FORTY SIX DOLLARS

In U.S. Dollars Using Figures: **\$414,126,646**

(Signature of Person Executing Proposal)

Date

TONY WAYNE VICE PRESIDENT & GENERAL MANAGER

Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES

FORM PF-1A (CNG - 40')

SUBSYSTEM EQUIPMENT

CONTRACT MODIFICATION NO. 2

Contractor: ELDORADO NATIONAL (CALIFORNIA), INC

Contract No.: OP28367-000

BASE BUY		
NO.	DESCRIPTION OF ITEM	
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **	
1.1	TS 9. Propulsion Power Assembly (PPA)***	\$18,372
1.2	TS 9. Engine	\$60,324
1.3	TS 10. Cooling System	\$12,650
1.4	TS 18. Fuel System	\$68,300
1.5	TS 31. Suspension	\$19,950
1.6	TS 33. Steering System	\$4,950
1.7	TS 37. Brakes	\$3,260
1.8	TS 39. Pneumatic System	\$6,850
1.9	TS 42. Charging System	\$36,800
1.10	TS 44. Multiplex Control System	\$24,200
1.11	TS 54. HVAC Climate Control System	\$29,450
1.12	TS 78. Passenger Seats	\$28,955
1.13	TS 80. Doors	\$14,830
1.14	TS 81. Accessibility Provisions	\$19,740
1.15	TS 86. Communications	\$3,244
1.16	TS 11. Transmission	\$14,261
1.17	TS 78.1 USB Passenger Charging Port	\$480
1.18	TS 85.1 Wireless Stop Request Button	\$485
1.19	TS 86.3 Matrix APC	\$4,596
1.99	All other bus subsystem equipment not included above	\$242,469
TOTAL CNG BUS PRICE		\$614,166
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 1 - Base Buy		

- Notes:**
- ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
 - Price for line item Nos. 1a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
 - *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99


OPTION BUY		
NO.	DESCRIPTION OF ITEM	
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **	
2.1	TS 9.	
2.2	TS 9.	
2.3	TS 10.	
2.4	TS 18.	
2.5	TS 31.	
2.6	TS 33.	
2.7	TS 37.	
2.8	TS 39.	
2.9	TS 42.	
2.10	TS 44.	
2.11	TS 54.	
2.12	TS 78.	
2.13	TS 80.	
2.14	TS 81.	
2.15	TS 86.	
2.16	TS 11	
2.17	TS 78.1	
2.18	TS 85.1	
2.19	TS 86.3	
2.99		
	Propulsion Power Assembly (PPA)***	\$18,372
	Engine	\$60,324
	Cooling System	\$12,650
	Fuel System	\$68,300
	Suspension	\$19,950
	Steering System	\$4,950
	Brakes	\$3,260
	Pneumatic System	\$6,850
	Charging System	\$36,800
	Multiplex Control System	\$24,200
	HVAC Climate Control System	\$29,450
	Passenger Seats	\$28,955
	Doors	\$14,830
	Accessibility Provisions	\$19,740
	Communications	\$3,244
	Transmission	\$14,261
	USB Passenger Charging Port	\$480
	Wireless Stop Request Button	\$485
	Matrix APC	\$4,596
	All other bus subsystem equipment not included above	\$242,469
TOTAL CNG BUS PRICE OPTION QUANTITY		\$614,166

* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 10 - Option Buy)

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.

3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99

 (Signature of Person Executing Proposal) 6/24/12 Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40')
SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO. 2
TONY WAYNE /VICE PRESIDENT & GENERAL MANAGER
Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 2

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
LOW NOX ENGINE					
1	Ea.	Propulsion Power Assembly (See Definition in SP-1)	3	\$86,270.00	\$258,810.00
2	Ea.	Air Compressor	5	\$6,760.00	\$33,800.00
3	Ea.	Turbo	3	\$1,982.00	\$5,946.00
4	Ea.	EGR Cooler	20	\$1,110.47	\$22,209.40
5	Ea.	EGR Valve	10	\$610.68	\$6,106.80
6	Ea.	Delta P Sensor	10	\$347.66	\$3,476.60
7	Ea.	Mass. Air Flow Sensor	10	\$1,067.56	\$10,675.60
8	Ea.	Oxygen Sensor	20	\$223.61	\$4,472.20
9	Ea.	Catalyst	5	\$3,574.95	\$17,874.75
10	Ea.	Cylinder Head	5	\$4,513.81	\$22,569.05
11	Ea.	Pistons Kits	60	\$325.00	\$19,500.00
12	Bus Set	Rod Bearings	10	\$64.00	\$640.00
13	Bus Set	Main Bearing	10	\$219.27	\$2,192.70
14	Ea.	Liners	60	\$191.87	\$11,512.20
15	Ea.	Head Gasket	5	\$428.75	\$2,143.75
16	Ea.	Upper Gasket Set	5	\$844.99	\$4,224.95
17	Ea.	Oil Pan Gasket	20	\$133.60	\$2,672.00
18	Ea.	Stiffener Plate Gasket	20	\$92.85	\$1,857.00
19	Ea.	Oil Pan	5	\$505.51	\$2,527.55
20	Ea.	Throttle Actuator	5	\$574.16	\$2,870.80
21	Ea.	Fuel Control Valve	10	\$1,429.19	\$14,291.90
22	Ea.	Ignition Control Module	10	\$1,648.45	\$16,484.50
23	Ea.	Ignition Coils	120	\$175.23	\$21,027.60
24	Ea.	Engine Harness	5	\$1,493.62	\$7,468.10
25	Ea.	Ignition Harness	10	\$167.53	\$1,675.30
26	Ea.	Oil Cooler	5	\$179.73	\$898.65
27	Ea.	Lube Pump	5	\$275.51	\$1,377.55
28	Ea.	Front Crank Seal	10	\$30.54	\$305.40
29	Ea.	Rear Seal	10	\$28.65	\$286.50
30	Ea.	Water Pump	10	\$175.03	\$1,750.30
31	Ea.	Vibration Damper	10	\$344.21	\$3,442.10
32	Ea.	Belt Tensioner (If applicable)	20	\$145.47	\$2,909.40
33	Ea.	Coolant Temperature Sensor	20	\$11.21	\$224.20
34	Ea.	Oil Pressure Sensor	10	\$98.10	\$981.00
35	Ea.	Fuel Pressure Sensor	10	\$144.34	\$1,443.40
36	Ea.	Low Fuel Pressure Regulator	10	\$1,222.22	\$12,222.20
37	Ea.	Engine Cradle	5	\$1,420.00	\$7,100.00
38	Ea.	Belt Guard	5	\$358.80	\$1,794.00
39	Ea.	Complete Engine Package (See definition in TS-2)	4	\$66,430.00	\$265,720.00
40	Bus Set	Spark Plugs	15	\$42.02	\$630.30
41	Bus Set	Adaptation Kit (Eng to Trans)	3	\$1,066.00	\$3,198.00
42	Ea.	PPA Dollies	8	\$685.00	\$5,480.00
COOLING SYSTEM					
1	Ea.	Radiator Packages (See definition in TS-2)	5	\$7,715.00	\$38,575.00
2	Ea.	Thermal Management Controllers	5	\$598.32	\$2,991.60
3	Bus Set	Fan Resistors	20	\$48.60	\$972.00
4	Bus Set	CAN Interface Cables	5	\$101.25	\$506.25
5	Ea.	Fan Reversal LED Panel	5	\$593.39	\$2,966.95
6	Ea.	Fan Assembly	30	\$40.66	\$1,219.80
7	Ea.	Coolant Reservoir	10	\$556.20	\$5,562.00
8	Ea.	Transmission Cooler	10	\$648.00	\$6,480.00
9	Bus Set	Pressure Relief Valve	20	\$23.85	\$477.00
10	Ea.	Radiator Cap	30	\$5.27	\$158.10
11	Ea.	Coolant Overflow Tank	10	\$36.29	\$362.90

PRICING FORM
PF2 - CNG 40'
SCHEDULE A - SPARE PARTS
Contract Mod. No. 2

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 2

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
CHARGING SYSTEM					
1	Ea.	Alternator	10	\$9,750.00	\$97,500.00
2	Ea.	Voltage Regulators	10	\$351.00	\$3,510.00
3	Ea.	Batteries	40	\$203.77	\$8,150.80
4	Ea.	Battery Equilizer	20	\$418.50	\$8,370.00
5	Ea.	Battery Disconnect	10	\$31.82	\$318.20
6	Ea.	Battery Separator	5	\$297.00	\$1,485.00
7	Ea.	Power Distribution Panel in Battery Compartment	5	\$267.30	\$1,336.50
8	Ea.	Low Voltage Disconnect	10	\$44.55	\$445.50
9	Ea.	Circuit Breaker 80A	20	\$31.59	\$631.80
10	Ea.	Circuit Breaker 100A	20	\$39.15	\$783.00
11	Ea.	Circuit Breaker 120A or 130A, whichever applies	20	\$49.95	\$999.00
12	Bus Set	Fuse and Circuit Breaker Panels	5	\$310.50	\$1,552.50
SUSPENSION					
1	Bus Set	Air Ride Beams	10	\$2,310.00	\$23,100.00
2	Bus Set	Air Bags	20	\$672.00	\$13,440.00
3	Ea.	Front Axle	10	\$4,879.85	\$48,798.50
4	Ea.	Rear Axle	10	\$3,946.07	\$39,460.70
5	Bus Set	Radius Rods	5	\$412.80	\$2,064.00
6	Bus Set	Shocks	10	\$383.68	\$3,836.80
7	Bus Set	Leveling Valve Front	10	\$191.81	\$1,918.10
8	Bus Set	Leveling Valve Rear	10	\$191.81	\$1,918.10
DRIVE TRAIN					
1	Ea.	Transmission	5	\$14,261.00	\$71,305.00
2	Ea.	TCM Programmed	5	\$611.00	\$3,055.00
3	Ea.	Adaptation Kit (Trans to Eng)	2	\$1,066.00	\$2,132.00
4	Ea.	Drive Shaft	10	\$544.00	\$5,440.00
5	Ea.	Differential	15	\$6,972.00	\$104,580.00
STEERING SYSTEM					
1	Bus Set	Steering Gear and Linkage	10	\$1,172.50	\$11,725.00
2	Ea.	Steering Column	10	\$596.77	\$5,967.70
3	Ea.	Steering Shaft	10	\$135.30	\$1,353.00
4	Ea.	Steering Box Assembly	10	\$277.78	\$2,777.80
5	Ea.	Power Steering Gear Assembly	10	\$893.97	\$8,939.70
PNEUMATIC SYSTEM					
1	Bus Set	Air Tanks (Complete Sets)	10	\$352.00	\$3,520.00
2	Ea.	Air Dryer	10	\$400.68	\$4,006.80
3	Ea.	Air Governor	10	\$68.80	\$688.00
4	Bus Set	Pressure Reducing Valves	10	\$28.80	\$288.00
5	Bus Set	Check Valves	10	\$57.60	\$576.00
6	Bus Set	Brake Control Valve	10	\$46.40	\$464.00
7	Bus Set	Brake Pedal Valve	10	\$134.54	\$1,345.40
8	Bus Set	Quick Release Valve	10	\$17.60	\$176.00
9	Bus Set	Parking Relay Valve	10	\$57.60	\$576.00
10	Bus Set	Parking Control Valve	10	\$46.40	\$464.00
11	Bus Set	Air Brake Tubing	10	\$134.54	\$1,345.40
12	Bus Set	Solenoid Valve Assembly	10	\$17.60	\$176.00
FUEL SYSTEM					
1	Bus Set	Fuel Cylinder Assembly	2	\$68,300.00	\$136,600.00
2	Ea.	Fill Manifold	2	\$592.00	\$1,184.00

PRICING FORM
PF2 - CNG 40'
SCHEDULE A - SPARE PARTS
Contract Mod. No. 2

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG - 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 2

CONTRACTOR: EL DORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
3	Bus Set	Shut Off Valve Assembly	5	\$440.00	\$2,200.00
4	Bus Set	PRD'S	10	\$134.40	\$1,344.00
5	Ea.	High Fuel Pressure Regulator	20	\$600.00	\$12,000.00
6	Bus Set	Defueling Valves	5	\$1,560.00	\$7,800.00
7	Ea.	Low/High Pressure Filler Assembly	5	\$704.00	\$3,520.00
8	Bus Set	Fuel Pressure Gauges	10	\$88.00	\$880.00
9	Bus Set	Defueling Switches	5	\$41.60	\$208.00
10	Bus Set	Manifold Shut Off Valve Assembly	10	\$325.00	\$3,250.00
11	Bus Set	Solenoid Valve Assembly	10	\$376.00	\$3,760.00
12	Bus Set	Fuel Line Assembly	10	\$576.00	\$5,760.00
13	Ea.	Low Pressure Sensor	20	\$144.00	\$2,880.00
14	Ea.	Proximity Switch @ the Fuel Fill Door	20	\$7.94	\$158.80
15	Bus Set	Fuel Line Assembly	5	\$576.00	\$2,880.00
16	Bus Set	Vent Tubes	5	\$137.60	\$688.00
17	Ea.	Control Harness	5	\$240.00	\$1,200.00
18	Ea.	Proximity Switch @ the Fast Fill Recepticle	20	\$7.94	\$158.80

DOORS

1	Bus Set	Complete Base Plate and Operator Assembly	5	\$1,920.00	\$9,600.00
2	Bus Set	Front/Rear Turning Shaft Assembly	5	\$1,864.00	\$9,320.00
3	Bus Set	Door Panels	5	\$6,387.00	\$31,935.00
4	Bus Set	Door Glass	2	\$1,816.00	\$3,632.00

BODY INTERIOR

1	Bus Set	Interior AVA Sign Assembly	5	\$1,580.00	\$7,900.00
2	Ea.	Destination Sign Controller	2	\$512.00	\$1,024.00
3	Ea.	Next Stop Sign	5	\$256.00	\$1,280.00
4	Bus Set	Interior Speaker Assembly	10	\$192.00	\$1,920.00
5	Ea.	Microphone Hand Set	5	\$92.80	\$464.00
6	Ea.	Visor/Sun Shade(s) Front & Side	10	\$316.80	\$3,168.00
7	Bus Set	Access Panels	5	\$960.00	\$4,800.00
8	Bus Set	Light Covers	5	\$916.80	\$4,584.00
9	Bus Set	Modesty Panels	10	\$680.00	\$6,800.00
10	Bus Set	Ceiling Panels	10	\$1,472.00	\$14,720.00
11	Bus Set	Side Wall Trim Panel	10	\$480.00	\$4,800.00
12	Bus Set	Floor Covering	5	\$2,470.00	\$12,350.00
13	Bus Set	Wheelchair Securement Devices	5	\$1,248.00	\$6,240.00
14	Bus Set	Passenger Seat	4	\$34,087.00	\$136,348.00
15	Bus Set	Seat Track	2	\$388.00	\$776.00
16	Ea.	Operator Seat	5	\$2,680.00	\$13,400.00
17	Ea.	Farebox Grabrail	4	\$248.00	\$992.00
18	Bus Set	Manual Release Mechanism	6	\$47.00	\$282.00
19	Bus Set	Passenger Hand Strap	10	\$496.00	\$4,960.00
20	Ea.	HVAC Return Grill	5	\$390.00	\$1,950.00

BODY EXTERIOR

1	Bus Set	Passenger Windows	2	\$14,186.40	\$28,372.80
2	Bus Set	Replacement Pass Side Window Glass (if not bonded)	2	\$4,560.00	\$9,120.00
3	Bus Set	Side Window Film or Guards	5	\$1,847.00	\$9,235.00
4	Bus Set	Windshield	3	\$680.00	\$2,040.00
5	Bus Set	Operator Window	2	\$1,139.68	\$2,279.36
6	Bus Set	Access Door Set (excluding engine door and HVAC access door)	3	\$2,180.00	\$6,540.00
7	Ea.	Engine Door	2	\$623.00	\$1,246.00
8	Ea.	HVAC Rear Attic Door	2	\$428.80	\$857.60
9	Ea.	Bike Rack	2	\$1,469.00	\$2,938.00
10	Ea.	Emergency Roof Hatch	2	\$249.20	\$498.40
11	Bus Set	Windshield Wiper Assy.	3	\$766.96	\$2,300.88
12	Ea.	Windshield Washer Reservoir	2	\$52.80	\$105.60
13	Bus Set	Mirrors	4	\$971.28	\$3,885.12
14	Bus Set	Bumper	3	\$2,208.00	\$6,624.00
15	Bus Set	Mud Guards	3	\$104.00	\$312.00

PRICING FORM
PF2 - CNG 40'
SCHEDULE A - SPARE PARTS
Contract Mod. No. 2

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 2

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
16	Ea.	Head Lights	10	\$742.00	\$7,420.00
17	Bus Set	Front Turn Signal	10	\$54.40	\$544.00
18	Bus Set	Side Marker Lights	10	\$128.00	\$1,280.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 2

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
 Contract No.: OP28367-000
 Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
19	Bus Set	Rear Door Lights	10	\$84.00	\$840.00
20	Bus Set	Under Hood Hazard Lights	10	\$115.20	\$1,152.00
21	Ea.	License Plate Installation	5	\$20.80	\$104.00
22	Bus Set	CNG Tank Cover Installation	4	\$3,800.00	\$15,200.00
23	Bus Set	Exterior Trim (including fender skirts, exit door trim and trim pieces covering joints between body panels)	4	\$1,387.00	\$5,548.00

CLIMATE CONTROL SYSTEM

1	Ea.	Compressor	2	\$6,800.00	\$13,600.00
2	Ea.	Controller	2	\$300.00	\$600.00
3	Ea.	Evaporator	2	\$6,300.00	\$12,600.00
4	Ea.	Condensor	2	\$410.25	\$820.50
5	Ea.	Blower Assembly	4	\$555.00	\$2,220.00
6	Ea.	Thermostat	2	\$55.79	\$111.58
7	Ea.	Marine Pump	3	\$603.00	\$1,809.00

WHEELCHAIR

1	Bus Set	Ramp Assembly	3	\$7,995.00	\$23,985.00
2	Bus Set	Valve Assembly	2	\$87.00	\$174.00
3	Bus Set	Electrical Harness	2	\$348.40	\$696.80
4	Ea.	Ramp	2	\$7,895.00	\$15,990.00
5	Ea.	Controller	2	\$707.38	\$1,414.76
6	Ea.	Motor	3	\$819.00	\$2,457.00

BRAKES

1	Bus Set	Pressure Switches (include all for each Bus Set)	10	\$585.00	\$5,850.00
2	Bus Set	Protection Valve	10	\$84.00	\$840.00
3	Bus Set	Brake Air Chamber	10	\$269.70	\$2,697.00
4	Bus Set	Brake Wear Indicator	5	\$390.00	\$1,950.00
5	Ea.	ABS Electronic Control Unit	5	\$388.50	\$1,942.50
6	Ea.	ABS Harness	2	\$367.50	\$735.00
7	Bus Set	ABS Sensor	5	\$295.50	\$1,477.50


MULTIPLEX CONTROLS SYSTEM

1	Ea.	Event Data Recorder	2	\$2,200.00	\$4,400.00
2	Ea.	DVR	2	\$5,535.40	\$11,070.80
3	Bus Set	Complete Bus Wiring Harnesses	2	\$21,071.15	\$42,142.30
4	Bus Set	Communication Module (Gateway Module)	10	\$3,630.00	\$36,300.00
5	Bus Set	Multiplex Module	10	\$6,610.81	\$66,108.10
6	Bus Set	Wheels	5	\$2,860.00	\$14,300.00

Total Unit Price \$502,045.21
TOTAL PARTS BUY \$2,203,833.65

In U.S. Dollars Using Words:

TWO-MILLION TWO HUNDRED THREE THOUSAND EIGHT-HUNDRED THIRTY-THREE DOLLARS & SIXTY-FIVE CENTS



 Authorized Signature

 12/8/2017
 Date

 TONY WAYNE
 Print Name



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-013

Response Required: No

Date: January 3, 2018

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 3
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES**

Reference: MAEL-002, 011; ELMA-007; ELMA-008; ELMA-015;
ELMA-017 Revised

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at
hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan
Phil Rabottini

CDRL NO.: n/a
MAEL-013

DATE: January 3, 2018

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 3

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 3 to Contract No.: OP28367-000 is made effective on the 27th day of December 2017 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, and Contract Modification No. 2, dated December 6, 2017 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Change in the bike rack model from Trilogy 3 to Apex 3 from supplier Sportworks for an aggregate decrease of \$67,666 in the total Contract Price from \$198,759,641 to \$198,691,975. Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of ~~\$198,759,641~~ **\$198,691,975** inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. Revised Pricing Forms: PF 1, PF-1A and PF-2 as attached to this modification no. 3.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 3 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

TONY WAYNE
Type or Print Name

1/2/18
Date

By: Elizabeth Hernandez
Elizabeth Hernandez
Principal Contract Administrator

1/3/18
Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 Contract Modification No. 3

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

1.0 CONTRACT FOR 295 BUSES (BASE BUY)		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
1	295	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A*:	\$594,216.87	\$181,117,277
1a	Lot	Manuals (Base Buy) (TS 5.6.4)		
1b	295	Vehicle Delivery Charge for Base Buy	\$2,281.50	\$613,957
1c		Tax (Base Buy)		
2	Lot	Reserved	Value of all taxable delivery charges per bus**:	Lump Sum
3	Lot	Reserved	9.75%	\$275.00
4	Lot	Reserved		\$81,125.00
5	Lot	Reserved		\$17,093,444.22
6	Lot	Reserved		
7	Lot	Performance Bond (Base Buy)		
8	1,000	Total Training Hours for Base Buy***	Lump Sum	\$119,336.00
8a	900	Contractor (Proposer/Prime) Base Buy	\$175,000.00	
8b	100	Subcontractor/Supplier Base Buy	\$175.00	\$157,500.00
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1	\$175.00	\$17,500.00
10a	15	Special Towing Equipment (TS 25)	\$74,930.00	\$74,930.00
10b		Tax	\$386.00	\$5,790.00
11a	2	Rear Recovery Devices/Tie Downs (TS 25)	9.75%	\$564.53
11b		Tax	\$505.00	\$1,010.00
			9.75%	\$98.48

1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation

In U.S. Dollars Using Words: **ONE HUNDRED NINETY-EIGHT MILLION SIX HUNDRED NINETY ONE THOUSAND NINE HUNDRED SEVENTY FIVE DOLLARS**

In U.S. Dollars Using Figures: **\$198,691,975**

NOTE * Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 3

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 Contract Modification No. 3

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40") LOW FLOOR CNG BUS PROCUREMENT**

2.0 CONTRACT FOR 150 UP TO 305 BUSES (OPTION BUY)				Taxable		
No.	Qty.	Description of Item	Unit Price	Unit Price	Unit Price	Total Price
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles*		\$594,217.00	\$613,957.00	\$187,256,885.00
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***		\$2,281.50	Lump Sum	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy		\$0.00	\$275.00	\$83,875.00
10c		Tax (Option Buy)		9.75%	\$57,936.16	\$17,672,809.54
11		Reserved			\$	\$
12	Lot	Performance Bond for Option Buy***			Lump Sum	\$123,421.00
13	500	Total Training Hours for Option Buy****			\$87,500.00	
13a	450	Contractor (Proposer/Prime) Option Buy			\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy			\$175.00	\$8,750.00
14		Reserved			\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation						
In U.S. Dollars Using Words:				TWO-HUNDRED FIVE MILLION TWO HUNDRED FORTY SEVEN THOUSAND EIGHT HUNDRED NINETY ONE DOLLARS		
				In U.S. Dollars Using Figures:		\$205,247,891

NOTE * Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 3

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION			
No.	Qty.	Description of Item	Total Price
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)	\$6,370.00
15a		Direct Materials/Equipment	\$5,750.00
15b		Labor Installation Costs	\$620.00
15c		Non Recurring Cost	\$0.00
15d		Other Costs (Identify)	\$0.00
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)	\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00
16b		Labor Installation Costs	\$1,020.00
16c		Non Recurring Cost	\$0.00
16d		Other Costs (Identify)	\$0.00
17	600	Reserved****	
17a	295	Reserved	
17b	305	Reserved	
18	600	25-Year Certified CNG Tanks	\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$256,650.00
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$265,350.00
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)	\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00
19b	295	Labor Installation Costs for Base Buy APC	\$460.00

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19c	295	Non Recurring Cost for Base Buy APC	\$	
19d	295	Other Costs (Identify) for Base Buy APC	\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles		\$4,136.00
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles		\$460.00
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles	\$	
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles	\$	
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)		\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System		\$869.00
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System		\$96.00
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System	\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System	\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$869.00
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$96.00
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$284,325.00	\$965.00
21	600	USB Ports for Passenger Charging Only		\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00

LACMTA
 CONTRACT NO. OP28367-000
 GA12-93

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 3

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

22	600	Optional Wireless Stop Request Switches (Bus set)		\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00
22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00
23	600	Optional Full Color Destination Sign Sets (TS 86.3)		\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00
24	Lot	Spare Parts (From Schedule A, Form PF-2)		\$2,203,445.65
25	Lot	Special Tools (Schedule B Form PF-3)		\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)		\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)		\$958,460.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.				
In U.S. Dollars Using Words: TEN-MILLION FORTY EIGHT THOUSAND SEVEN HUNDRED SIXTY FIVE DOLLARS & SIXTY-FIVE CENTS				
In U.S. Dollars Using Figures:			\$10,048,765.65	

**** Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:

ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx)	Particulate Matter (PM) grams
Grams per brake horsepower-hour	per brake horsepower hour
0.02	0.01

GROUP A - UP TO 600 40' CNG BUSES

FORM PF-1A (CNG - 40')

SUBSYSTEM EQUIPMENT

CONTRACT MODIFICATION NO. 3

Contractor: ELDORADO NATIONAL (CALIFORNIA), INC

Contract No.: OP28367-000

BASE BUY		
NO.	DESCRIPTION OF ITEM	
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **	
1.1	TS 9. Propulsion Power Assembly (PPA)***	\$18,372
1.2	TS 9. Engine	\$60,324
1.3	TS 10. Cooling System	\$12,650
1.4	TS 18. Fuel System	\$68,300
1.5	TS 31. Suspension	\$19,950
1.6	TS 33. Steering System	\$4,950
1.7	TS 37. Brakes	\$3,260
1.8	TS 39. Pneumatic System	\$6,850
1.9	TS 42. Charging System	\$36,800
1.10	TS 44. Multiplex Control System	\$24,200
1.11	TS 54. HVAC Climate Control System	\$29,450
1.12	TS 78. Passenger Seats	\$28,955
1.13	TS 80. Doors	\$14,830
1.14	TS 81. Accessibility Provisions	\$19,740
1.15	TS 86. Communications	\$3,244
1.16	TS 11. Transmission	\$14,261
1.17	TS 78.1 USB Passenger Charging Port	\$480
1.18	TS 85.1 Wireless Stop Request Button	\$485
1.19	TS 86.3 Matrix APC	\$4,596
1.99	All other bus subsystem equipment not included above	\$242,260
TOTAL CNG BUS PRICE		\$613,957
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 1 - Base Buy		

- Notes:** 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
2. Price for line item Nos. 1a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40')
SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO. 3

OPTION BUY	
NO.	DESCRIPTION OF ITEM
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **
2.1 TS 9.	Propulsion Power Assembly (PPA)***
2.2 TS 9.	Engine
2.3 TS 10.	Cooling System
2.4 TS 18.	Fuel System
2.5 TS 31.	Suspension
2.6 TS 33.	Steering System
2.7 TS 37.	Brakes
2.8 TS 39.	Pneumatic System
2.9 TS 42.	Charging System
2.10 TS 44.	Multiplex Control System
2.11 TS 54.	HVAC Climate Control System
2.12 TS 78.	Passenger Seats
2.13 TS 80.	Doors
2.14 TS 81.	Accessibility Provisions
2.15 TS 86.	Communications
2.16 TS 11	Transmission
2.17 TS 78.1	USB Passenger Charging Port
2.18 TS85.1	Wireless Stop Request Button
2.19 TS 86.3	Matrix APC
2.99	All other bus subsystem equipment not included above
TOTAL CNG BUS PRICE OPTION QUANTITY	
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 10 - Option Buy)	
	\$613,957

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99


 (Signature of Person Executing Proposal)
TONY WAYNE MICE PRESIDENT & GENERAL MANAGER
 Type Name, Title

Date
 1/2/18

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 3

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
LOW NOX ENGINE					
1	Ea.	Propulsion Power Assembly (See Definition in SP-1)	3	\$86,270.00	\$258,810.00
2	Ea.	Air Compressor	5	\$6,760.00	\$33,800.00
3	Ea.	Turbo	3	\$1,982.00	\$5,946.00
4	Ea.	EGR Cooler	20	\$1,110.47	\$22,209.40
5	Ea.	EGR Valve	10	\$610.68	\$6,106.80
6	Ea.	Delta P Sensor	10	\$347.66	\$3,476.60
7	Ea.	Mass. Air Flow Sensor	10	\$1,067.56	\$10,675.60
8	Ea.	Oxygen Sensor	20	\$223.61	\$4,472.20
9	Ea.	Catalyst	5	\$3,574.95	\$17,874.75
10	Ea.	Cylinder Head	5	\$4,513.81	\$22,569.05
11	Ea.	Pistons Kits	60	\$325.00	\$19,500.00
12	Bus Set	Rod Bearings	10	\$84.00	\$840.00
13	Bus Set	Main Bearing	10	\$219.27	\$2,192.70
14	Ea.	Liners	60	\$191.87	\$11,512.20
15	Ea.	Head Gasket	5	\$428.75	\$2,143.75
16	Ea.	Upper Gasket Set	5	\$844.99	\$4,224.95
17	Ea.	Oil Pan Gasket	20	\$133.60	\$2,672.00
18	Ea.	Stiffener Plate Gasket	20	\$92.85	\$1,857.00
19	Ea.	Oil Pan	5	\$505.51	\$2,527.55
20	Ea.	Throttle Actuator	5	\$574.16	\$2,870.80
21	Ea.	Fuel Control Valve	10	\$1,429.19	\$14,291.90
22	Ea.	Ignition Control Module	10	\$1,648.45	\$16,484.50
23	Ea.	Ignition Coils	120	\$175.23	\$21,027.60
24	Ea.	Engine Harness	5	\$1,493.62	\$7,468.10
25	Ea.	Ignition Harness	10	\$167.53	\$1,675.30
26	Ea.	Oil Cooler	5	\$179.73	\$898.65
27	Ea.	Lube Pump	5	\$275.51	\$1,377.55
28	Ea.	Front Crank Seal	10	\$30.54	\$305.40
29	Ea.	Rear Seal	10	\$28.65	\$286.50
30	Ea.	Water Pump	10	\$175.03	\$1,750.30
31	Ea.	Vibration Damper	10	\$344.21	\$3,442.10
32	Ea.	Belt Tensioner (If applicable)	20	\$145.47	\$2,909.40
33	Ea.	Coolant Temperature Sensor	20	\$11.21	\$224.20
34	Ea.	Oil Pressure Sensor	10	\$98.10	\$981.00
35	Ea.	Fuel Pressure Sensor	10	\$144.34	\$1,443.40
36	Ea.	Low Fuel Pressure Regulator	10	\$1,222.22	\$12,222.20
37	Ea.	Engine Cradle	5	\$1,420.00	\$7,100.00
38	Ea.	Belt Guard	5	\$358.80	\$1,794.00
39	Ea.	Complete Engine Package (See definition in TS-2)	4	\$66,430.00	\$265,720.00
40	Bus Set	Spark Plugs	15	\$42.02	\$630.30
41	Bus Set	Adaptation Kit (Eng to Trans)	3	\$1,066.00	\$3,198.00
42	Ea.	PPA Dollies	8	\$685.00	\$5,480.00
COOLING SYSTEM					
1	Ea.	Radiator Packages (See definition in TS-2)	5	\$7,715.00	\$38,575.00
2	Ea.	Thermal Management Controllers	5	\$598.32	\$2,991.60
3	Bus Set	Fan Resistors	20	\$48.60	\$972.00
4	Bus Set	CAN Interface Cables	5	\$101.25	\$506.25
5	Ea.	Fan Reversal LED Panel	5	\$593.39	\$2,966.95
6	Ea.	Fan Assembly	30	\$40.66	\$1,219.80
7	Ea.	Coolant Reservoir	10	\$556.20	\$5,562.00
8	Ea.	Transmission Cooler	10	\$648.00	\$6,480.00
9	Bus Set	Pressure Relief Valve	20	\$23.85	\$477.00
10	Ea.	Radiator Cap	30	\$5.27	\$158.10
11	Ea.	Coolant Overflow Tank	10	\$36.29	\$362.90

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 3

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
CHARGING SYSTEM					
1	Ea.	Alternator	10	\$9,750.00	\$97,500.00
2	Ea.	Voltage Regulators	10	\$351.00	\$3,510.00
3	Ea.	Batteries	40	\$203.77	\$8,150.80
4	Ea.	Battery Equilizer	20	\$418.50	\$8,370.00
5	Ea.	Battery Disconnect	10	\$31.82	\$318.20
6	Ea.	Battery Separator	5	\$297.00	\$1,485.00
7	Ea.	Power Distribution Panel in Battery Compartment	5	\$267.30	\$1,336.50
8	Ea.	Low Voltage Disconnect	10	\$44.55	\$445.50
9	Ea.	Circuit Breaker 80A	20	\$31.59	\$631.80
10	Ea.	Circuit Breaker 100A	20	\$39.15	\$783.00
11	Ea.	Circuit Breaker 120A or 130A, whichever applies	20	\$49.95	\$999.00
12	Bus Set	Fuse and Circuit Breaker Panels	5	\$310.50	\$1,552.50
SUSPENSION					
1	Bus Set	Air Ride Beams	10	\$2,310.00	\$23,100.00
2	Bus Set	Air Bags	20	\$672.00	\$13,440.00
3	Ea.	Front Axle	10	\$4,879.85	\$48,798.50
4	Ea.	Rear Axle	10	\$3,946.07	\$39,460.70
5	Bus Set	Radius Rods	5	\$412.80	\$2,064.00
6	Bus Set	Shocks	10	\$383.68	\$3,836.80
7	Bus Set	Leveling Valve Front	10	\$191.81	\$1,918.10
8	Bus Set	Leveling Valve Rear	10	\$191.81	\$1,918.10
DRIVE TRAIN					
1	Ea.	Transmission	5	\$14,261.00	\$71,305.00
2	Ea.	TCM Programmed	5	\$611.00	\$3,055.00
3	Ea.	Adaptation Kit (Trans to Eng)	2	\$1,066.00	\$2,132.00
4	Ea.	Drive Shaft	10	\$544.00	\$5,440.00
5	Ea.	Differential	15	\$6,972.00	\$104,580.00
STEERING SYSTEM					
1	Bus Set	Steering Gear and Linkage	10	\$1,172.50	\$11,725.00
2	Ea.	Steering Column	10	\$596.77	\$5,967.70
3	Ea.	Steering Shaft	10	\$135.30	\$1,353.00
4	Ea.	Steering Box Assembly	10	\$277.78	\$2,777.80
5	Ea.	Power Steering Gear Assembly	10	\$893.97	\$8,939.70
PNEUMATIC SYSTEM					
1	Bus Set	Air Tanks (Complete Sets)	10	\$352.00	\$3,520.00
2	Ea.	Air Dryer	10	\$400.66	\$4,006.60
3	Ea.	Air Governor	10	\$68.80	\$688.00
4	Bus Set	Pressure Reducing Valves	10	\$28.80	\$288.00
5	Bus Set	Check Valves	10	\$57.60	\$576.00
6	Bus Set	Brake Control Valve	10	\$46.40	\$464.00
7	Bus Set	Brake Pedal Valve	10	\$134.54	\$1,345.40
8	Bus Set	Quick Release Valve	10	\$17.60	\$176.00
9	Bus Set	Parking Relay Valve	10	\$57.60	\$576.00
10	Bus Set	Parking Control Valve	10	\$46.40	\$464.00
11	Bus Set	Air Brake Tubing	10	\$134.54	\$1,345.40
12	Bus Set	Solenoid Valve Assembly	10	\$17.60	\$176.00
FUEL SYSTEM					
1	Bus Set	Fuel Cylinder Assembly	2	\$68,300.00	\$136,600.00
2	Ea.	Fill Manifold	2	\$592.00	\$1,184.00

GROUP A - UP TO 600 40' CNG BUSES
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CONTRACT MODIFICATION NO. 3

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
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Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
3	Bus Set	Shut Off Valve Assembly	5	\$440.00	\$2,200.00
4	Bus Set	PRD'S	10	\$134.40	\$1,344.00
5	Ea.	High Fuel Pressure Regulator	20	\$600.00	\$12,000.00
6	Bus Set	Defueling Valves	5	\$1,560.00	\$7,800.00
7	Ea.	Low/High Pressure Filer Assembly	5	\$704.00	\$3,520.00
8	Bus Set	Fuel Pressure Gauges	10	\$88.00	\$880.00
9	Bus Set	Defueling Switches	5	\$41.60	\$208.00
10	Bus Set	Manifold Shut Off Valve Assembly	10	\$325.00	\$3,250.00
11	Bus Set	Solenoid Valve Assembly	10	\$376.00	\$3,760.00
12	Bus Set	Fuel Line Assembly	10	\$576.00	\$5,760.00
13	Ea.	Low Pressure Sensor	20	\$144.00	\$2,880.00
14	Ea.	Proximity Switch @ the Fuel Fill Door	20	\$7.94	\$158.80
15	Bus Set	Fuel Line Assembly	5	\$576.00	\$2,880.00
16	Bus Set	Vent Tubes	5	\$137.60	\$688.00
17	Ea.	Control Harness	5	\$240.00	\$1,200.00
18	Ea.	Proximity Switch @ the Fast Fill Recepticle	20	\$7.94	\$158.80

DOORS

1	Bus Set	Complete Base Plate and Operator Assembly	5	\$1,920.00	\$9,600.00
2	Bus Set	Front/Rear Turning Shaft Assembly	5	\$1,864.00	\$9,320.00
3	Bus Set	Door Panels	5	\$6,387.00	\$31,935.00
4	Bus Set	Door Glass	2	\$1,816.00	\$3,632.00

BODY INTERIOR

1	Bus Set	Interior AVA Sign Assembly	5	\$1,580.00	\$7,900.00
2	Ea.	Destination Sign Controller	2	\$512.00	\$1,024.00
3	Ea.	Next Stop Sign	5	\$256.00	\$1,280.00
4	Bus Set	Interior Speaker Assembly	10	\$192.00	\$1,920.00
5	Ea.	Microphone Hand Set	5	\$92.80	\$464.00
6	Ea.	Visor/Sun Shade(s) Front & Side	10	\$316.80	\$3,168.00
7	Bus Set	Access Panels	5	\$960.00	\$4,800.00
8	Bus Set	Light Covers	5	\$916.80	\$4,584.00
9	Bus Set	Modesty Panels	10	\$880.00	\$8,800.00
10	Bus Set	Ceiling Panels	10	\$1,472.00	\$14,720.00
11	Bus Set	Side Wall Trim Panel	10	\$480.00	\$4,800.00
12	Bus Set	Floor Covering	6	\$2,470.00	\$12,350.00
13	Bus Set	Wheelchair Securement Devices	5	\$1,248.00	\$6,240.00
14	Bus Set	Passenger Seat	4	\$34,087.00	\$136,348.00
15	Bus Set	Seat Track	2	\$388.00	\$776.00
16	Ea.	Operator Seat	5	\$2,680.00	\$13,400.00
17	Ea.	Farebox Grabrail	4	\$248.00	\$992.00
18	Bus Set	Manual Release Mechanism	6	\$47.00	\$282.00
19	Bus Set	Passenger Hand Strap	10	\$496.00	\$4,960.00
20	Ea.	HVAC Return Grill	5	\$390.00	\$1,950.00

BODY EXTERIOR

1	Bus Set	Passenger Windows	2	\$14,186.40	\$28,372.80
2	Bus Set	Replacement Pass Side Window Glass (if not bonded)	2	\$4,580.00	\$9,120.00
3	Bus Set	Side Window Film or Guards	5	\$1,847.00	\$9,235.00
4	Bus Set	Windshield	3	\$680.00	\$2,040.00
5	Bus Set	Operator Window	2	\$1,139.68	\$2,279.36
6	Bus Set	Access Door Set (excluding engine door and HVAC access door)	3	\$2,180.00	\$6,540.00
7	Ea.	Engine Door	2	\$623.00	\$1,246.00
8	Ea.	HVAC Rear Attic Door	2	\$428.80	\$857.60
9	Ea.	Bike Rack	2	\$1,275.00	\$2,550.00
10	Ea.	Emergency Roof Hatch	2	\$249.20	\$498.40
11	Bus Set	Windshield Wiper Assy.	3	\$766.96	\$2,300.88
12	Ea.	Windshield Washer Reservoir	2	\$52.80	\$105.60
13	Bus Set	Mirrors	4	\$971.28	\$3,885.12
14	Bus Set	Bumper	3	\$2,208.00	\$6,624.00
15	Bus Set	Mud Guards	3	\$104.00	\$312.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 3

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
16	Ea.	Head Lights	10	\$742.00	\$7,420.00
17	Bus Set	Front Turn Signal	10	\$54.40	\$544.00
18	Bus Set	Side Marker Lights	10	\$128.00	\$1,280.00
19	Bus Set	Rear Door Lights	10	\$84.00	\$840.00
20	Bus Set	Under Hood Hazard Lights	10	\$115.20	\$1,152.00
21	Ea.	License Plate Installation	5	\$20.80	\$104.00
22	Bus Set	CNG Tank Cover Installation	4	\$3,800.00	\$15,200.00
23	Bus Set	Exterior Trim (including fender skirts, exit door trim and trim pieces covering joints between body panels)	4	\$1,387.00	\$5,548.00

CLIMATE CONTROL SYSTEM

1	Ea.	Compressor	2	\$6,800.00	\$13,600.00
2	Ea.	Controller	2	\$300.00	\$600.00
3	Ea.	Evaporator	2	\$6,300.00	\$12,600.00
4	Ea.	Condensor	2	\$410.25	\$820.50
5	Ea.	Blower Assembly	4	\$555.00	\$2,220.00
6	Ea.	Thermostat	2	\$55.79	\$111.58
7	Ea.	Marine Pump	3	\$603.00	\$1,809.00

WHEELCHAIR

1	Bus Set	Ramp Assembly	3	\$7,995.00	\$23,985.00
2	Bus Set	Valve Assembly	2	\$87.00	\$174.00
3	Bus Set	Electrical Harness	2	\$348.40	\$696.80
4	Ea.	Ramp	2	\$7,995.00	\$15,990.00
5	Ea.	Controller	2	\$707.38	\$1,414.76
6	Ea.	Motor	3	\$819.00	\$2,457.00

BRAKES

1	Bus Set	Pressure Switches (Include all for each Bus Set)	10	\$585.00	\$5,850.00
2	Bus Set	Protection Valve	10	\$84.00	\$840.00
3	Bus Set	Brake Air Chamber	10	\$269.70	\$2,697.00
4	Bus Set	Brake Wear Indicator	5	\$390.00	\$1,950.00
5	Ea.	ABS Electronic Control Unit	5	\$388.50	\$1,942.50
6	Ea.	ABS Harness	2	\$367.50	\$735.00
7	Bus Set	ABS Sensor	5	\$295.50	\$1,477.50

MULTIPLEX CONTROLS SYSTEM


1	Ea.	Event Data Recorder	2	\$2,200.00	\$4,400.00
2	Ea.	DVR	2	\$5,535.40	\$11,070.80
3	Bus Set	Complete Bus Wiring Harnesses	2	\$21,071.15	\$42,142.30
4	Bus Set	Communication Module (Gateway Module)	10	\$3,630.00	\$36,300.00
5	Bus Set	Multiplex Module	10	\$6,610.81	\$66,108.10
6	Bus Set	Wheels	5	\$2,860.00	\$14,300.00

Total Unit Price \$501,851.21

TOTAL PARTS BUY \$2,203,445.65

In U.S. Dollars Using Words:

TWO-MILLION TWO HUNDRED THREE THOUSAND FOUR HUNDRED FORTY FIVE DOLLARS & SIXTY-FIVE CENTS


 Authorized Signature

4/2/18
 Date

TONY WAYNE
 Print Name



Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

MAEL-016

Response Required: No

Date: January 31, 2018

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 4
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES**

Reference: MAEL-002, 011; ELMA-007; ELMA-008; ELMA-015;
ELMA-017 Revised; MAEL-015

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at
hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan
Phil Rabottini

CDRL NO.: n/a

MAEL-016

DATE: January 31, 2018

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 4

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 4 to Contract No.: OP28367-000 is made effective on the 19th day of January 2018 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, and Contract Modification No. 3 dated December 27, 2017, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

Modify and revise the technical specifications for Group A 40' CNG Buses with the Conformed Metro Technical Specifications Volume II dated January 19, 2018 (attached).

A summary of the changes to the Technical Specifications is enclosed as Attachment 1.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 4 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature

TONY WAYNE
Type or Print Name

1/29/18
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: 
Elizabeth Hernandez
Principal Contract Administrator

1/31/18
Date



Metro™

Technical Specifications

(GROUP A - 40-FOOT CNG BUSES)

Contract Modification No. 4

(January 19, 2018)

Contract No.: OP28367-000

**FORTY-FOOT (40') LOW FLOOR
CNG BUS PROCUREMENT**

November 10, 2017

VOLUME II OF II

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SECTION 6: TECHNICAL SPECIFICATIONS

GENERAL (TS 1-TS 5)

TS 1. Scope

These technical specifications contain the LACMTA's requirements for wheelchair accessible low floor transit buses, which accommodate the widest spectrum of passengers including children, adults, the elderly, and the physically disabled, conforming to all applicable ADA regulations. These buses shall provide maximum passenger appeal in appearance, comfort, and safety; combined with excellence in operating characteristics, standardization with existing LACMTA fleet, economy of operation, maximum efficiency, optimum seating, and conformity with federal, state and local regulations and emission standards. Buses shall include interior and exterior styling features in common with existing Metro BRT type buses such as streamlined appearance. These buses shall incorporate a high level of subsystem integration coordinated with central diagnostic functions and single point Operator interface. Buses shall have a minimum expected life of 12 years or 500,000 miles, whichever comes first. Refer to Table 17 for design life goals.

Metro will consider and evaluate proposals of Zero Emission (ZE) buses that meet legal, dimensional, maintainability and performance requirements outlined in this document. Vendors proposing electric buses for consideration should also include a list of any specialty equipment used for fueling and/or recharging vehicle, any specialty support and/or diagnostic equipment, and any other unique equipment that will be necessary to support daily operation of the vehicle. Any specialty equipment required to support the ZEB project should be itemized and listed along with estimated installation costs as part of each Contractor's proposal. Any ZE buses proposed in response to this solicitation shall meet CARB's definition for zero emission buses.

These technical specifications have been prepared with emphasis on in-service reliability. The basic structure of the bus including major suspension components shall be designed to last the life of the bus without major overhaul or replacement.

Wherever brand, manufacturer or product names are indicated in the Technical Specification, they are included for the purpose of establishing identification and a general description of the Goods, Equipment, Components or parts. Wherever such names appear, the term "OR APPROVED EQUAL" is deemed to follow. The decision whether a proposed Item is an approved equal will be rendered by LACMTA as defined by Contract SP-34 Non-Restrictive Clauses.

TS 2. Definitions

Ackerman Geometry: A geometric arrangement of linkages in the steering of a vehicle designed to solve the problem of wheels on the inside and outside of a turn needing to trace out circles of different radii. The intention of Ackermann geometry is to avoid the need for tires to slip sideways when following the path around a curve.

Alternative: An alternative specification condition to the default bus configuration. LACMTA may define alternatives to the default configuration to satisfy local operating requirements. Alternatives for the default configuration will be clearly identified.

Ambient Temperature: The temperature of the surrounding air. For testing purposes, ambient temperature must be between 16°C (50°F) and 38°C (100°F).

Analog Signals: A continuously variable signal that is solely dependent upon magnitude to express information content.

Aspect Ratio: The ratio of height to width of a character.

Audible Discrete Frequency: An audible discrete frequency is determined to exist if the sound power level in any 1/3-octave band exceeds the average of the sound power levels of the two adjacent 1/3-octave bands by four decibels (dB) or more.

Auxiliary Power System: Provides single or three phase power for functions other than propulsion.

Battery: One or more electrochemical cells that convert stored chemical energy into electricity.

Battery Compartment: Low-voltage energy storage, i.e. 12/24 VDC batteries.

Battery Management System (BMS): Monitors energy, as well as temperature, cell or module voltages, and total pack voltage. The BMS adjusts the control strategy algorithms to maintain the batteries at uniform state of charge and optimal temperatures.

Braking Resistor: Device that converts electrical energy into heat, typically used as a retarder to supplement or replace the regenerative braking.

Burst Pressure: The highest pressure reached in a container during a burst test.

Capacity (fuel container): The water volume of a container in gallons (liters).

Cells: Individual components (i.e., battery or capacitor cells).

Code: A legal requirement.

Combination Gas Relief Device: A relief device that is activated by a combination of high pressures or high temperatures, acting either independently or together.

Composite Container for Compressed Gas: A container fabricated of two or more materials that interact to facilitate the container design criteria.

Compressed Natural Gas (CNG): Mixtures of hydrocarbon gases and vapors consisting principally of methane in gaseous form that has been compressed for use as a vehicular fuel.

Container: A pressure vessel, cylinder or cylinders permanently manifold together, used to store compressed gas.

Container Appurtenances: Devices connected to container openings for safety, control or operating purposes.

Container Valve: A valve connected directly to a container outlet.

Curb Weight: Weight of vehicle, including maximum fuel, oil and coolant; and all equipment required for operation and required by this Specification, but without passengers or driver.

dBA: Decibels with reference to 0.0002 microbar as measured on the "A" scale.

DC to DC Converter: A module that converts a source of direct current from one voltage level to another.

Default Configuration Bus: The bus described if no alternatives are selected. Signing, colors, the destination sign reading list and other information must be provided by the LACMTA.

Defueling: The process of removing fuel from a tank or container.

Defueling Port: Device that allows for vehicle defueling, or the point at which this occurs

Design Operating Profile: The anticipated design requirements are based on LACMTA's operating environment for LACMTA's service area and as designed in TS 5.7. Specific characteristics include; "CBD type" urban heavy-duty duty-cycle, high passenger loading, five to 100 percent relative humidity, temperature range of -10°F to 120°F, and elevation range of 200 feet below sea level to 3,000 feet above sea level.

Destroyed: Physically made permanently unusable.

Discrete Signal: A signal that can take only pre-defined values, usually of a binary 0 or 1 nature, where 0 is battery ground potential and 1 is a defined battery positive potential.

Driver's Eye Range: The 95th-percentile ellipse defined in SAE Recommended Practice J941, except that the height of the ellipse shall be determined from the seat at its reference height.

Duty Cycle: A service cycle that utilizes only the CBD portion of the FTA ADB heavy-duty transit Vehicle cycle. The CBD portion shall be further modified to add 20 minutes of idle time.

Electric: A vehicle that uses one distinct power sources to propel the vehicle.

Electric System Controller (ESC): Regulates energy flow throughout electric system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (voltages, currents, temperatures, etc.) within specified operating ranges.

Electric Drive System (EDS): The mechanical and/or electromechanical components, including traction motors and energy storage system, which comprise the traction drive portion of the electric propulsion system.

Electronic Parts Catalog (EPC): Digital versions of the illustrated parts catalog that can upload into Metro's Enterprise Asset Management (EAM) or Enterprise Resource Planning (ERP) systems.

Energy Density: The relationship between the weight of an energy storage device and its power output in units of watt-hours per kilogram (Wh/kg).

Energy Storage System (ESS): A component or system of components that stores energy and for which its supply of energy is rechargeable by the on-vehicle system (engine/regenerative braking/ generator) or an off-vehicle energy source.

Engine Package: Complete engine assembly incorporating accessories necessary for operation as applicable. Package shall include at a minimum; turbocharger(s), supercharger(s), electronic control modules, manifolds, throttle body, starter, air compressor, hydraulic pump and engine mounted filters.

Extended Warranty: Warranties that extend past the minimum warranty periods defined in the warranty requirements.

Failures Classifications are listed below.

- **Class 1 Failure (Physical Safety):** A failure that could lead directly to passenger, bus operator or other injury and/or results in a crash.
- **Class 2 Failure (Road Call):** A failure resulting in an interruption of service. Passengers are removed from the bus at the point of failure; the bus is unable to continue in revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.
- **Class 3 Failure (Bus Change):** A failure that requires removal of the bus from service during its assignments. The bus is operable to a rendezvous point but cannot be used in passenger service until repairs are made.
- **Class 4 Failure (Bad Order):** A failure not related to safety that degrades the operation of the bus but does not require the bus's removal from service.

Fill Pressure for Compressed Gas: The pressure attained at the actual time of filling. Fill pressure varies according to the gas temperatures in the container, which are dependent on the charging parameters and the ambient conditions. The maximum dispensed pressure shall not exceed 125 percent of service pressure.

Fireproof: Materials that will not burn or melt at temperatures less than 2000 °F.

Fire Resistant: Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162.

Firewall: A fire resistant barrier designed to slow the spread of fire for a prescribed period of time.

Flow Capacity: For natural gas flow, this is the capacity in volume per unit time (normal cubic meters/minute or standard cubic feet per minute) discharged at the required flow rating pressure.

Free Floor Space: Floor area available to standees, excluding the area under seats, area occupied by feet of seated passengers, the vestibule area forward of the standee line, and any floor space indicated by manufacturer as non-standee areas such as, the floor space “swept” by passenger doors during operation. Floor area of 1.5 sq. ft. shall be allocated for the feet of each seated passenger that protrudes into the standee area.

Fuel Cell: A device that converts the chemical energy from a fuel into electricity through a chemical reaction with oxygen and another oxidizing agent.

Fuel Line: The pipe, tubing or hose on a vehicle, including all related fittings, through which natural gas passes.

Fuel Management System: Fuel system components that control or contribute to engine air fuel mixing and metering, and the ignition and combustion of a given air-fuel mixture. The fuel management system would include, but is not limited to, reducer/regulator valves, fuel metering equipment (e.g. carburetor, injectors), sensors (e.g., main throttle, waste gate).

Fusible Material: A metal, alloy or other material capable of being melted by heat.

Gross Axle Weight Rating (GAWR): The maximum total weight as determined by the axle manufacturer, at which the axle can be safely and reliably operated for its intended purpose.

Gross Load: 150 pounds for every designed passenger seating position, for the driver, and for each 1.5 sq.-ft. of free floor space.

Gross Vehicle Weight (GVW): Curb weight plus gross load.

Gross Vehicle Weight Rating (GVWR): The maximum total weight as determined by the vehicle manufacturer, at which the vehicle can be safely and reliably operated for its intended purpose.

Hazardous Voltage: Greater than 50 volts (AC and DC).

Head Injury Criteria (HIC): The following equation presents the definition of head injury criteria:

$$\left[\frac{1}{t_1 - t_2} \int_{t_1}^{t_2} (a) dt \right]^{2.5} (t_2 - t_1)$$

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Where a = the resultant acceleration at the center of gravity of the head form expressed as a multiple of g , the acceleration of gravity. t_1 and t_2 = any two points in time during the impact.

High Pressure: Those portions of the CNG fuel system exposed to full container or cylinder pressure.

High Voltage (HV): Greater than 600 volts (AC and DC).

High Voltage Charger: Regulated DC supply used to charge the propulsion battery pack.

Hose: Flexible line.

Illustrated Parts Catalog (IPC): A series of assemblies and sub-assemblies that combine into a parts manual with sections. Metro recognizes that a complete illustrated part catalog includes component breakdown in a disassembly sequence and their illustrations.

Intermediate Pressure: The portion of a CNG system after the first pressure regulator, but before the engine pressure regulator. Intermediate pressure on a CNG vehicle is generally from 3.5 to 0.5 MPa (510 to 70 psi).

Inverter: A module that converts DC to and from AC.

Jerk: The rate of change of acceleration shall be minimized throughout the acceleration/deceleration range and shall not be greater than 15.5 mph/sec/sec (0.3g/sec).

Labeled: Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization, which is acceptable to the authority having jurisdiction and concerned with product evaluation, which maintains periodic inspection of production labeled equipment or materials, and by labeling, the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Leakage: Release of contents through a Defect or a crack. See *Rupture*.

Line: All tubes, flexible and hard, that carry fluids.

Liner: Inner gas-tight container or gas container to which the overwrap is applied.

Local Regulations: Regulations below the state level.

Low-Floor Bus: A bus that, between at least the front (entrance) and rear (exit) doors, has a floor sufficiently low and level so as to remove the need for steps in the aisle between the doors and in the vicinity of these doors.

Low Voltage (LV): 50 volts or less (AC and DC).

Low Voltage Generation: Provides 12 or 24 volt DC to properly charge and maintain the charge on low voltage batteries as well as provide power for a variety of bus systems including; lighting, multiplex and other control modules.

Lower Explosive Limit: The lowest concentration of gas where, given an ignition source, combustion is possible.

Maintenance Personnel Skill Levels: Defined below are the LACMTA's maintenance personnel skill levels:

- **3M:** LACMTA Mechanic

- **2M:** Bus Service Attendant

Master Run Switch: Rotary four-position switch controlling the following functions:

- **Off:** All systems off
- **Day Run:** All electrical systems and engine on except; headlights, parking lights, and marker lights
- **Night Run:** All electrical systems and engine on including; headlights, parking lights, marker lights, and interior light system
- **Night Park:** Same as “Off” except that marker lights, destination signs, parking lights, curbside interior lights, and instrument panel lights are on

Maximum Service Temperature: The maximum temperature to which a container/cylinder will be subjected in normal service.

Metallic Hose: A hose whose strength depends primarily on the strength of its metallic parts; it can have metallic liners or covers, or both.

Metering Valve: A valve intended to control the rate of flow of natural gas.

Module: An assembly of individual components.

Motor (Electric): A device that converts electrical energy into mechanical energy.

Motor (Traction): An electric motor used to power the driving wheels of the bus.

Operating Pressure: The varying pressure developed in a container during service.

Physical Layer: The first layer of the seven-layer International Standards Organization (ISO) Open Systems Interconnect (OSI) reference model. This provides the mechanical, electrical, functional and procedural characteristics required to gain access to the transmission medium (e.g., cable) and is responsible for transporting binary information between computerized systems.

Pipe: Nonflexible line.

Power: Work or energy divided by time.

Power Density: Power divided by mass, volume or area.

Pressure Relief Device (PRD): A pressure and/or temperature activated device used to vent the container/cylinder contents and thereby prevent rupture of an NGV fuel container/cylinder, when subjected to a standard fire test as required by fuel container/cylinder standards.

Propulsion Power Assembly (PPA): System that provides propulsion for the vehicle proportional to operator commands. Includes; engine, transmission, cooling and other applicable systems (See SP-01).

Primary Power Unit (PPU): System that provides propulsion power for the vehicle proportional to operator commands. Includes; controllers, energy conversion, electric drive, cooling and other applicable systems (See SP-01).

Radiator Package: Complete system with accessories necessary for operation. Package shall include at a minimum; heat exchanger(s), cooling fan(s), electronic controller(s) with diagnostic communications and alternator if applicable.

Real-Time Clock (RTC): Computer clock that keeps track of the current time.

Regenerative Braking: Deceleration of the bus by switching motors to act as generators, which return vehicle kinetic energy to the energy storage system.

Rejectable Damage: In terms of NGV fuel containers/cylinders, this is damage as outlined in CGA C-6.4, "Methods for External Visual Inspection of Natural Gas Vehicle Fuel Containers and Their Installations," and in agreement with the manufacturer's recommendations.

Response Time: Response times shall be measured from the activation or deactivation of the accelerator or brake pedal to the initial response of an on-board accelerometer measuring longitudinal Bus acceleration. Response times for power to brake, brake to power, coast to power and coast to brake shall be no greater than 0.20 seconds.

Retarder: Device used to augment or replace some of the functions of primary friction based braking systems of the bus.

Rupture: Sudden and unstable damage propagation in the structural components of the container resulting in a loss of contents. See *Leakage*.

Seated Load: 150 pounds for every designed passenger seating position and for the driver.

SLW (Seated Load Weight): Curb weight plus seated load.

Serial Data Signals: A current loop based representation of ASCII or alphanumeric data used for transferring information between devices by transmitting a sequence of individual bits in a prearranged order of significance.

Service Life: The Bus shall be designed to operate in transit service at least 40,000 miles per year for 12 years or 500,000 miles.

Service Pressure: The settled pressure at a uniform gas temperature of 21°C (70°F) and full gas content. It is the pressure for which the equipment has been constructed, under normal conditions. Also referred to as the nominal service pressure or working pressure.

Settled Pressure: The gas pressure when a given settled temperature, usually 21°C (70°F), is reached.

Settled Temperature: The uniform gas temperature after any change in temperature caused by filling has dissipated.

Simplified Technical English (STE): A set of writings rules that guide non-English speaking technician writers. Four steps are used to establish a simplified technical dictionary:

- Keyword
- Approved meaning
- Approved example
- What is not approved (sample sentences)

Solid State Alternator: A module that converts high-voltage DC to low-voltage DC (typically 12/24 volt systems).

Sources of Ignition: Devices or equipment that because of their modes of use or operation, are capable of providing sufficient thermal energy to ignite flammable compressed natural gas-air mixtures when introduced into such a mixture, or when such a mixture comes into contact with them.

Special Tools: Tools not normally stocked by the LACMTA.

Specification: A particular or detailed statement, account or listing of the various elements, materials, dimensions, etc. involved in the manufacturing and construction of a product.

Standard: A firm guideline from a consensus group.

Standards: Standards referenced in “Technical Specifications” are the latest revisions unless otherwise stated.

Standee Line: A line marked across the bus aisle to designate the areas that passengers may not occupy when the bus is moving.

State of Charge (SOC): Quantity of electric energy remaining in the battery relative to the maximum rated amp-hour (Ah) capacity of the battery expressed in a percentage. This is a dynamic measurement used for the energy storage system. A full SOC indicates that the energy storage system cannot accept further charging from charging device or the regenerative braking system.

Stress Loops: The “pigtails” commonly used to absorb flexing in piping.

Structure: The basic body, including floor deck material and installation, load-bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.

Tamper Resistant: Fasteners or components that cannot be easily removed or modified using pocket knives, coins, or other similar items commonly carried by passengers.

Thermally Activated Gas Relief Device: A relief device that is activated by high temperatures and generally contains a fusible material.

Vestibule: Area in front of the standee line, including Operator’s area.

Wheelchair: A mobility aid belonging to any class of three- or four-wheeled devices, usable indoors, designed for and used by individuals with mobility impairments, whether operated manually or powered. A “common wheelchair” is such a device that does not exceed 30 inches in width and 48 inches in length measured two inches above the ground, and does not weigh more than 600 pounds. when occupied.

Wheelchair Ramp: A device for allowing ingress and egress of persons or wheelchairs between ground or curb level and the floor level of the bus. The terms “wheelchair ramp” and “ramp” are used interchangeably in this specification.

Zero Emission Bus, (ZEB): A bus meeting California Air Resources Board zero emission standard.

TS 2.1 Abbreviations

Abbreviation and Acronyms

A/C	air conditioning
ABS	anti-lock braking system
AC	alternating current
ACQ	alkaline copper quaternary
ADA	Americans with Disabilities Act
AFSS	automatic fire suppression system
Ah	amp hour
ALR	auto-locking retractor
ANSI	American National Standards Institute
APA	The Engineered Wood Association, formerly the American Plywood Association
APC	Automatic Passenger Counter
APTA	American Public Transportation Association

ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASTM	ASTM International, formerly the American Society for Testing and Materials
ATC	Automatic Traction Control
ATMS	Advanced Transportation Management System
AVA	Automated Voice Annunciation
AVL	Automatic Vehicle Location
AWG	American Wire Gauge
AWS	American Welding Society
BAFO	Best and Final Offer
BMCS	Bureau of Motor Carrier Safety
BMS	Battery Management System
BRT	Bus Rapid Transit
CALOSHA	California Occupational Safety and Health Administration
CAL TITLE 13	California Code of Regulations, Title 13, Motor Vehicle Code
CAN	Controller Area Network
CARB	California Air Resources Board
CBD	Central Business District
CCS	climate control system
CCTV	closed-circuit television
cfm	cubic feet per minute
CGA	Compressed Gas Association
CNG	compressed natural gas
CSA	Canadian Standards Association
dB	decibel
DBE	disadvantaged business enterprise
DC	direct current
DDU	driver display unit
DEF	diesel exhaust fluid
DOT	Department of Transportation
DPF	diesel particulate filter
ECM	engine control and monitoring
ECS	emission control system
ELR	emergency locking retractor
EMI	electromagnetic interference
EPA	Environmental Protection Agency
ESS	energy storage system
FEA	finite element analysis
FEMA	failure mode effects analysis
FM	Factory Mutual
FMCSA	Federal Motor Carrier Safety Administration
FMCSR	Federal Motor Carrier Safety Regulations
FMVSS	Federal Motor Vehicle Safety Standards
Ft.	foot or feet
FTA	Federal Transit Administration
GAWR	gross axle weight rating
GPS	global positioning system
GVW	gross vehicle weight
GVWR	gross vehicle weight rating
H-point	hip-point
EDS	electric drive system
HMI	human-machine interface
ESC	electric system controller
HV	high voltage
HVAC	heating, ventilation and air conditioning

IBSS	Incident Based Surveillance System
I/O	input/output
IEEE	Institute of Electrical and Electronics Engineers
In.	inch or inches
ISO	International Standards Organization
LAN	local area network
lb.	pound
lbs.	pounds
LCD	liquid crystal display
LED	light emitting diode
LEL	lower explosive limit
LV	low voltage
mA	milliampere
MDT	mobile data terminal
MPa	mega-Pascal
MTTF	mean time to fix
NC	normally closed
NFPA	National Fire Protection Association
NGV	natural gas vehicle
NOx	nitrogen oxide
NO	normally open
NTP	notice to proceed
OCU	operator control unit
OEM	original equipment manufacturer
OSI	Open Systems Interconnect
PA	public address system
PMO	project management oversight
PPA	propulsion power assembly
PPU	primary propulsion unit or prime power unit
PPV	price per vehicle
PRD	pressure relief device
psia	pounds per square inch absolute
psi	pounds per square inch
RF	radio frequency
RFI	radio frequency interference
rms	root mean square
RTC	real-time clock
SAE	SAE International, formerly the Society of Automotive Engineers
SAS	silent alarm system
scf	standard cubic feet
scfm	standard cubic feet a minute
SLW	seated load weight
SOC	state of charge
SPI	Society of the Plastics Industry
UFS	Universal Fare System
UL	Underwriters Laboratories
UNECE	United Nations Economic Commission for Europe
USDHEW	United State Department of Health, Education, and Welfare
V	volt or volts
VAC	volt or volts AC
VDC	volts of direct current
Wh	watt-hours
VIN	vehicle information number
ZEB	zero emission bus

TS 3. Referenced Publications

The documents or portions thereof referenced within this specification shall be considered part of the requirements of the specification. The edition indicated for each referenced document is the current edition, as of the date of the LACMTA issuance of this specification.

TS 4. Legal Requirements

The Contractor shall comply with all applicable federal, state and local regulations. These shall include but not be limited to ADA, as well as state and local accessibility, emissions, safety and security requirements. Local regulations are defined as those below the state level.

Buses shall meet all applicable FMVSS and shall accommodate all applicable FMCSR regulations in effect at location of the LACMTA and the date of manufacture.

In the event of any conflict between the requirements of these specifications and any applicable legal requirement, the legal requirement shall prevail. Technical requirements that exceed the legal requirements are not considered to conflict.

TS 5. Overall Requirements

The Contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors' requirements and recommendations. Contractor and LACMTA shall identify subcomponent vendors that shall submit installation/application approval documents, (including necessary documents and/or diagrams to verify configuration), with the completion of the Pilot and First Article Bus. Components used in the vehicle shall be of heavy-duty design and proven in transit service.

The Contractor shall submit to LACMTA the life expectancy of specified components in LACMTA's revenue service and duty cycle per the attached list I Life Cycle Cost Submittal Form. The projected life expectancy shall be based upon actual in-service experience wherever practical. If in-service data is not available, the projected life expectancy shall be based upon durability testing utilizing the best applicable industry practices as may be promulgated by such organizations as SAE, ANSI, ASTM or other acknowledged industry organizations.

Without exception, all technical information, drawings, nameplates, etc. shall be written in the English language. For all means of communications, i.e., letters, cables, telephone conversations, meetings, etc., the English language shall be used. The English System of units shall be used in connection with this Contract.

TS 5.1 Weight

It shall be a design goal to construct each bus as light in weight as possible without degradation of safety, appearance, comfort, traction or performance.

Buses at a capacity load shall not exceed the tire factor limits, brake test criteria or structural design criteria.

The Contractor shall submit a certified weight slip for the curb weight of each axle as well as the total curb weight of each bus upon delivery.

TS 5.2 Capacity

The vehicle shall be designed to carry the gross vehicle weight, which shall not exceed the bus GVWR.

TS 5.3 Service Life

The minimum useful design life of the bus in transit service shall be at least 12 years or 500,000 miles. It shall be capable of operating at least 40,000 miles per year, including the 12th year.

TS 5.4 Maintenance and Inspection

Scheduled maintenance tasks shall be related and shall be grouped in maximum mileage intervals. Scheduled maintenance actions such as filter or belt replacements and other adjustments shall not be required at intervals of less than 6,000 miles except for routine daily service performed during fueling operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of not less than 6,000 miles.

Test ports, as required, shall be provided for commonly checked functions on the bus, such as air intake, exhaust, hydraulic, pneumatic, brakes, charge-air and engine cooling systems.

The bus manufacturer shall give prime consideration to the routine problems of maintaining the vehicle. All bus components and systems, both mechanical and electrical, which will require periodic physical work or inspection processes, shall be installed so that a minimum of time is consumed in gaining access to the critical repair areas. To the extent practical, disconnection or removal of components unrelated to a specific maintenance and/or repair task shall be unnecessary. It shall not be necessary to disassemble portions of the Bus structure and/or equipment such as seats and flooring under seats in order to gain access to these areas. Relative accessibility of components, measure in time to gain access, shall be prioritized for items requiring more frequent service.

Bus shall be designed to facilitate the disassembly, reassembly, servicing or maintenance, using tools and equipment that are normally available as standard commercial items. Bus design shall include features that maximize the intervals between scheduled service requirements for major bus systems while minimizing service time needed to perform the preventative maintenance work. Design goal shall be to minimize diagnostic time required for major bus systems repair.

Requirements for the use of unique specialized tools will be minimized. The body and structure of the Bus shall be designed for ease of maintenance and repair. Individual panels or other equipment that may be damaged in normal service shall be repairable or replaceable. Ease of repair shall be related to the vulnerability of the item to damage in service.

Contractor shall provide a list of all special tools and pricing required for maintaining this equipment. Said list shall be submitted as a supplement to Form PF-3-Schedule B of Prices Special Tools.

NOTE: Tools such as compartment door keys, bellows gauges and other tools that are required for daily maintenance and inspections shall not be included in the special tool list and shall be furnished for each bus.

TS 5.5 Interchangeability

Unless otherwise agreed, all units and components procured under this Contract, whether provided by Suppliers or manufactured by the Contractor, shall be duplicates in design, manufacture and installation to ensure interchangeability among buses in each order group in this procurement. This interchangeability shall extend to the individual components as well as to their locations in the buses. These components shall include, but are not limited to, passenger window hardware, interior trim, lamps, lamp lenses and seat assemblies. Components with non-identical functions shall not be, or appear to be, interchangeable.

Any one component or unit used in the construction of these buses shall be an exact duplicate in design, manufacture and assembly for each bus in each order group in this Contract. Contractor shall identify and secure approval for any changes in components or unit construction provided within a Contract.

In the event that the Contractor is unable to comply with the interchangeability requirement, the Contractor must notify the LACMTA and obtain the LACMTA's prior written approval, including any changes in pricing.

LACMTA shall review proposed product changes on a case-by-case basis and shall have the right to require extended warranties to ensure that product changes perform at least as well as the originally supplied products.

TS 5.6 Training

The Contractor shall have one or more qualified instructors who shall be available at the LACMTA between the hours of 7:00 a.m. and 5:00 p.m. during the period immediately after acceptance of the Pilot Bus. Contractor provided Instructor(s) shall conduct regular and “train the trainer” type classes, for various size groups, to advise LACMTA trainers and mechanics on the proper operation and maintenance of equipment. Training shall be provided throughout the Contract period up to the conclusion of the initial Warranty period for the Option Buses, one (1) year following receipt of the final bus.

Base Order Buses

The Contractor shall provide pricing for up to 1,000 Instructor class-room hours with the bus order. The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor at the time of Pilot Bus review. Training shall be provided throughout the Contract period up to the conclusion of the initial Warranty period following receipt of the final Bus.

Option Order Buses

For each Option order, Contractor shall also be required to provide Instructor training. The quantity of training hours shall be determined by the quantity of Option Buses ordered and shall be equal to five hours of training per Option Bus up to a maximum of 500 instructor class-room hours for each Option order. The LACMTA may elect to reduce the amount of training required for the Option orders. The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor.

TS 5.6.1 Training Curriculum

The Contractor shall develop and submit a training curriculum using the most current version Microsoft Office Word and/or Power Point, subject to LACMTA approval. The curriculum will be discussed during Pre-Production meetings and submitted to the LACMTA no later than 30 days prior to delivery of the Pilot Bus. The curriculum shall be designed specifically for the LACMTA Bus order and shall cover all major systems ordered on the buses including, but not limited to:

- Engine/Propulsion System
- Transmission/Electric Drive
- HVAC System
- Electrical Systems
- Electronic Controls and Sub-systems
- Special Equipment (Fire and Gas Detection, Operator’s seats etc.)
- ABS Brake System
- Steering and Suspension
- Pneumatic System
- Passenger Door/Wheelchair ramp system
- Fuel/Battery system and delivery
- Maintenance Bus Orientation
- Operator Bus Orientation
- Security Camera System
- Bus Defueling Procedures
- Engine/Propulsion Cooling System
- Electronic Cooling System
- PPU
- Energy Storage System (including BMS)
- Automatic Passenger Counter

TS 5.6.2 Teaching Materials

The Contractor shall provide to the LACMTA Maintenance Instruction Department visual and other teaching materials as needed during classroom instruction. Teaching materials shall be subject to LACMTA approval. Typical teaching materials include items such as; printed technical literature, training modules, service training and operating manuals, slides, DVD presentations, overhead presentations, etc.

TS 5.6.3 Optional Training Aids

The items in this section are discretionary and may be purchased through this contract, subject to LACMTA approval.

Special Training Aids

The Contractor shall supply pricing for items a through k, special training aids, as listed below for use by LACMTA training staff. Pricing for these aids is to be provided to the LACMTA on Form PF-5-Schedule D of Prices Training Aids. The Special Training aids are to be provided not later than the delivery date for the first production Bus.

System Simulation Training Boards must be designed to imitate a described bus system and shall be mounted vertically on a sturdy roll around frame. Simulation Boards can be approximately three- foot by six foot and in no case larger than four feet by eight feet. Boards shall not be taller than 7 feet to enable the training boards to pass through doors. Simulation boards shall be provided with a 120 VAC power cord. The use of actual Bus components for simulation is desired; however, extremely bulky or heavy items such as large fan motors, A/C compressor, starter, alternators, engine controls, transmission controls, doors, and other similar devices may be smaller or modeled.

- a) **One complete running engine and transmission assembly** - Including cooling and fueling systems, mounted on a suitable roll around stand.
- b) **One complete static transmission assembly** - For visual purposes, mounted on a roll around stand with considerable cut-away sections that improve visibility and insight into the operation of the transmission.
- c) **One complete static front axle assembly** - For visual purposes, mounted on a roll around stand with considerable cut-away sections that improve visibility and insight into the operation of the front axle assembly.
- d) **One complete static rear axle assembly** - For visual purposes, mounted on a roll around stand with considerable cut-away sections that improve visibility and insight into the operation of the rear axle assembly.
- e) **ATECH Electrical Training Board Kits** - General electrical training. Kit to include GM Specialized Electronic Trainer, Guide Book, four resistors, dual filament light, blank board and horn.

System Simulation Training Boards:

- f) **Anti-Lock Brake / Air Brake Board** - Fully functional ABS training board. Bendix design bus disc brake air system training board with all air valve and electrical instrumentation.
- g) **Electric Air Conditioning Training Simulator Module** - A/C system training board to highlight new system products. Board must be fully functional and shall be made to give mechanics a general perspective of A/C and heating components. Module should be similar to what is used during APTA bus Roadeo competitions.
- h) **Fire Suppression** - One complete bus set of equipment on display board of fire and gas detection system
- i) **Video Security System** – One complete bus set of equipment for training simulator including all cameras, DVR and the monitor system.
- j) **Destination Sign** – One complete bus set of equipment for training simulator including all signs, cables and controller.

- k) **Multiplex Electrical Training Board** - A mock-up board, where key components including all functioning switches, modules, lights, diagnostic ports, and diagnostic switches are replicated on a functional model, shall be provided as a tool for diagnostic, design verification and training purposes.

E-Learning/Interactive Training Media

The Contractor shall provide pricing for 25 hours of CNG/Electric Bus interactive learning seat time to LACMTA on Form PF-5 Schedule D of Prices, Training Aids. The media shall provide a high level of student interactivity, including but not limited to: questions review, component identification, tool use, circuit building, component testing. The 25 hours shall be broken down as follows:

TABLE 1
E-Learning Media Hours

CNG Bus			Electric Bus		
Module #	System	Hrs.	Module #	System	Hrs.
Module 1	Engine and Transmission	6	Module 1	Safety Procedures	1
Module 2	Electrical System	3	Module 2	Powertrain	4
Module 3	Vehicle Multiplex System	3	Module 3	Electrical System	4
Module 4	HVAC System	2	Module 4	Vehicle Multiplex System	3
Module 5	Brake, Axles, and Air System	4	Module 5	HVAC System	2
Module 6	CNG Fuel System	2	Module 6	Brake, Axles, and Air System	4
Module 7	Entrance/Exit Doors	2	Module 7	PM Procedures	2
Module 8	Cooling System	1	Module 8	Entrance/Exit Doors	2
Module 9	Wheelchair Ramp	1	Module 9	Cooling System	1
Module 10	Towing and Recovery	1	Module 10	Wheelchair Ramp	1
			Module 11	Towing and Recovery	1

Each module shall include: introduction, component operation, component testing, system diagnosis, and diagnostic software/tool use. The content in each module shall be presented with the following breakdown: video content (5-10 percent), slide content with V/O (40-45 percent), student interactivity (45 percent), skills assessment (5 percent). All modules shall have LA Metro branding and a full electronic text student handout. All handouts shall be in MS Word and editable.

The content shall be delivered via DVD, ready for installation and operational on any platform including Microsoft, MAC and Android. All content shall be developed using HTML5 programming and optimized for web browsing. All content shall be navigated through an industry standard e-learning programs graphical user interface (GUI) subject to LACMTA approval.

TS 5.6.4 Manuals

Manual Review and Approval

The Contractor shall be solely responsible for the accuracy and completeness of the manuals and the conversion of the Parts manual into Electronic Parts Catalog (EPC). The LACMTA will assemble a technical review committee to define acceptance criteria of the manuals deliverables, quality standards, file formats, expected results and the testing methods to be used. The Contractor shall put together a team with the technical capabilities to successfully complete these deliverables to LACMTA's satisfaction.

The Contractor will be required to participate in Manual Review and Approval process and attend one service manual review meeting held at the LACMTA shortly following LACMTA Notice to Proceed. Except for the Parts Index, the draft manuals shall be shipped simultaneously with the first Pilot Bus. The final meeting will be scheduled after receipt of draft manuals but prior to the ship date of the first Production Bus.

Draft Manuals

Except for the Parts Index, the Contractor shall provide the LACMTA with draft manuals simultaneously with the Pilot Bus: Draft manuals shall include:

- Ten draft hardcopies each of the Service, Parts and Operator's manuals plus a list of all proposed OEM Component Repair manuals, simultaneously to the shipping of the first Pilot Bus.
- Draft Parts manuals are further defined to include a minimum of 95 percent of all part numbers with an error rate of less than 5 percent. It will be the responsibility of the Contractor to ensure the accuracy of all part numbers.
- Hard copy manuals shall be provided in suitable 3-post binders clearly identified with the Bus manufacturer and model number, LACMTA Bus series number, revision date, and table of contents.
- A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production Bus.

Final Manuals

Final DVD editions of Service, Parts and Operator's manuals must be delivered within 90 days after the start date for production Buses. Following the 90 day period after start of production the LACMTA may withhold \$10,000 per Bus delivered until all maintenance and parts manuals are received.

- Ten final hardcopy sets of Service and Parts manuals shall be provided for each 100 Buses and 12 total sets for Subsystem OEM manuals.
- For any Option Buses, four hardcopy sets of Service manuals shall be provided for each 100 Option Buses.
- Twenty final edition Service and Parts manuals excluding subsystem OEM component manuals shall be provided on DVD
- The Contractor shall supply two final hardcopy Operator's manuals per every 10 buses and five total final electronic copies on DVD.
- Contractor shall supply a listing of diagnostic codes with final service manuals delivered that covers trouble shooting fault trees/codes related to the PPU.

If separate subsystem OEM component supplier manuals are provided for preventative maintenance, diagnostics, parts and repair, then the number of manuals provided shall correspond with the quantities described above.

Manuals on DVD

Final edition Service and Parts manuals shall include an index and search function to locate items by subject, part name, or system. Updates shall be delivered to the Maintenance Instruction Department as they occur. Updates must be identified with effected system and with update revision dates.

The DVD versions shall be provided with licenses which permit the MTA to load the manuals on an unlimited number of MTA computers and/or server units. Neither generic nor poor quality reproductions shall be acceptable. Manuals must be in English. The DVD version may consist of multiple DVDs.

The Contractor must be able to work with the 3rd party EPC provider (Digabit, Inc., 850 Englewood Pkwy. #200, Englewood, CO 80110 (Phone # 303 957-2822)) directly to convert their Parts manual into an EPC format suitable for use with LACMTA's current ERP/EAM systems. EPC integration shall include the ability of the contractor to provide information in the current format for initial EPC publishing needs and continue working with the EPC publishing provider using current data formatting standards over the life cycle of the bus.

Manual - Updates

Updates to the manuals covering revisions, corrections or additions shall be grouped and released to the LACMTA as discovered or disclosed by LACMTA at a minimum of once per year but not to exceed three times per year for 12 years. Updates shall be provided in electronic and hardcopy format and shall be delivered to the LACMTA Maintenance Instruction Department. Updates must be identified with defected system and with update revision dates.

Service Manuals

Service manuals shall be divided into separate sections as listed below:

- a) Preventative Maintenance Procedures (PMP) by component or system - Specifically for use at LACMTA Operating Divisions. Procedures must identify what inspection criteria procedures are needed for each component or system at intervals by time or mileage. Daily inspection is not acceptable criteria for preventative maintenance.
- b) Diagnostic Procedures - Include troubleshooting guides for all air, fluid, mechanical and electrical systems. Include schematics for fuel, air, hydraulic, coolant, HVAC, multiplex, braking and electrical with wiring harness drawings.
- c) Component Repair/Service - The manuals must be organized to show every subsystem in the bus including all re-buildable components used. For example, the steering box, air compressor, power steering pump, differential, transmission/electric drive/electric drive and PPU must be included. Component Reference Diagrams must be specific and referenced by exact exploded view diagrams.

PMP Section

PMP manuals shall be specific for the LACMTA's bus order and shall include the manufactures inspection and maintenance requirements for buses covered by this procurement and shall not contain any unrelated or unnecessary requirements. All routine maintenance schedule requirements, including maintenance of major subsystems, shall be provided in one master PMP matrix. The master PMP matrix shall include; specific service task, service mileage, and PMP service manual section reference. The PMP manual shall also include remove-and replace instructions for all sub-system components including: PPA, engine, transmission, starter, alternator, A/C compressor, air compressor, etc.

Diagnostic Section

Diagnostic manuals which may be integrated with the maintenance manual shall include isometric, phantom, and schematic illustrations as necessary to completely describe each system including but not limited to location and routing of air, hydraulic, water, lines and electrical harnesses including all anchor and attachment points. Diagnostic manuals shall also include trouble shooting guides necessary to complete running repairs for all supplied Bus equipment.

All wiring schematics and wiring harness drawings required in Service Manuals shall be provided in a separate publication in 11 X 17 inch uniform format. OEM schematics and those provided by all subsystem manufacturers shall be uniform diagrams with an emphasis on readability by mechanics performing diagnostic functions. Drawings shall provide functional grouping, continuity and interfacing at all connection points to eliminate unnecessary interfacing between multiple drawings and subsystem supplier drawings. Electrical schematic drawings shall include diagrams to clearly and accurately show locations of all electrical connectors splice and ground points for the Bus wiring harnesses.

Component Repair/Service Section

Fourteen sets of Repair Manuals necessary to rebuild all Contractor supplied Units including: PPU, transmission/electric drive, HVAC system, starter, alternator, air compressor, etc., shall be provided. Each copy shall be the latest hardcopy edition issued by the OEM component manufacturer. Repair manuals shall be comprehensive and shall cover all aspects of repair from tear-down through final test as recommended by the Bus OEM. Repair manuals shall be grouped in sets and with a table of contents. Each set shall be organized and mounted onto a suitable table top holding rack subject to LACMTA approval. The LACMTA requires fourteen sets of wall posters with the repair manuals showing subsystem, component and part assembly, parts numbers, torque values, installation notes, etc. A list of subsystem component repair manuals shall be submitted for LACMTA review at time of Pilot Bus delivery.

Parts Manuals

Must be specific and referenced by exact exploded-view diagrams and organized to coordinate with Service Manuals for ease of use. Parts manuals shall be specific to the LACMTA bus order including subsystem OEM PPU and transmission/electric drive parts listings. IPC and EPC manuals provided shall include illustrations with necessary exploded diagrams and data arranged so that part numbers can be readily found and identified in the illustration for each system and subsystem component, assembly, subassembly or piece part, from an

orderly breakdown of the complete bus. An assembly or subassembly is an identifiable portion of a component of a system or subsystem.

Parts manuals shall contain a reference part number index, listed in numerical order with descriptions, and page numbers. The comprehensive number index shall include major subsystem parts numbers which includes the PPU, transmission/electric drive/, and air conditioning. A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production bus.

The parts list index shall also be provided to the LACMTA in a PC spreadsheet file on a DVD compatible with Microsoft Excel and include subsystem supplier part numbers, part description, and price. OEM component supplier part numbers are required.

Price List

Ten copies of the current price list shall be provided separately as a supplement to the final parts manuals. Price lists shall be updated at least annually and provided for the life of the bus as they are updated.

Operator's Manuals

The Operator manuals shall be specific to the LACMTA bus configuration and designed for a LACMTA Bus Operator target audience, without extraneous material or information. Manuals shall clearly outline the features and controls, indicators necessary for safe and proper operation of the buses including ADA equipment.

TS 5.6.5 Special Equipment

Option, Special Service Equipment

The items in this section are discretionary and may be purchased through this contract, subject to LACMTA approval.

The Contractor shall supply pricing for 30 sets of Special Service Equipment listed below for use by LACMTA training staff. Pricing for this special service equipment is to be provided to the LACMTA on Form PF-4-Schedule C of Prices Special Service Equipment.

The LACMTA is aware that diagnostic equipment and/or software has been developed or is being developed by many of the OEMs to assist in the maintenance of the Buses. Proposer is required to submit a list of recommended special equipment, software and/or diagnostic tools deemed necessary to provide state-of-the-art service for the bus systems. Depending on the type of available equipment and/or software, the LACMTA may wish to obtain complete sets of such Special Service Equipment and/or software, plus any additional tools identified by the OEM manufacturer required to diagnose, calibrate, or remove-and-replace, all equipment provided with this bus order. The purchase of any such Special Equipment and/or software is at the sole option of the LACMTA. Because of technological changes which may occur prior to and during the actual production of the buses, the LACMTA reserves the right to issue Change Orders for updated diagnostic equipment, tools and software, and other Special Service Equipment at any time prior to Contract closeout.

For the Base order or any Option order that is exercised the Contractor shall provide pricing for Diagnostic Tools and Equipment listed below. The quantities listed below are for 300 Base Vehicles. Quantities for Diagnostic Tools and Equipment of Option Vehicles will be determined at the time the Option is exercised. At a minimum, Proposers shall provide a complete listing of such currently available equipment and/or software and the proposed pricing in the Price Forms.

Engine/Propulsion and Electric Drive/Transmission:

- Engine/Propulsion Diagnostic software, including necessary cables and connectors with one year software registration.
- Transmission/Electric Drive diagnostic software, including necessary cables and connectors.
- PPU diagnostic software, including necessary cables and adapters.

- Nexiq Technologies USB Link PC to Vehicle Interface.
- ABS/Regenerative Braking diagnostic software, including necessary cables and connectors.
- Engine/Propulsion cooling system diagnostic or programming software.
- Power Management diagnostic tools and software.
- Battery Management diagnostic tools and software.

Electrical/Vehicle Control System:

- Multiplex/Vehicle Control software and connection kit to include applicable cables, connectors and translator boxes, no registration or upgrade fees attached.
- Diagnostic laptop (to be defined) to include: applicable cables, connectors and translator boxes.
- Multiplex Module programmers, (if applicable).

Energy Storage and BMS

- Power management diagnostic software and connection kit to include applicable cables and adapters, including registration fees.

Doors

- Door System diagnostic or programming software.

Interior:

- ITS Diagnostic Kits including test fixture(s) and associated software application(s) that allows for installing components of each group, (Video Security, IBSS and Destination Sign) so that all the components of each group are easily accessible for programming, replacement, adjustment and troubleshooting including but not limited to all cables, DVR docking station, cameras, etc. Diagnostic kits should be integrated with the Training Aids to allow off-the-bus training and familiarization of the systems.
- Destination Sign Diagnostic Equipment (J1708 Protocol Boxes/software).

Heating Ventilation Air Conditioning (HVAC):

- A/C interface software and cable.

Diagnostic PC:

- Diagnostic laptops with necessary interface cables, power adapters.

TS 5.6.6 Diagnostic Laptop PC Specifications

Optional diagnostic laptop shall be Dell Latitude E5570 at a minimum contain the following:

TABLE 2
Laptop Specifications

Category	Description
Processor	Intel Core i5-6300U (Dual Core, 2.4GHz, 3M cache)
Operating System	Windows 7 Professional English, French, Spanish 64-bit (Includes Windows 10 Pro License)
Memory	8GB (2x4GB) 2133MHz DDR4 Memory
Hard Drive	500GB 7200rpm 7.2krpm HD
Video Card	AMD Radeon RT M360, for I5-6300U (Vpro Capable)
Optical Drive	Dell External USB Slim DVD+/-RW Optical Drive
Battery	Primary 4-cell 62W/HR Battery
Adapter	65 Watt AC Adaptor
Power Cord	US Power Cord
LCD	15.6-inch HD (1366x768) Anti-Glare LCD
Wireless	Intel Dual-Band Wireless-AC 8260 Wi-Fi + BTW8260AC 4.1 Wireless

	Driver (2x2)
Keyboard	Internal Dual Pointing Keyboard, English
Security Hardware	Absolute Computrace Complete 5 Year - Education
System Management	No Out-of-Band System Management

System shall be compatible with all diagnostic software. Contractor shall provide a complete listing of all proposed software and hardware to the LACMTA Project Manager prior to purchasing.

Because of the time delay between the procurement process and receipt of computer equipment, the final laptop computer configuration shall be subject to approval by the LACMTA at delivery to ensure it has all of the appropriate and necessary software and is compatible with LACMTA's other existing laptop computers. All laptop PCs shall include a suitable protective carrying "soft" case and a Microsoft mouse.

TS 5.6.7 Recommended Spare Parts List

The Contractor shall attend at least one Parts Provisioning Meeting with the LACMTA's Inventory Planning staff to discuss recommended spare parts. The Parts Provisioning meeting shall occur at least 60 days prior to the first production Bus being delivered. At the meeting, the Contractor shall provide a bill of material and a list of recommended spare parts for the buses ordered. The recommended spare parts list shall include the quantity of each item per bus, the estimated normal lead time, and recommended minimum/maximum quantities. As changes are implemented and corrections are made, the recommended spare parts list shall be updated throughout the Contract period and life of the bus. The Contractor Parts subsequently ordered by LACMTA must be delivered within thirty (30) days after initial Bus delivery or within 30 days of placement of the order, whichever is later.

TS 5.6.8 In-Process and As-Built Drawings

The Contractor shall, no later than 30 days prior to commencing production, supply the LACMTA with two sets of hardcopy scale drawings suitable for conducting repairs on every area of the vehicle, including all major systems and sub-system installations. Electrical and air schematics shall also be provided. In addition, the Contractor shall provide a description of the electronic configuration, layout and functionality of the bus including communication paths and power distribution. Drawings shall be organized in a logical, easily searchable format consistent with parts and or maintenance manuals, and shall include a table of contents searchable by parts or systems descriptions.

Drawings shall also be supplied in electronic format compatible with AutoCAD, PRO-E or other LACMTA approved design software. Contractor shall update these specific drawing to conform to "as-built". Five sets of Conforming drawings shall be delivered to the LACMTA within 60 days after final bus delivery.

Drawings shall include at a minimum the following:

- Entire structure of the bus
- Interior body with dimensions
- Exterior body with dimensions
- Floor
- Glazing and frames
- Engine and Transmission mounts
- PPU installation and mounting
- Fuel containers and supporting structure
- Passenger assists layout
- Seat placement and dimensions
- Passenger door and window dimensions
- Wiring schematics and drawings
- Wiring harnesses and cables drawings
- Plumbing schematics (pneumatic/hydraulic) and drawings

- Suspension
- Any specialized bracketry or mounts
- Battery tray
- Paint Scheme
- Interior decal placement
- Exterior decal placement
- Destination Signs drawings and schematics
- Frame Drainage Plan
- AFSS installation and routing
- ADA device installation

TS 5.7 Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of 0° F to 120° F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 1,500 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 0 °F, above 120° F or at altitudes above 1,500 feet. Altitude requirements above 1,500 feet will need separate discussions with the engine manufacturer to ensure that performance requirements are not compromised. Speed, grade-ability and acceleration performance requirements shall be met at, or corrected to, 77° F, 29.31 inches Hg, dry air per SAE J1995 with all accessories on including A/C.

TS 5.8 Noise

Noise Level Test Conditions

Instrumentation and other general requirements shall conform to SAE Standards; J336, J366 and J2805. The bus shall be empty except for test personnel, not to exceed four persons, and the test equipment. All openings shall be closed and all accessories shall be operating at maximum output during the test. The bus shall accelerate at full throttle from a standstill to 35 mph on level commercial asphalt or concrete pavement.

TS 5.8.1 Interior Noise

The combination of inner and outer panels and any material used between them shall provide sufficient sound insulation so that a sound source with a level of 80 dBA measured at the outside skin of the bus shall have a sound level of 65 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.

The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 78 dBA. The driver area shall not experience a noise level of more than 75 dBA. Measurements of interior noise levels shall be taken in accordance with SAEJ2805 for portion of testing under acceleration. The bus shall also be operated at various speeds to check for audible vibrations.

TS 5.8.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80 dBA under full power acceleration when operated at 0 to 35 mph at curb weight. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 83 dBA. The bus-generated noise at curb idle shall not exceed 65dBA. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the sound level measured. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the LACMTA and SAEJ366.

The bus builder shall minimize all transient noises generated by the bus and/or by accessories. These efforts shall include the application of mufflers on exhaust air ports for the kneeling valve, dryer and brake exhaust if their sound levels exceed 78 dBA interior or 83 dBA exterior.

TS 5.9 Fire Safety

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations. These provisions shall include the use of fire-retardant/low-smoke materials, fire detection systems, bulkheads and facilitation of passenger evacuation. A barrier shall separate the passenger and drive system compartments and shall incorporate fire resistant materials to create a firewall. Contractor must provide required certificates of compliance prior to manufacture of the Pilot Bus.

TS 5.9.1 Materials

All materials used in the construction of the passenger compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision. Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls and sub-floor, need not comply. In addition, smaller components and items, such as seat grab rails, switch knobs, small light lenses, door seals, window seals, steering wheel, steering column and escape hatches shall be exempt from this requirement.

TS 5.10 Fire Suppression

The purpose of the suppression system is to ensure bus and passenger safety and survivability in the event of a fire. The AFSS system design shall include sensors and nozzles in all areas that are known to commonly have bus fires.

The AFSS system shall meet or exceed the environmental requirements of SAE J1211 and be approved by Underwriters Laboratory or Factory Mutual. At a minimum, the engine compartment, rear-mount HVAC compartment, exhaust area and high current electrical areas (except the battery compartment) at rear of bus shall be equipped with an automatic fire sensing and suppression (AFSS) system product, subject to LACMTA approval during proposal period.

AFSS Operation

The AFSS system shall be powered through the solenoid battery cutoff switch(es) and be activated automatically by the AFSS system sensors. The AFSS shall provide a programmable time-delayed signal to the engine shut-down controls following detection of a fire. The AFSS initiated engine shut-down shall include an integrated Engine Stop Over-Ride to permit the Operator more time, if required, to slow and stop the Bus (Refer to Section TS 46.5 Table 9).

The AFSS sensors shall detect fires in monitored areas and immediately activate the fire alarm signal in the Operator's compartment and fire warning light on the Operator's indicator panel. The AFSS system shall activate fast-acting extinguisher(s) which release suppression agent to all areas monitored. If water based, the distribution system shall utilize nozzles for high-pressure water mist, and shall deliver water droplets between 50-80µm (micrometer). After a system discharge, the AFSS shall be able to clear alarm condition and be ready for reactivation following a simple system reset. The only cost to prepare system for reuse will be for recharge of agent and clean up.

AFSS Monitor Panel

The system shall have a supervision monitoring panel located above the Operators' side console subject to LACMTA approval in Pre-Production meetings. Monitor panel shall include visual indicators for a) Operational Status, for sensors, harness, and extinguishers, b) Fire or system discharged, and c) Power Failure. Monitor panel shall be capable of identifying each individual sensor (gas or fire) and location of each sensor. Monitor panel shall be capable of recording and storing system events in non-volatile memory. In the event of power loss, events shall still be retrievable after power is restored.

AFSS Sensor

Linear heat detectors shall be mechanically protected from abrasion with use of a spring wire external jacket. All heat sensors shall be installed per the manufacturer's recommendations to sensor fires, extreme

temperatures or conditions that are sufficient to ignite combustible materials in the monitored areas. The AFSS/GDS control module shall provide a fault signal to the AFSS status indicator located in the Operator's area in the event of a sensor failure, and the fault shall be traceable to each fire and gas sensor for easy diagnostic purposes. Fault data shall be recorded and accessible even after loss of battery power.

AFSS Agent

The agent shall be approved by Underwriters Laboratory or Factory Mutual Research Corporation and have no ozone depleting property and no global warming potential per USA EPA guidelines.

AFSS Cylinder(s)

The AFSS agent cylinders shall use DOT shippable linear actuators or electric solenoid valves (squibs are prohibited) attached to DOT certified bottles which do not require hydrostatic retest for a minimum of twelve years. Cylinder(s) shall be compatible with suppression agents. Each cylinder shall have a pressure gauge with easy to read "Go-No-Go" type indicator which is visible when the cylinder(s) is installed on the bus. Each agent cylinder shall have a low pressure sensor to monitor agent cylinder pressure from the display panel. Low agent cylinder pressure shall indicate a fault condition on the display panel.

TS 5.11 Gas Detection System (GDS)

GDS system shall be provided to monitor the engine compartment and each separate fuel storage area(s) and shall automatically activate audible and visible alarms in the Operators' area at levels of the lower explosive limit (LEL), of natural gas (methane), subject to LACMTA approval during proposal period.

GDS Operation

The GDS system shall be powered through the solenoid battery cutoff switch(es) and be activated automatically by the GDS system sensors. The system shall be capable of detecting gas in concentrations from 20 percent to 100 percent of LEL and shall continue to indicate the presence of gas at concentrations above 100 percent LEL. A control button shall be provided to silence the GDS audible alarm. The GDS shall provide a programmable time-delayed signal to the engine shut-down controls following detection of methane 50 percent LEL of the gas selected for fuel as described in TS 46.5 Table 9. The GDS initiated engine shut-down shall include an integrated Engine Stop Over-Ride to permit the Operator more time, if required, to slow and stop the bus (Refer to Section TS 46.5 Table 9). The GDS shall be in full time sampling mode at all times.

GDS Monitor Panel

The system shall have a supervision monitoring panel located above the Operators' side console area subject to LACMTA approval in Pre-Production meetings. Monitor panel shall indicate operational status of the sensors, harness, and calibration with visual indicators provided on the Operators' indicator panel. Visual indicators shall include a) System OK (power on and calibrated), b) Gas Alarm, c) Service Required and d) Monitor each gas sensor for trace gas, significant gas, and trouble conditions for ease of system diagnostics..

GDS Calibration

System shall not require calibration. System diagnostics shall not require more than 20 minutes and shall provide traceability to individual sensor failures during diagnostic work.

TS 5.12 Respect for the Environment

In the design and manufacture of the bus, the Contractor shall make every effort to reduce the amount of potentially hazardous waste. In accordance with Section 6002 of the Resource Conservation and Recovery Act, the Contractor shall use, whenever possible and allowed by the specifications, recycled materials in the manufacture of the bus.

TS 5.13 Water Leak Testing

The roof, windows, windshields, and all doors of all Buses shall be water tested for a minimum of 30 continuous minutes in order that leaks may be detected and corrected. The HVAC shall be turned on only for

the first 15 minutes of the test. The water test should replicate a sustained driving rain contacting all surfaces equally. Water spray nozzles shall be located to provide an overlapping pattern to effectively test the full length of the roof, sides, front and back of the bus at a flow rate of 0.04 gal/min/ft²

TS 5.14 Fasteners and Securements

Unless otherwise specified all bolts, nuts and washers shall use Metric or English system dimensions. All bolts, nuts, washers shall be SAE Grade 5 or better and be designed to resist corrosion for the life of the bus. Stainless steel fasteners are required for the structure exterior, suspension system, fuel system, HVAC system, PPA area and mirror/camera attachments. Where the bus design requires high-strength fasteners, zinc plated, or phosphate coated (only if zinc is not available) fasteners shall be provided. Zinc plated fasteners may be used in areas requiring welding. Exceptions to the use of stainless steel or zinc plated fasteners shall be approved on a case-by-case basis.

The use of plastic tie wraps shall be limited to bundling small diameter lines (under one-inch diameter); they shall not be used as an attachment device unless approved by LACMTA during proposal period. The failure of any number of tie wraps over the life of the bus shall not result in a required repair action or service interruption.

All wire harnesses assemblies and wire bundles over 18 inches long shall be secured with suitable wire trays or fully wrapped PTFE or Nylon insulated P-clamps, or other suitable method approved by the LACMTA. P-clamps not used for wiring support shall be orange, fully wrapped silicone insulated. The use of plastic tie wraps shall be limited to bundling wires; they shall not be used as a primary attachment device unless approved by LACMTA during proposal period. The failure of any number of tie wraps shall not result in a required repair action or service interruption. Supports for wires, cables, or harnesses shall be insulated from contact with wire, cable or harness by a fully cushioned, non-conductive material. Supports for all electrical cables, harnesses and bundles will be subject to LACMTA approval during proposal period and shall be of premium quality.

TS 6. Physical Size

FIGURE 1

Technical drawing of a motorhome showing side, rear, and front views with dimension lines for length, width, height, and wheelbase.

Side View Dimensions:

- LENGTH OVER BUMPERS
- BODY LENGTH
- OVERALL HEIGHT
- REAR OVERHANG
- WHEEL BASE
- FRONT OVERHANG

Rear View Dimensions:

- WIDTH (Excluding Mirrors)

Front View Dimensions:

- WIDTH (Including Mirrors)

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For ease of use, the following tolerances will be allowable for each given bus length.

Length Over Bumpers –40-1/2 feet to 44 feet

TS 6.2.1 Transit Bus

Body width shall be 102 inches (+0, -1 inch).

Not applicable.

TS 6.3 Bus Height

Maximum Overall Height

Maximum overall height shall be 135 inches, including all rigid, roof-mounted items such as A/C, exhaust, fuel system and cover, etc.

TS 6.4 Step Height

TS 6.4.1 Transit Bus

The step height shall not exceed 16.0 inches at either doorway without kneeling. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.4.2 Commuter Bus

Not applicable.

TS 6.4.3 Articulated Bus

Not applicable.

TS 6.5 Underbody Clearance

The bus shall maintain the minimum clearance dimensions as defined and shown in Figure 2, regardless of load, up to the gross vehicle weight rating.

TS 6.6 Ramp Clearances

The approach angle is the angle measured between a line tangent to the front tire static loaded radius arc, (axle centerline), and the initial point of structural interference forward of the front tire to the ground.

The departure angle is the angle measured between a line tangent to the rear tire static loaded radius arc, (axle centerline), and the initial point of structural interference rearward of the rear tire to the ground.

The break over angle is the angle measured between two lines tangent to the front and rear tire static loaded radius arcs, (axle centerlines), and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll.

TABLE 3
Default Breakover Angle

Angle	30 to 45 ft. Bus
Approach	9 deg. (min.)
Front breakover	8 deg. (min.)
Departure	8.5 deg. (min.)

TS 6.7 Ground Clearance

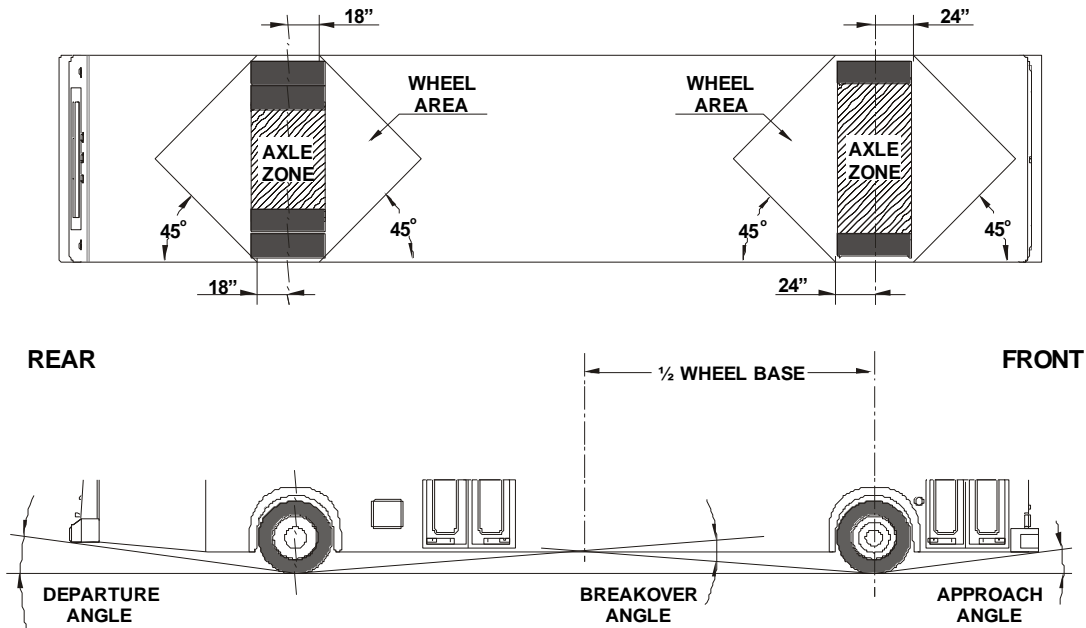
Ground clearance shall be no less than 8.5 inches, (eight inches at jacking pad) except within the axle zone and wheel area.

Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5.4 inches.

Wheel area clearance shall be no less than six inches for parts fixed to the bus body and five inches for parts that move vertically with the axles.

— **FIGURE 2**

Transit Bus Minimum Road Clearance



TS 6.8 Floor Height

TS 6.8.1 Transit Bus

Height of the step above the street shall be no more than 16 inches measured at the centerline of the front and rear doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.8.2 Commuter Bus

Not applicable.

TS 6.9 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 inches in the forward half of the bus tapering to no less than 74 inches forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 65 inches reducing to 60 inches at the side wall, except for parcel racks and reading lights, if specified. Headroom at the back of the rear bench seat may be reduced to a minimum of 56 inches, but it shall increase to the ceiling height at the front of the seat cushion. In any area of the bus directly over the head of a seated passenger and positioned where a passenger entering or leaving the seat is prone to strike his or her head, padding shall be provided on the overhead paneling.

TS 6.10 Aisle Width

The minimum clear aisle width between pairs of transverse seats with all attached hardware shall be at least 22 inches.

The aisle width between the front wheelhouses shall be at least 35.5 inches, and the entire area between the front wheelhouses shall be available for passengers and mobility aid devices.

VEHICLE PERFORMANCE (TS 7-TS 8)

TS 7. Power Requirements

The propulsion system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed and grade-ability requirements, and operate all propulsion-driven accessories using actual road test or dynamometer results and computerized vehicle performance data.

TS 7.1 Top Speed

The bus shall be capable of achieving a top speed of 65 mph on a straight, level road at GVWR with all accessories operating. The bus shall be capable of safely maintaining the vehicle speed for the discrete bus range specified in proposed bus.

NOTE: Values are assumed to be sustained. Manufacturer shall supply LACMTA with data, if there is a variance between peak performance and sustained vehicle performance.

TS 7.2 Grade-ability

Grade-ability requirements shall be met from a standing stop on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating.

The propulsion system shall enable the bus to achieve and maintain a speed of 40 mph on a 2.5 percent ascending grade and 15 mph on a 10 percent ascending grade for the discrete bus range specified in proposed bus.

NOTE: Values are assumed to be sustained. Manufacturer shall supply LACMTA with data, if there is a variance between peak performance and sustained vehicle performance.

TS 7.3 Acceleration

TS 7.3.1 Acceleration (CNG)

The acceleration shall meet the requirements in Table 4 below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed.

TABLE 4a

Maximum Start Acceleration Times on a Level Surface¹

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	18
40	30
50	60
Top speed	

1. Vehicle weight = GVWR

Jerk

The rate of change of acceleration shall be minimized throughout the acceleration/deceleration range and shall not be greater than 15.5 mph/sec/sec (0.3g/sec)

Response Time

Response times shall be measured from the activation or deactivation of the accelerator or brake pedal to the initial response of an on-board accelerometer measuring longitudinal Bus acceleration. Response times for power to brake, brake to power, coast to power and to brake shall be no greater than 0.20 seconds.

TS 7.3.2 Acceleration Electric or Zero Emission

The propulsion and braking systems shall meet the performance requirements of the Duty Cycle.

Braking application and performance shall remain consistent regardless of EV system State of Charge (SOC) or other variances related to regenerative braking.

The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming.

TABLE 4b

Maximum Start Acceleration Times on a Level Surface¹

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	18
40	30
50	60
Top speed	

1. Vehicle weight = GVWR

Jerk

The rate of change of acceleration shall be minimized throughout the acceleration/deceleration range and shall not be greater than 15.5 mph/sec/sec (0.3g/sec)

Response Time

Response times shall be measured from the activation or deactivation of the accelerator or brake pedal to the initial response of an on-board accelerometer measuring longitudinal Bus acceleration. Response times for power to brake, brake to power, coast to power and to brake shall be no greater than 0.20 seconds.

TS 7.3.3 Acceleration (Commuter Bus)

Not applicable.

TS 7.4 Operating Range

The operating range of the Bus shall be designed to meet the operating profile as stated in the applicable section and performance requirements as stated below.

TS 7.4.1 Diesel (Transit Bus)

Not applicable.

TS 7.4.2 Diesel (Commuter Bus)

Not applicable.

TS 7.4.3 CNG

A compressed natural gas fuel system consisting of fuel cylinders, filler provisions, fuel lines, pressure reduction, and auxiliary equipment necessary to safely operate under all operating conditions shall be provided. The Contractor shall provide sufficient fuel capacity to give the Bus a 400-mile range before the low fuel warning light comes on. The 400-mile range shall be based on:

- A service cycle that utilizes only the CBD portion of the FTA ADB heavy-duty transit bus cycle as administered by The Altoona Bus Research and Testing Center.
- The CBD portion shall be further modified to add 20 minutes of idle time.

The Contractor shall provide the LACMTA with a technical analysis which supports the proposed CNG fuel system design compliance to the LACMTA's range of operation requirement including the proposed fuel capacity. The analysis shall contain at a minimum:

- Source of fuel economy information (pounds per mile or standard cubic feet per mile).
- Summary of the gas quality used in the calculations.
- Bus condition including weight.

The analysis shall use the natural gas data supplied below based on 70 ° F ambient temperature.

TABLE 5
LACMTA CNG Fuel Properties

Lower Heating Value Btu/lb.	Molecular Weight	Density @ 3,614.7 psia	Density @ 14.7 psia	Specific Gravity
21904	16.734	12.49 lb./cu ft.	0.044 lb./cu ft.	0.580

The analysis shall be provided with the Proposal.

The system shall be capable of refueling at a minimum rate of 5,000 scfm.

TS 7.4.4 Electric (Zero Emission)

The Contractor shall provide sufficient energy storage and charger charging systems to give the bus a cumulative 300-mile daily operating range before the low power warning light comes on. The 300-mile range shall be based on:

- A service cycle that utilizes only the CBD portion of the FTA ADB heavy-duty transit bus cycle with all accessories operating at full capacity.
- The CBD portion shall be further modified to add 20 minutes of idle time.

The Contractor shall provide the LACMTA with a technical analysis which supports the proposed energy storage and charger systems design compliance to the MTA's range of operation requirement including the proposed energy storage system capacity. The analysis shall contain at a minimum:

- Source of energy storage and charger systems information (kilowatt-hour per mile).
- Bus condition including weight.

TS 8. Fuel Economy

Test results from the Altoona fuel economy tests or other applicable test procedures shall be provided to the LACMTA. Results shall include vehicle configuration and test environment information.

POWERPLANT (TS 9-TS 19)

TS 9. Engine

The Propulsion Power Assembly (PPA) shall consist of an engine and transmission, and support equipment mounted in a compartment in the rear of the bus in T-drive configuration. . The propulsion system shall be designed to minimize exhaust emissions and maximize fuel economy while meeting the specified performance requirements.

Prior to manufacturing the Pilot Bus, the Contractor shall coordinate a technical review with the LACMTA and engine and transmission suppliers covering integration and installation design. As part of the technical review, the Contractor shall advise the LACMTA concerning engine and transmission features and control system options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality.

Prior to start of production, the Contractor shall provide documentation from the Sub-suppliers, which supports their approval, that the engine and transmission installation, support system design, and components used specifically for the LACMTA's contract meet the OEM requirements and recommendations.

The engine shall comply with applicable local, state, and/or federal emissions and useful life requirements. Components of the fuel management and/or control system shall have a design life of not less than 150,000 miles without replacement or major service. The lifetime estimate shall be based on the defined design operating profile while operating under conditions in TS 5.7.

The engine shall be equipped with an electronically controlled management system (ECM), compatible with either 12- or 24-volt power distribution. The engine control system shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. The engine's electronic management system shall monitor operating conditions and provide instantaneous adjustments to optimize both engine and bus performance. The system shall be programmable to allow optimization of parameters or adjustable features.

The engine starting system shall be protected by an interlock that prevents its engagement when the engine is running. Special equipment or procedures may be employed to start the bus when exposed to temperatures less than 30° F for a minimum of four hours without the engine in operation. The integration of all systems on the vehicle relative to engine idle speed shall be the responsibility of the vehicle manufacturer to meet the requirements of LACMTA.

The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for safe operation and automatically de-rate power and/or speed and initiate engine shutdown as needed.

The engine shall be designed for city transit bus application. The engine shall be designed to operate without failure for 300,000 miles in LACMTA revenue service without major failure or significant deterioration. Electronic controls, supplied by the OEM engine manufacturer, such as throttle control, programmable control module(s), and engine protection system, shall be provided and integrated with other bus electronic systems.

Automatic Engine Protection/Shutdown Override Feature

A control shall be available to the Operator that when depressed and released will delay the engine shutdown for 30 seconds to allow the bus to be moved. Override action shall be recorded. This data shall be retrievable by the LACMTA.

TS 9.1 Engine (CNG)

The engine shall meet all regulatory requirements when operating on fuel equal to CARB Specifications for Compressed Natural Gas #2292.5. The four predominant characteristics that must be met are Methane, Ethane, Butane, and Propane.

Standard Requirements for a Fast Idle Device

The engine shall be equipped with an operator-controlled fast idle device. The fast idle control shall be a two-way switch mounted on the dash or side console and shall activate only with the transmission in neutral and the parking brake applied. The fast idle device may be activated and controlled automatically by the control system for heavy loads, e.g. air conditioning.

Oil filtration systems shall be approved by the engine and transmission OEM and be designed with by-pass circuits, as needed, in the event that a filter becomes plugged.

TS 9.1.1 Engine Compartment Control Panel

A rear control panel shall be provided for the convenience and safety of LACMTA mechanics. The control panel shall be located in the engine compartment located in an area where it shall not be damaged during repairs. The control panel wiring, switches, and gauges shall be water proof with IP 65 and IP 67 ratings to withstand steam cleaning.

Control Panel Gauges and Indicators

The following mechanical, electrical dial gauges, or digital display, subject to LACMTA approval during proposal period, shall be mounted on, or adjacent to, the engine compartment control panel:

- **Oil Pressure Gauge:** 0-100 psi - Accuracy ± 2 , psi, shall indicate oil pressure at a main oil galley.
- **Temperature Gauge:** 0-250° F - Accuracy ± 2 ° F, shall indicate engine block coolant temperature.
- **Air Filter Restriction Gauge:** 0-20 inches H₂O- Accuracy ± 1 inch. H₂O, shall indicate air filter restriction.
- **Voltage Gauge(s):** Battery voltage gauge to monitor both 12 and 24-volt electrical systems with a range of 0-48-Volt.

Engine Panel Controls

The following controls shall be located on the engine compartment control panel:

- a) **Rear Run Switch:** Three-position toggle switch, marked REAR, OFF, and FRONT positions.
- b) **Light Switch:** Two-position toggle switch with waterproof cover labeled "Compartment" for control of the minimum of five LED lamps.
- c) **Engine Start:** Starter switch marked "START" shall operate the starter motor only when the rear run switch is in the "REAR" position and transmission is in neutral, and fuel fill door is closed. The Operators start button shall be deactivated when the Rear Run Switch is in "REAR" Position.
- d) **Engine Speed Control:** A spring-return control knob or toggle switch marked "ENGINE SPEED" shall be provided that will increase engine RPM from idle to maximum controlled free speed. The switch shall be activated only when the Rear Run Switch is in the "REAR" position, the transmission is in neutral and parking brake set.
- e) **Diagnostic Test Ports:** Additional to the ports required in the Operators' area per Specification Section TS 46.5 and Table 9.

TS 9.2 Propulsion System Electric (Zero Emission)

TS 9.2.1 Propulsion System Description

The bus shall be powered by an electric propulsion system. Function and operation of the bus shall be transparent to the bus operator and passengers. The OEM shall ensure that the bus structure can successfully accept the installation of the propulsion system and be operated on the stated duty-cycle for a period of 12 years without a structural failure. At a minimum, the propulsion system shall comply with applicable local, state and/or federal emissions and useful life requirements. The propulsion system shall comply with local, state and federal (maintenance) and other applicable sections.

The electric drive system shall be rated for the GVWR or greater of the bus.

TS 9.2.2 Propulsion System Service

The propulsion system shall be arranged so that accessibility for all routine maintenance is ensured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems. However, LACMTA shall recognize that properly rated equipment and safety electrical work practices are essential when servicing high-voltage electric components. The air compressor, radiator, all propulsion accessories, and any other component requiring service or replacement shall be easily removable. The Contractor shall provide all specialty tools and diagnostic equipment required for maintaining the propulsion system in accordance with the Special Tools List.

All compartments and areas that include components using hazardous or higher voltages, shall incorporate safety warning labels to provide appropriate warning for service personnel. A secondary label shall be included to list the voltages in use within the compartment or area. Labels shall be visible when approaching the area. Labels shall include pictograph symbols for easy recognition.

TS 9.2.3 Primary Propulsion Unit and Traction Motor

The propulsion system may be configured in a variety of methods depending upon type of driver, series and/or parallel. The definition of motor in the context of this specification assumes that the device can provide or consume energy as well as provide or retard mechanical motion.

TS 9.2.4 Energy Storage, Controller and Charging Systems

Design and performance shall be provided to LACMTA. Energy storage shall be of a commercial design capable of operating in the LACMTA transit environment. The primary charging of the energy storage system shall be accomplished by the on-board electric system controller and regenerative braking.

Thermal management will be provided to ensure optimal life and performance of the ESS over the environmental operating range.

Energy storage system SOC correction methods stated in SAE J2711 shall be utilized.

Master Disconnect Switch

A single master switch shall be provided near the battery compartment or other appropriate area for disconnecting of all battery positives in the event of an emergency. The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion when the batteries are washed off or are in normal service.

In the event of an emergency, turning the master battery switch "Off" with the PPU operating shall shut off the PPU and shall not damage any component of the electrical system. The master battery switch shall be capable of carrying and interrupting the total circuit load. Master battery switch shall be capable of being locked in the "Open" or "Off" position or suitable alternative to prevent accidental turn on.

Shop Charging System

The Contractor shall supply and install battery charger either on the bus or at MTA operating facility capable of recharging the electric/hybrid bus propulsion batteries to a state necessary for the bus to complete a cumulative 300 miles per day according to the route profile as stated in the "Design Operating Profile", and section TS 5.7.

On-Route Charging System

If required to meet daily operating range requirement in Section TS 7.4, battery electric buses will be outfitted with suitable on-route charging systems. The charging system shall be an overhead contact system or an in-ground inductive charging system. All charging systems shall allow driver to easily connect without the need of a complex bus guidance system. Connecting to charging system shall not require the driver to leave his/her seat. Safety protocols shall not energize the charging system until the bus is parked in designated charging position, and the charging system is properly interfaced with the bus. Brake and drive interlock shall prevent inadvertent movement of the bus while charging.

TS 9.2.5 Electric System Controller (ESC)

The ESC regulates energy flow throughout electric system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters, (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.

The controller shall monitor the process inputs and execute outputs as appropriate to control the operation of all propulsion system components.

Primary Power Unit (PPU)

The PPU and related emission system shall meet California Air Resources Board (CARB) standards for zero emissions.

Contractor shall provide LACMTA with expected durability of the PPU and related emissions systems. The PPU shall be equipped with an electrically controlled management system, compatible with multiplex wiring system and either 12- or 24-volt electrical systems.

The PPU shall have on-board diagnostic capabilities, able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in Operator's area and inside PPU compartment. The on-board diagnostic system shall inform the Operator via visual and audible alarms when out-of-parameter conditions exist for vital PPU functions.

Fuel Cell

The fuel cell power assembly shall consist of fuel cell, electric motor, transmission and support equipment (fuel cell driven bus) or fuel cell, battery, transmission and support equipment (battery dominant fuel cell bus). In both cases, the fuel cell can be of any type (characterized by the electrolyte used), however the fuel is limited to hydrogen, only. The fuel cell and its embedded electronics should have a design life of 300,000 miles without failure, significant deterioration, replacement or major service.

TS 9.2.6 Engine

Refer to Section TS 9.1 Engine (CNG).

TS 10. Cooling Systems

The cooling systems shall be of sufficient size and designed to maintain fluids and engine intake air at safe, continuous operating temperatures during the most severe operations possible with the bus loaded to GVWR and with ambient conditions as listed in Section TS 5.7 with a 10 percent minimum reserve capacity in accordance with engine and transmission manufacturers' cooling system requirements. The cooling system fan

controls should sense the temperatures of the operating fluids and the intake air, and if either is above safe operating conditions the cooling fan should be engaged. The fan control system shall be designed with a fail-safe mode of "fan on." The cooling system shall provide functional service while operating in the design operating profile environment.

The cooling system shall be equipped with ethylene glycol base engine coolant approved by the engine manufacturer and compatible with the LACMTA's existing coolant product. Use of LACMTA's standard coolant shall not adversely affect the cooling system's performance. Coolant shall meet the propulsion system manufacturer's most stringent requirements for coolant properties.

The cooling system shall be self-purging requiring no special procedures to remove air from the system when coolant is installed or added. Quarter-turn ball valves shall permit complete shut-off of both lines for the heating and defroster units. All low points in the cooling system shall be equipped with drain cocks. The radiator drain plug provided at the radiator shall be a minimum ½-inch dry break type (Refer to TS 88.1 for approved products). The drain plug shall be protected from damage and have a provision for attaching a drain adapter for directing the draining fluid into a container. This shall be accomplished without having the coolant drain onto or through any structure of body parts.

The radiator and charge air cooler unit(s) shall be mounted in such a manner to be replaceable by one LACMTA mechanic within the MTTF specified in TS 88.2. The units shall be easily accessible for cleaning and maintenance by one LACMTA mechanic in less than one hour. Mounting shall be designed so that a LACMTA mechanic can gain full access to the fan side of the units for cleaning without the use of tools. This may be accomplished by swing out design, removable fan shroud section, or suitable inspection door.

For CNG applications, radiator piping shall be stainless steel or brass tubing, if practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360-degree seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material. All coolant hoses shall have appropriate sized, constant torque, hose clamps.

TS 10.1 Engine Cooling

A heavy-duty stainless steel radiator surge tank shall provide sufficient draw down capacity as required by the engine manufacturer. A heavy-duty single glass tube, (non-plastic), shall be provided to determine satisfactory engine coolant level accessible by opening the surge tank access door. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system no more than 65 inches above the ground. Surge tank filler cap shall have a safety lock. A ¼-inch NPT port shall be provided in a convenient location in the surge tank for the LACMTA's pressure testing equipment, subject to LACMTA approval in Pre-Production meetings. The system shall be designed to allow coolant to be added while the cooling system is at full operating temperature incorporating an un-pressurized coolant overflow reservoir.

The radiator shall be of durable corrosion-resistant construction with metal header tanks for CNG bus only. No heat producing components, such as intake charge-air-coolers, or climate control system components shall be mounted between the engine cooling air intake aperture and the radiator. Sensor port fittings (1/8-inch NPTF) shall be provided in the upper and lower sections of the radiator to allow the use of thermocouple for diagnostics. Louvered fins are not acceptable.

Self-Cleaning

Radiator and charge air cooler fan(s) shall be electrically driven and capable of reverse operations for periodic self-cleaning of the radiator and charge air cooler. For multiple fans, system shall be designed to prevent air recirculation in the event of individual fan failure.

A cooling system pressure gauge with an operating range of 0-30 psi, easily readable through the surge tank access door, shall be installed to monitor static and operating pressures.

TS 10.1.1 Radiator Screen

Screen in Front of Radiator

The radiator input shall be protected by an easily cleanable screen designed to collect large debris. Radiators with a fin density greater than 12 fins per inch or a louvered slit design shall not be used. No heat-producing components or climate-control system components shall be mounted between the engine cooling air intake aperture and the radiator. The radiator and charge air cooler shall be designed to withstand thermal fatigue and vibration associated with the installed configuration. The radiator and charge air cooler cores shall be easily cleaned (to include engine side core surface) with standard pressure-washing equipment.

TS 10.1.2 Coolant

Standard Requirement for Coolant Filtration

The engine cooling system shall be equipped with a properly sized water filter with a spin-on element. When replacing the water filter, only the water in the filter will be lost.

TS 10.1.3 Fan Drive Design

Electric Fans

The bus shall be equipped with an electric fan drive cooling system. A screen guard must be installed on electric motor fans per SAE J1308. (Refer to Section TS 10.1 Engine Cooling). The cooling system shall be equipped with a master controller with the following capabilities:

- a) Multiple electric DC brushless pusher type variable speed fans with electronic feedback controls.
- b) Communicate on the J1939 CAN data link with system diagnostic reporting via DM1 messaging
- c) Review and download data via a laptop with service tool software
- d) Capable of software and calibration up-dates, receiving commands from the engine/PPU
- e) Sense engine compartment temperature and activate fans if maximum temperature is exceeded.
- f) Report fault codes by lighting an engine compartment LED flashing light.
- g) Collect and store cooling system and vehicle performance histogram data.
- h) If system controller loses communication with the engine/PPU or sensors, it shall direct all fans to go into a default speed mode to avoid vehicle shutdown.
- i) If fans lose communication with system controller, they shall go into a default mode to avoid vehicle shutdown.

TS 10.1.4 Mounting

Standard Mounting Design

Mounting location of radiator and charge air cooler shall be the Contractor's standard design. (Refer to Section TS 10 Cooling Systems).

TS 10.2 Charge Air Cooling

The charge air cooling system shall provide maximum air intake temperature reduction with minimal pressure loss. The charge air radiator shall be sized and positioned to meet engine manufacturer's requirements. Air ducting and fittings shall be protected against heat sources and shall be configured to minimize restrictions and maintain sealing integrity.

Charge air piping and fittings shall be designed to minimize air restrictions and leaks.

TS 10.3 Transmission Cooling

The transmission shall be cooled by a dedicated heat exchanger sized to maintain operating fluid within the transmission manufacturer's recommended parameters of flow, pressure and temperature. The transmission cooling system shall be matched to retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer. The engine

cooling system should provide coolant bypass flow to the transmission cooling system with the engine thermostats closed. The heat exchanger will have provisions to drain transmission oil during routine servicing.

TS 10.4 Electric Drive System Cooling

The thermal management system shall maintain electric system components within their design operating temperature limits. Refer to Section TS 10.1 inclusive for additional requirements.

TS 11. Transmission (Conventional Powertrain)

The transmission shall be designed for city transit bus application. The transmission shall be multiple speeds, automatic shift with torque converter, retarder, electronic controls, and have integrated oil cooler. Gross input power, gross input torque and rated input speed shall be compatible with the engine. The transmission shall be designed to operate for not less than 300,000 miles on the design operating profile without replacement or major service. The transmission should be easily removable without disturbing the engine and accessible for service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. Electronic controls shall provide consistent shift quality and compensate for changing conditions such as variations in vehicle weight and engine power.

The transmission shall be flushed of any non-synthetic transmission oil and filled with an OEM approved synthetic fluid designed for extended drain intervals. Unless otherwise agreed to in writing, the synthetic transmission oil provided by the Contractor shall be compatible with the LACMTA's existing synthetic transmission oil.

A brake pedal application of nominal 6 psi shall be required by the driver to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

The electronically controlled transmission shall have on-board diagnostic capabilities, be able to monitor functions, store and time stamp out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. The transmission shall contain built-in protection software to guard against severe damage. The on-board diagnostic system shall trigger a visual alarm to the driver when the electronic control unit detects a malfunction.

An electronic transmission fluid level monitoring and protection system shall be provided.

TS 12. Retarder (Transit Bus)

The powertrain shall be equipped with a retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake function and shall activate the brake lights.

The retarder application shall be controlled by the throttle pedal and shall be integrated with the ABS system controls so that actuation of ABS shall override the operation of the brake retarder.

Throttle Pedal Activation of the Retarder

The retarder shall apply approximately 1/3 of its total application with a resulting deceleration of no greater than 0.077g when the throttle pedal is completely released. The retarder shall apply approximately 2/3 of its total application with a resulting deceleration of no greater than 0.14g with light brake application. Maximum retarder shall be achieved when brake pedal is fully depressed to engage service brakes, with a maximum resulting deceleration of approximately 0.20g in an empty bus. The resulting decelerations specified include the effects of engine braking, wind resistance and rolling resistance.

The thermostatically controlled cooling fan shall be activated when the retarder is engaged and the coolant temperature reaches the maximum operating temperature established by the engine and transmission manufacturers.

Retarder Disable Switch

The retarder disable switch shall be located behind the destination sign door, subject to LACMTA approval in Pre-Production meetings.

Regenerative Braking

The electric propulsion system shall be equipped with a regenerative braking system designed to extend brake lining service life, and capture braking energy to recharge the Energy Storage System. The application of the regenerative braking shall cause a smooth blending of both regenerative brake and service brake function and shall not activate the brake lights independent of the service brake.

Regenerative Braking Disable Switch

The regenerative braking disable switch shall be located behind the destination sign door, subject to LACMTA approval in preproduction meetings.

TS 13. Engine Brake (Commuter Bus)

Not applicable.

TS 14. Mounting

All PPA/PPU mounting shall be mechanically isolated to minimize transfer of vibration to the body structure and provide a minimum clearance of 0.75 inches. Mounts shall control the movement of the PPA/PPU so as not to affect performance of belt-driven accessories or cause strain in piping and wiring connections to the PPA/PPU.

PPA/PPU mounts shall be manufactured from high grade rubber material and shall last for three years or 150,000 miles, whichever comes first. PPA/PPU mounts shall not deteriorate from contact with oil, heat, and ozone present in the engine compartment.

All air, fuel, fluid, electrical, and other cabling connecting the cradle assembly to the bus, shall have "bulkhead" connections in the proximity of the fire wall to facilitate the replacement of powertrain assemblies. Hoses, cables, and harnesses shall not require unclamping in order to remove the PPA.

TS 14.1 Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing. The muffler, exhaust system, air cleaner, air compressor, starter, alternator, radiator, all accessories and any other component requiring service or replacement shall be easily removable and independent of the engine and transmission removal.

No special tools, other than dollies and hoists, shall be required to remove the PPA/PPU. Two LACMTA mechanics shall be able to remove, replace, and prepare the complete PPA/PPU assembly for service within a MTTF of 12-man hours. The MTTF does not include miscellaneous preparation such as placing the bus on stands and removing the bumper, if necessary.

Engine tune-up, PPA/PPU removal and replacement, cylinder heads, and accessories, including, but not limited to muffler, exhaust system, air compressor, alternator(s), starter, and A/C compressor, shall be serviceable from a flat floor and with the use of a pit or hoist.

The Contractor shall provide two suitable dollies for each spare PPA/PPU purchased under this Contract. The Contractor shall mount and ship any spare PPA/PPUs purchased and delivered under this contract onto these

dollies. The PPA/PPU dollies shall be designed, subject to LACMTA approval in Pre-Production meetings, for long term storage of spare PPA/PPUs and also aid the LACMTA in PPA/PPU replacement to meet the specified MTTF. Use of the PPA/PPU dollies shall be included in the Service manual. The dolly wheels shall be heavy-duty, approximately six inch diameter, with solid steel wheels. The Contractor shall provide the LACMTA with sufficient fabrication drawings needed to manufacture additional dollies.

PPA/PPU driven accessories shall be unit mounted for quick removal and repair. Accessory drive systems including belts shall operate without failure or unscheduled adjustment for 50,000 miles in LACMTA service. Accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of idle and low route speed operation. To the maximum extent possible, belt drive systems shall be self-adjusting after initial installation adjustment. Belt drives that require manual tensioning shall be designed to facilitate easy service/maintenance, subject to LACMTA approval at the Pre-Production Meeting. Accessory drive belts shall be guarded in accordance with CAL OSHA article 45, Belt and Pulley Drives, Section 4070 "Guarding."

All fillers shall be easily accessible with standard funnels, pour spouts and automatic dispensing equipment.

All fluid fill locations shall be color coded to ensure correct fluid is added: red for transmission fluid, yellow for engine oil. Fill points shall include easy to read labels prominently displayed at the fill point indicating the type and specification of fluid to be added. The engine oil filler cap shall be a spring loaded with sufficient force to retain the cap in a closed position after servicing with no additional action by a service attendant.

All lubricant sumps, including engine, transmission, transmission cooler and hydraulic reservoir, shall be fitted with magnetic type, external, dry break drain plugs of standard size. Any fluid intended to be used on the bus requires a Maintenance Safety Data Sheet (MSDS) to be submitted for LACMTA approval. These fluids shall also be compatible and mixable with the respective LACMTA approved fluids used for the same application.

No engine bypass oil filter.

Engine Oil Pressure and Coolant Temperature Gauges

Engine oil pressure and coolant temperature gauges required in engine compartment.

Engine Air Cleaner

An air cleaner with a dry filter element and a graduated air filter restriction indicator shall be provided. The location of the air intake system shall be designed to minimize the entry of dust and debris and to maximize the life of the air filter. The engine air duct shall be designed to minimize the entry of water into the air intake system. Drainage provisions shall be included to allow any water/moisture to drain prior to entry into air filter.

The engine air inlet system shall be provided which meets the requirements of the OEM engine manufacturer. The air inlet system shall include a heavy-duty, high dust capacity, dry paper air filter with outside-to-inside air flow with an initial efficiency of 99 percent when tested per SAE Standard J726C, latest edition. The air filter shall be positioned for easy access and service, subject to LACMTA approval during proposal period.

Air inlet piping from the air filter to engine inlet shall use T-bolt type heavy duty, minimum ¾ inch wide, band clamps at all joints. One 1/81/4 inch NPTF test port, with brass plug, shall be provided near the air filter. The test port shall be positioned for easy accessibility with the engine door open.

TS 15. Hydraulic Systems

Hydraulic system service tasks shall be minimized and scheduled no more frequently than those of other major bus systems. All elements of the hydraulic system shall be easily accessible for service or unit replacement. Critical points in the hydraulic system shall be fitted with service ports so that portable diagnostic equipment may be connected or sensors for an off-board diagnostic system permanently attached to monitor system operation when applicable. A tamper-proof priority system shall prevent the loss of power steering during operation of the Bus if other devices are also powered by the hydraulic system.

The hydraulic system shall operate within the allowable temperature range as specified by the lubricant manufacturer. Any hydraulically driven system shall be subject to LACMTA approval at the Pilot Bus. The hydraulic system shall be filled with premium approved synthetic oil that will demonstrate a mean time between fluid replacements in excess of 50,000 miles. A system shall be provided to easily determine the level of hydraulic fluid in the reservoir.

The system shall be configured and/or shielded so that failure of any line shall not allow hydraulic fluid to spray or drain onto any component operating above the auto ignition temperature of the fluid.

The hydraulic system (steering) shall be located to accommodate easy service. The hydraulic system filter shall be located in the return, low pressure, circuit to the oil reservoir, or internal to the oil reservoir, subject to LACMTA approval at the Pilot Bus. Sufficient pump cleanable strainers shall be installed to keep the hydraulic pump and system free of contamination. The strainers shall be located for easy access and service.

TS 15.1 Fluid Lines

All lines shall be rigidly supported to prevent chafing damage, fatigue failures, degradation and tension strain. Lines should be sufficiently flexible to minimize mechanical loads on the components. Lines passing through a panel, frame or bulkhead shall be protected by grommets (or similar devices) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and wear. Pipes and fluid hoses shall not be bundled with or used to support electrical wire harnesses.

Lines shall be as short as practicable and shall be routed or shielded so that failure of a line shall not allow the contents to spray or drain onto any component operable above the auto-ignition temperature of the fluid.

All hoses, pipes, lines and fittings shall be specified and installed per the manufacturer's recommendations. All straight couplings and elbows shall be suitable 4-ply Hi-Line Silicone coated polyester with glossy finish. The straight couplings and elbows shall meet SAE J20R1 Class A rating with a temperature range of -65°F to 350°F. All hoses shall be protected from engine exhaust heat which may cause premature failure.

Unless otherwise specified, all hydraulic, fuel, oil, and air lines shall be made with steel tubing. When rigid lines are not practical, flexible fluid lines shall be kept as short as practical. Flexible lines shall be rubber hoses with braided stainless steel jackets except in applications where premium hoses compatible with the fluid type are required. Standard SAE or JIC end fittings shall be used.

Rigid and flexible lines shall be individually supported and readily accessible for inspection and service, including interior lines inside the bus, subject to LACMTA approval in Pre-Production meetings, and shall not touch one another or any part of the bus. Each individual line or hose shall be identified with a steel tag which includes a line number or designator and OEM part number for easy identification.

TS 15.2 Fittings and Clamps

All clamps shall maintain a constant tension at all times, expanding and contracting with the line in response to temperature changes and aging of the line material. The lines shall be designed for use in the environment where they are installed. For example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on.

All hose clamps shall be stainless steel. All hoses shall have appropriately sized, constant torque, hose clamps.

All fluid lines shall be secured using anchor blocks or suitable securement devices.

Compression fittings shall be standardized to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed, even if the components are known to be interchangeable.

TS 15.3 Charge Air Piping

Refer to Section TS 10.2 Charge Air Cooling.

TS 16. Radiator

Refer to Section TS 10.1 Engine Cooling.

TS 17. Oil and Hydraulic Lines

Oil and hydraulic lines shall be compatible with the substances they carry. The lines shall be designed and intended for use in the environment where they are installed. For example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on. Lines within the engine compartment shall be composed of steel tubing where practicable, except in locations where flexible lines are required. Flexible lines shall include hose guard shielding with a 450-degree operating range within the engine compartment. High pressure hose ends shall be clamped and secured to prevent movement of line in event of failure of the line or fitting.

Hydraulic lines of the same size and with the same fittings as those on other piping systems of the bus, but not interchangeable, shall be tagged or marked for use on the hydraulic system only.

TS 18. Fuel

TS 18.1 Fuel Lines

Fuel lines shall be securely mounted, braced and supported as designed by the bus manufacturer to minimize vibration and chafing and shall be protected against damage, corrosion or breakage due to strain or wear.

Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected locations to prevent line or manifold damage from unsecured objects or road debris.

Fuel hose and hose connections, where permitted, shall be made from materials resistant to corrosion and fuel and protected from fretting and high heat. Fuel hoses shall be accessible for ease of serviceability.

TS 18.1.1 Fuel Lines, Diesel

Not applicable.

TS 18.1.2 Fuel Lines, CNG

Fuel lines shall comply with NFPA-52. All tubing shall be a minimum of seamless Type 304 stainless steel (ASTM A269 or equivalent). Fuel lines and fittings shall not be fabricated from cast iron, galvanized pipe, aluminum, plastic, or copper alloy with content exceeding 70 percent copper. Lines, fittings, and hoses shall be clear and free from cuttings, burrs or scale. Thread joining material that is impervious to CNG shall be utilized as required. Fuel lines shall be identifiable as fuel lines only. Fuel lines shall be bent using computer numeric machines (CNC) to assure consistency, no hand bending will be permitted.

The bus manufacturer shall have a documented procedure for testing the high pressure line assembly in accordance with NFPA 52 requirements.

Fuel lines shall be securely mounted braced and supported using "split-block" type or stainless steel P clamps; all mounting clamps shall be mounted to a rigid structure to minimize vibration and shall be protected against damage, corrosion or breakage due to strain, rubbing, or wear. "Floating clamps" (not mounted to a rigid structure) shall not be permitted. Fuel lines shall not be used to secure other components (wires, air lines, etc.).

Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected location(s) to prevent line or manifold damage from unsecured objects or road debris.

Fuel hose connections, where permitted, shall be less than 48 inches in length, made from materials resistant to corrosion and action of natural gas, and protected from fretting and high heat and shall be supported approximately every 12 inches. Hose support in-between the bus frame and the engine that exceed 12 inches is subject to LACMTA approval during the Pre-Production meeting.

TS 18.2 Design and Construction

TS 18.2.1 Design and Construction, Diesel

Fuel Tank(s)

Not applicable.

TS 18.2.2 Design and Construction, CNG

Fuel Containers/Cylinders

CNG fuel containers/cylinders shall have a minimum service life of 20 years and must be designed, constructed, manufactured, and tested in accordance with the latest revision of at least one of the following:

U.S. Applications:

- NFPA 52-Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems.
- FMVSS 304.
- Any local standard(s) specifically intended for CNG fuel containers.

The design and construction of the fuel system supplied by the OEM shall comply with federal and local regulations.

The fuel cylinders shall have a 3,600 psi service pressure and a working pressure of 125 percent the service pressure. The fuel cylinders shall be mounted on the roof in such a manner that replacement of one cylinder shall not require the removal of additional cylinders. The fuel cylinders shall also be clearly marked with serial numbers that shall be easily visible to mechanics when installed on the bus. Each cylinder shall have a purchased date no more than six months from the date of released for shipment to the LACMTA.

Fuel cylinder construction shall be in accordance with DOT Standard 304, ANSI NGV2, latest revision design and test criteria. Cylinder shall be designed for the lightest weight possible which does not require a hydrostatic re-qualification. Cylinders shall be certified for refueling pressures to 125 percent of working pressure during temperature compensated fueling.

Installation

Fuel cylinders shall be installed and tested in accordance with ANSI/IAS NGV2, latest revision, Basic Requirements for Compressed Natural Gas Vehicles (NGV) Fuel Containers and NFPA 52, Compressed Natural Gas (CNG) Vehicular Fuel Systems Code, latest revision, Section 303. In the case of a low floor transit bus, the placement of containers shall be limited to the roof of the vehicle or in the compartment above the engine of the vehicle.

Fuel cylinders, attached valves, pressure relief devices, and mounting brackets should be installed and protected so that their operation is not affected by bus washers and environmental agents such as rain, snow, ice or mud. These components should be protected from significant damage caused by road debris or collision.

The roof and above the engine mounted containers shall be contained within a skeletal structure resembling a roll cage and contained within an enclosure. The enclosure shall incorporate a hinged clamshell type access. The access panels shall be designed to offer protection from weather and to be sacrificial as a means of

providing an escape path to atmosphere upon rapid enclosure pressure rise. The latching method shall utilize quick release captive hardware that can be demonstrated to last the life of the bus. Additional shielding shall be provided surrounding end fittings and valves as needed. Shields shall be attached to the bus structure hinged in a manner that permits one mechanic to unlatch and swing the shield open for routine inspections. As practical, electrical components shall not be located within the roof enclosure and if unavoidable, they shall be intrinsically safe.

The cover(s) shall be hinged along the axis of the bus and open to either side providing complete access to the cylinders with mechanic(s) standing on the roof. A safety latch system shall be provided so that the doors when opened cannot inadvertently close during servicing. Failure of the safety latch(es) shall not result in the cover opening while the bus is in operation. The bus roof shall be coated with "anti-slip" paint applied to areas that will accommodate safe access for routine inspections of the fuel cylinders.

Labeling

CNG fuel systems shall be labeled in accordance with NFPA 52, "Compressed Natural Gas (CNG) Vehicular Fuel Systems Code," latest revision. System expiration dates posted shall match individual cylinder dates. This shall include required labelling in driver area and inspection record labels at fueling area. Each cylinder shall have a purchased date no more than six (6) months from the date of released for shipment to the LACMTA.

Pressure Relief Devices (PRDs)

PRDs must be designed, constructed, manufactured and tested in accordance with ANIS/IAS PRD1, latest revision, "Pressure Relief Devices for Natural Gas Vehicle (NGV) Fuel Containers" and ANSI/IAS NGV2, latest revision, "Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers." All natural gas fuel system piping, including the PRD vent line shall be stainless steel. PRDs shall be vented to the roof area of the Bus with minimum protrusion above the roof line and shall be protected with a suitable cap which shall withstand daily bus wash activity, subject to LACMTA approval during proposal period.

Valves

Valves must be installed in accordance with ANIS/IAS NGV2, latest revision, "Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers" and NFPA 52, "Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems." Manual valves shall not require the use of a tool to operate.

A quarter turn valve, easily accessible through the fuel door shall isolate the high pressure manifold and fuel storage system from the rest of the engine fuel system. The valve function and open and closed positions shall be clearly marked. An additional minimum ½ inch valve shall be provided for draining the high pressure manifold and any fuel cylinder(s) through a service port. Type and location of the service port shall be subject to LACMTA approval during proposal period.

A primary fuel pressure regulator shall be supplied and mounted in an accessible location for servicing. Coolant lines shall be routed in a manner to prevent trapping air or draining coolant when the regulator is removed for service.

One flow control solenoid operated shut-off valve shall be installed for the system. A control over-ride system shall be provided to operate (open or close) the solenoid valve for defueling. The flow control solenoid valve shall remain in normally closed position until energized, and shall open when the engine is running.

All valves, including solenoid type, shall be designed to operate properly under all possible system flow rates and conditions.

One manually operated shut-off valve and one solenoid valve shall be installed on each individual fuel cylinder or each combined fuel cylinders.

Gauges

Glycerin filled gauges which meets NFPA 52 requirements shall be located in the high and low pressure manifolds which shall indicate fuel system pressure. The high pressure fuel gauge shall have maximum 100 psi increments, 0-5,000 psi, and shall be visible during fueling operations and rated for the maximum system pressure, have welded (not soldered) fittings and have a restrictive orifice. A pressure transducer shall be incorporated into the high pressure fuel manifold which shall provide the Operators' low fuel warning light which shall activate at between 300 and 650 psi.

Fuel Filter

Filters, rated for the system working pressure, shall be provided that meet the engine manufacturer's requirements and are effective for use in LACMTA's CNG compressor environment. Primary and secondary filters shall be coalescing and equipped with a drain valve or plug to periodically drain coalesced contaminants.

Fuel Filler

The fuel filler shall be located 30 to 38 feet measure behind the centerline of the front door, subject to LACMTA approval during proposal period. The filler cap shall be retained to prevent loss and shall be recessed into the body.

The fill and vent receptacles shall be located within an enclosure on the right side of the bus. The access door shall be sized to allow full viewing of gauges, ease of hookups and maneuver of fuel nozzle.

The fuel fill receptacle and vent receptacle attachment shall be robust and capable of routine fueling connects/disconnects without deflection or metal fatigue, and capable of withstanding mechanical loads induced by a fueling drive-away incident without attachment failure. Existing LACMTA fueling system break-away device requires an applied force of 150 lb.-F to cause separation.

A dual fuel filler receptacle shall be located on the right side, rear corner, of the bus, 36 to 50 inches from the street surface. The fill receptacles shall be ANSI/AGA NGV1 or NGV2 certified and shall accept an OPW CT5000 nozzle or approved equal and an OPW CT1000 nozzle or approved equal and shall incorporate dust caps permanently affixed to the receptacles.

A static ground connecting point shall be installed near the fueling receptacles for grounding during fueling/defueling operations.

Fueling System

The fueling port receptacle shall be an ANSI/AGA NGV1 or NGV2 certified receptacle as designated by the LACMTA. The bus shall be capable of being fueled by a LACMTA fuel system nozzle. The fueling port receptacle location shall be such that connection by fueling personnel can be performed without physical strain or interference. A dust cap shall be permanently "tethered" to the fueling port receptacle. To prevent drive-away events, the fueling system shall incorporate a proximity sensor at the fast fill fuel receptacle to detect if a fuel nozzle is connected to it and apply an interlock. A separate sensor shall be incorporated on the fuel fill door. (Refer to Section TS 38.4) The fueling system must be sized to accommodate a minimum fuel flow of 5,000 scfm at 4,250 psi.

Defueling System

The CNG defueling port shall be an NGV-3.1/CGA-12.3 certified receptacle subject to LACMTA approval during proposal period. The CNG defueling port shall be located on the curbside of the bus, in a location that is compatible with the LACMTA's defueling station operation. The defueling system shall incorporate the following characteristics:

- Dust cap permanently "tethered" to the defueling port.
- Device(s) to prevent inadvertent defueling.
- Components compatible with LACMTA's defueling operation.

- The piping and fittings onboard the bus shall be sized to allow the fueling station to meet the following operating parameters:
- Fuel system sized to allow a bus with 20,000 scf on-board to defuel within six hours.
- The atmospheric-vent system shall allow a bus with 20,000 scf of on-board CNG storage to defuel to atmospheric pressure within 80 minutes.
- Location/method of attaching CNG fuel system to earth ground.

TS 19. Emissions and Exhaust

TS 19.1 Exhaust Emissions

The engine and related systems shall meet all applicable emission and engine design guidelines and standards.

The electric vehicle propulsion system shall comply with CARB's zero emissions standard.

TS 19.2 Exhaust System

Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof. The exhaust pipe shall be of sufficient height to prevent exhaust gases and waste heat from re-entering the bus, discoloring or causing heat deformation to the roof of the bus. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component, including the exhaust after-treatment compartment area. The exhaust outlet shall be designed to minimize rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the after-treatment.

Exhaust system shall incorporate joints as necessary to facilitate removal and replacement of individual components including exhaust muffler or, if required to meet emissions requirements, catalyst units. Mounting cushions, if provided, must last the life of the engine and shall not deteriorate when exposed to high exhaust system temperatures. Exhaust piping joints shall be machined V-band clamp design. Flexible exhaust lines necessary to accommodate engine movement shall be constructed from stainless steel bellows. Exhaust piping in the engine enclosure shall include reusable metal jacket that is easy to replace.

TS 19.3 Exhaust After-treatment

An exhaust after-treatment system will be provided to ensure compliance to all applicable EPA regulations in effect.

Diesel Exhaust Fluid Injection

Not applicable.

TS 19.4 Particulate After-treatment

Not applicable.

STRUCTURE (TS 20-TS 30)

TS 20. General

TS 20.1 Design

The structure of the bus shall be designed to withstand the transit service conditions typical of an urban duty cycle throughout its service life. The vehicle structural frame shall be designed to operate with minimal maintenance throughout the 12-year or 500,000-mile design operating profile. The design operating profile specified by the LACMTA shall be considered for this purpose.

TS 21. Altoona Testing

Prior to acceptance of first bus, the vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the LACMTA.

If available, the Altoona Test Report shall be provided to the LACMTA with the Proposal submittal. If not available, then the report shall be provided prior to First Article Bus acceptance.

TS 21.1 Structural Validation

Baseline Structural Analysis

The structure of the bus shall have undergone appropriate structural testing and/or analysis. At minimum, appropriate structural testing and analysis shall include Altoona testing or finite element analysis (FEA).

TS 22. Distortion

The bus, loaded to GVWR and under static conditions, shall not exhibit deflection or deformation that impairs the operation of the steering mechanism, doors, windows, passenger escape mechanisms or service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a six inch curb or in a six-inch deep hole.

TS 23. Resonance and Vibration

All structure, body and panel-bending mode frequencies, including vertical, lateral and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible or sensible resonant vibrations during normal service.

TS 23.1 Engine Compartment Bulkheads

The passenger and engine compartment shall be separated by fire-resistant bulkheads. The engine compartment shall include areas where the engine and exhaust system are housed. This bulkhead shall preclude or retard propagation of an engine compartment fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90A, latest revision. Only necessary openings shall be allowed in the bulkhead, and these shall be fire-proof. Any passageways for the climate control system air shall be separated from the engine compartment by fireproof material. Piping through the bulkhead shall have copper, brass, or fireproof fittings sealed at the bulkhead with copper or steel piping on the forward side. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. The conduit and bulkhead connector shall be sealed with fireproof material at the fire wall. Engine access panels in the bulkhead shall be fabricated of fireproof material and secured with fireproof fasteners. These panels, their fasteners and the bulkhead shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the bulkhead. Access panels shall be constructed to prevent vapors and fumes from entering the passenger compartment.

TS 23.2 Crashworthiness (Transit Bus)

Contractor shall be required to provide FEA software analysis or other evidence of compliance with this section during the pre-award audit. The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a six inches reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without the roof-mounted equipment installed.

The bus shall withstand a 25 mph impact by a 4,000-pound automobile at any side, excluding doorways, along either side of the bus with no more than three inches of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the bus interior.

Exterior panels below 35 inches from ground level shall withstand a static load of 2,000 pounds applied perpendicular to the bus by a pad no larger than five sq. inches. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

The bus, at GVWR and under static conditions, shall not exhibit deformation or deflection that impairs operation of doors, windows, or other mechanical elements. Static conditions include the bus at rest with any one wheel or dual set of wheels on a 6-inch curb or in a six-inch deep hole.

All structure, body, and panel-bending mode frequencies, including vertical, lateral, and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible, or sensible resonant vibrations during normal service.

TS 24. Corrosion

The bus flooring, sides, roof, understructure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and de-icing materials for a period of 12 years or 500,000 miles, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, with the LACMTA's use of proper cleaning and neutralizing agents.

All materials that are not inherently corrosion resistant shall be protected with corrosion-resistant coatings. All joints and connections of dissimilar metals shall be corrosion resistant and shall be protected from galvanic corrosion. All body joints and seams shall be protected by application of polyurethane based sealer, or approved equal, at assembly. Representative samples of all materials and connections shall withstand a two-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces and no weight loss of over one percent.

The entire bus understructure, including wheel housings, shall be spray-coated prior to installation of sub-assemblies with suitable corrosion preventative undercoating which meets the bus manufacturer's corrosion protection specifications. The Contractor shall provide a copy of its proposed undercoating system program at the first Pre-Production meeting.

Corrosion Resistance Requirements for Exposed and Interior Surfaces of Tubing throughout Entire Vehicle

All exposed surfaces and the interior surfaces of tubing and other enclosed members shall be corrosion resistant through incorporation of intrinsically corrosion-resistant materials or through the application of a corrosion protection system.

Additional Corrosion Resistance Requirements

Alternatively the vehicle may be constructed using only inherently corrosion-resistant materials and fasteners such as stainless steel or composites to minimize deterioration

TS 25. Towing

Towing attachment points shall be provided on the front of the bus. Each towing device, when used with a load equalizing sling, shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 degrees of the longitudinal axis of the bus. If applicable, the rear towing device(s) shall not provide a toehold for unauthorized riders. The method of attaching the LACMTA's towing bar shall require the specific approval of the LACMTA in Pre-Production meetings and shall not require the removal, or disconnection, of front suspension or steering components. Removal of the bike rack is permitted for attachment of towing devices. Contractor shall provide 15 sets of any special towing equipment adapters, if required, so that the LACMTA is able to flat tow the bus. Contractor shall demonstrate compliance with these provisions using the Pilot Bus.

Provision of Connectors for Towing

Shop air connectors shall be provided at the front and rear of the bus and shall be capable of supplying all pneumatic systems of the bus with externally sourced compressed air. The location of these shop air connectors shall facilitate towing operations. A second air supply should be provided to allow the rear service brakes to be applied using the tow truck brake signal air pressure to apply the rear primary service brakes.

All male fittings shall have an additional quarter turn manual shut off valve provided near the front bumper for use only during towing, subject to LACMTA approval in Pre-Production meetings. Fittings shall be protected against dirt and moisture when not in use. Air connectors shall be LACMTA standard air chucks conveniently located in the engine compartment. Air lines leading to the external air shall include hand shut-off valves.

Lifted (Unsupported) Front Axle and Flat Towing Capability

The front towing attachment points shall allow attachment of the LACMTA's standard tow bar. The front towing attachment points shall permit towing of the bus at curb weight by the towing device(s) and the LACMTA tow bar without damage to anybody panel or component. These devices shall permit common flat towing.

Two rear recovery devices/tie downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus. The method of attaching the tow bar or adapter shall require the specific approval of the LACMTA in pre-production meetings. Any tow bar or adapter exceeding 50 pounds should have means to maneuver or allow for ease of use and application. Each towing device shall accommodate a crane hook with a one-inch throat.

TS 26. Jacking

It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack with or without special adapter, when a tire or dual set is completely flat and the bus is on a level, hard surface, without crawling under any portion of the bus. Jacking from a single point shall permit raising the bus sufficiently high to remove and reinstall a wheel and tire assembly. Jacking pads located on the axle or suspension near the wheels shall permit easy and safe jacking with scissors or bottle jack with the flat tire or dual set on a six inches high run-up block not wider than a single tire. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

Jacking and changing any one tire/wheel assembly shall be completed by one LACMTA mechanic. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

Yellow Pads

Jacking pads shall be painted safety yellow.

Decals

Apply decals to identify location of jacking pads. The location of the jacking pad shall be identified with a label on the exterior of the bus, directly over the jack pad.

TS 27. Hoisting

The bus axles or jacking plates shall accommodate the lifting pads of a two-post hoist system. Jacking plates, if used as hoisting pads, shall be 5-1/4 square inches, with a turned-down flange not less than 1/2-inch deep on each side (if applicable) to prevent the bus from falling off the hoist. A model or sample jacking plate shall be provided during Pre-Production meetings for approval by LACMTA. Other pads or the bus structure shall support the bus on jack stands independent of the hoist. The manufacturer may be required to demonstrate compatibility with LACMTA hoists as part of the towing demonstration for TS 25.

TS 28. Floor

TS 28.1 Design (Transit Bus)

The floor shall be essentially a continuous plane, except at the wheel housings and platforms. Where the floor meets the walls of the bus, as well as other vertical surfaces such as platform risers, the surface edges shall be blended with a circular section of radius not less than 3/8 inch or installed in a fully sealed butt joint. Similarly, a molding or cover shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding two degrees to allow for drainage.

Floor installation, repair, and replacement method shall be subject to LACMTA approval during proposal period.

Bi-level Floor Design

The floor design shall consist of two levels (bi-level construction). Aft of the rear door extending to the rear settee riser, the floor height may be raised to a height no more than 21 inches above the lower level, with equally spaced steps. An increase slope shall be allowed on the upper level, not to exceed 3.5 degrees off the horizontal.

TS 28.2 Design (Commuter Bus)

Not applicable.

TS 28.3 Design (Articulated Transit Bus)

Not applicable.

TS 28.4 Strength

The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement and designed to last the life of the bus. Sheet metal screws shall not be used to retain the floor, and all floor fasteners shall be serviceable from one side only. Any adhesives, bolts or screws used to secure the floor to the structure shall last and remain effective throughout the life of the bus. Tapping plates, if used for the floor fasteners, shall be no less than the same thickness as a standard nut, and all floor fasteners shall be secured and protected from corrosion for the service life of the bus.

The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic deflection of no more than 0.60 inch from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. The floor, with coverings applied, shall withstand a static load of at least 150 pounds applied through the flat end of a ½-inch diameter rod, with 1/32-inch radius, without permanent visible deformation.

TS 28.5 Construction

The floor shall consist of the subfloor and the floor covering that will last the life of the bus. The floor as assembled, including the sealer, attachments and covering shall be waterproof, non-hygroscopic and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot). It shall be impervious to wood-destroying insects such as termites.

The floor shall be constructed using composite flooring material approved by the LACMTA during proposal period. All floor surfaces, including edges shall be water proofed, non-hygroscopic, resistant to wet and dry rot, mold growth, and impervious to insects. Floor panels shall be attached to the substructure in such a manner as to be water tight and free from squeaks. Fasteners shall be rust proof.

TS 28.6 Construction (Commuter Bus)

Not applicable.

TS 29. Platforms

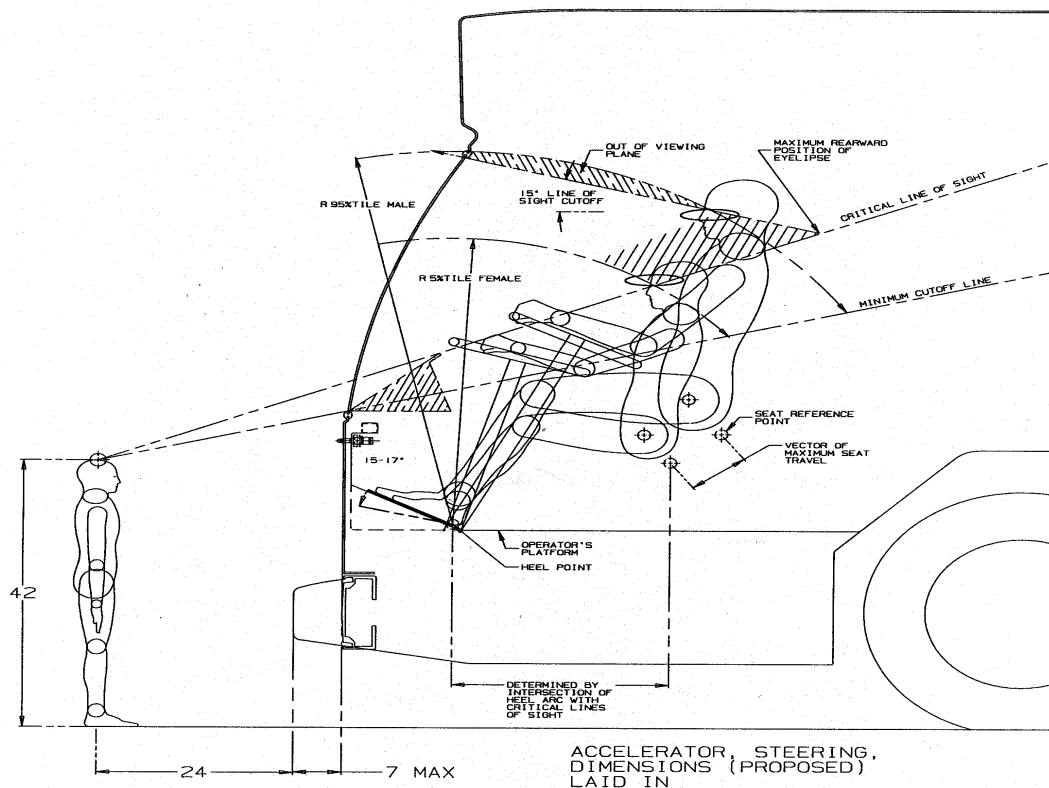
TS 29.1 Driver's Area

The covering of platform surfaces and risers, except where otherwise indicated, shall be the same material as specified for floor covering. Non-corroding metal trim shall be provided and installed with stainless steel hardware along top edges of platforms unless integral nosing is provided.

TS 29.2 Driver's Platform

The driver's platform shall be of a height such that, in a seated position, the driver can see an object located at an elevation of 42 inches above the road surface, 24 inches from the leading edge of the bumper. Notwithstanding this requirement, the platform height shall not position the driver such that the driver's vertical upward view is less than 15 degrees. A warning decal or sign shall be provided to alert the driver to the change in floor level. Figure 3 illustrates a means by which the platform height can be determined, using the critical line of sight.

FIGURE 3
Determining Platform Height



TS 29.3 Farebox

Farebox placement should minimize impact to passenger access and minimize interference with the driver's line of sight.

Driver Interface Required; Platform Needed to Bring Height to Driver Access

If the driver's platform is higher than 12 inches, then the farebox is to be mounted on a platform of suitable height to provide accessibility for the driver without compromising passengers' access. A maximum of two steps shall be allowed for access to the Operator's seat pedestal. Farebox stanchion shall be placed to also provide assistance to Operator when entering/exiting driver's seat.

Stanchions

Stanchions shall be located around the farebox in accordance with ADA requirements. and subject to LACMTA approval during proposal period.

TS 29.4 Rear Step Area to Rear Area (Transit Bus)

If the vehicle is of a bi-level floor design, then a rear step area shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This step area shall be cut into the rear platform and shall be approximately the aisle width, a minimum 12 inches deep and approximately half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with skid-resistant material with a visually contrasting nosing and shall be sloped slightly for drainage. A warning decal or sign shall be provided at the immediate platform area to alert passengers to the change in floor level.

If there is an interior raised floor area, a maximum of two steps shall be allowed for access to the raised floor area behind the rear door. All step riser heights shall be the same. Risers shall be continuous, flat planes across the entire width. Step risers may be inclined, not to exceed 10 degrees from the vertical (nosing edge lower). All corners shall have radii no less than ¼-inch to facilitate cleaning.

Each step shall simultaneously support a 300-pound load evenly distributed over the center half of each step-tread without permanent deformation and with elastic deflection of no more than 1/8-inch. Each step tread shall support a load of 500 pounds evenly distributed over the center half of the tread without permanent deformation. The steps shall be sloped only sufficient to preclude water accumulation.

TS 30. Wheel Housing

TS 30.1 Design and Construction

Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to preclude overheating when the bus is operating on the design operating profile. Wheel housings shall be constructed of corrosion-resistant and fire-resistant material. Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to prevent overheating when the bus is operated in revenue service.

Wheel housings, as installed and trimmed, shall withstand impacts of a two- inch steel ball with at least 200 foot-pounds of energy without penetration.

TS 30.2 Design and Construction (Transit Bus)

Interference between the tires and any portion of the bus shall not be possible in maneuvers up to the limit of tire adhesion with weights from curb weight to GVWR. Wheel housings shall be adequately reinforced where seat pedestals are installed. Wheel housings shall have sufficient sound insulation to minimize tire and road noise and meet all noise requirements of this specification.

Design and construction of front wheel housings shall allow for the installation of a radio or electronic equipment storage compartment on the interior top surface.

The finish of the front wheel housings shall be scratch-resistant and complement interior finishes of the bus to minimize the visual impact of the wheel housing. If fiberglass, or other composite material, wheel housings are provided, then they shall be color-impregnated to match interior finishes. The lower portion extending to approximately 10 to 12 inches above the floor shall be equipped with stainless steel trim.

Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than seven inches higher than the wheel well housing. If required for access to suspension components, installation of access panels in the wheel housing must meet all requirements listed including fastening devices, strength and mounting.

TS 30.3 Articulated Joint (Articulated Transit Bus)

Not applicable.

TS 30.4 Raceway (Articulated Transit Bus)

Not applicable.

TS 30.5 Bellows

Not applicable.

CHASSIS (TS 31-TS 38)

TS 31. Suspension

TS 31.1 General Requirements

The front and rear suspensions shall be pneumatic type. The basic suspension system shall last the service life of the bus without major overhaul or replacement. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Routine adjustments shall be easily accomplished by limiting the removal or disconnecting the components. Heavy-duty height control valves shall be provided to keep the bus body in relatively level position and shall contain a dampening or compensating feature to prevent excessive consumption of air resulting from high-frequency axle movements over rough streets. The height control valves will retain the height of the body in relation to the axles under all loading conditions. Regardless of load, the bus relative height to the centerline of the wheels shall not change more than ± 0.5 inches

TS 31.2 Alignment

All axles should be properly aligned so the vehicle tracks accurately within the size and geometry of the vehicle.

TS 31.3 Springs and Shock Absorbers

TS 31.3.1 Suspension Travel

The suspension system shall permit a minimum wheel travel of three inches jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and three inches rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than $\frac{1}{2}$ inch at any point from the height required. The safe operation of a bus cannot be impacted by ride height up to one inch from design normal ride height.

TS 31.3.2 Damping

Vertical damping of the suspension system shall be accomplished by hydraulic shock absorbers mounted to the suspension arms or axles and attached to an appropriate location on the chassis. Damping shall be sufficient to control bus motion to three cycles or less after hitting road perturbations. The shock absorber bushing shall be made of elastomeric material that will last the life of the shock absorber. The damper shall incorporate a secondary hydraulic rebound stop. Shock absorber travel shall be centered on suspension travel to equalize travel to stops in jounce and rebound.

TS 31.3.3 Lubrication

Standard Grease Fittings

Components that do not require regular greasing are desired. A review of all components available that do not require greasing shall be provided with proposal. All elements of steering, suspension and drive systems

requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534. These fittings shall be located for ease of inspection and shall be accessible with a standard grease gun from a pit or with the bus on a hoist. Each element, requiring lubrication, shall have its own grease fitting with a relief path. The lubricant specified shall be standard for all elements on the bus serviced by standard fittings and shall be required no less than every 6,000 miles.

TS 31.3.4 Kneeling/Raising

Kneeling

A kneeling system shall lower the entrance of the bus a minimum of 2.75 inches during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door by the driver. The kneeling control shall provide the following functions:

- Downward control must be held to allow downward kneeling movement.
- Release of the control during downward movement must completely stop the lowering motion and hold the height of the bus at that position.
- Upward control actuation must allow the bus to return to normal floor height without the driver having to hold the control.

The brake and throttle interlock shall prevent movement when the bus is kneeled. The kneeling control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully kneeled position within 4.5 seconds. After kneeling, the bus shall rise within 3 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum vertical acceleration shall not exceed 0.2g, and the jerk shall not exceed 0.3g/second.

An indicator visible to the Operator shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert boarding passengers and minimize the sound directed to other areas. The audible alarm sound level shall be automatically adjustable to compensate for ambient sound levels. A warning light mounted near the curbside of the front door, a minimum 2.5 inches diameter amber lens, shall be provided that will blink when the kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.

Raising

The bus shall incorporate a system controlled by the Operator that permits the bus to raise (to account for high curbs) 2.75 inches, measured from normal ride height at the center of the bottom front step regardless of passenger load up to GVWR. Brake and throttle interlock shall be activated to prevent movement when the Bus is raised. The bus shall rise at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully raised position within 4.5 seconds. After rising the bus shall recover (lower) within 3.5 seconds to a ride height permitting the bus to resume service and shall fully recover to the correct operating ride height within 10 seconds. During the lowering operation, the maximum acceleration shall not exceed 0.2g and the jerk shall not exceed 0.3g/sec. measured on the front door step tread.

An indicator visible to the Operator shall be illuminated until the bus has recovered to a height adequate for safe operation. The indicator lights shall be clearly labeled. Warning devices that operate with the high curb system which are visible and audible to passengers near the curbside of the front door shall be provided.

TS 32. Wheels and Tires

TS 32.1 Wheels

All wheels shall be interchangeable and shall be removable without a puller. Wheels shall be compatible with tires in size and load-carrying capacity. Front wheels and tires shall be balanced and counter weighted as an assembly per SAE J1986. Wheel stud nut(s) shall be 1.50-inch in size, (or metric equivalent), and shall be finished with rust preventative in natural steel with no paint.

Wheels and tires shall be removable without disturbing the fender skirts.

Aluminum Wheel

Wheels shall be Alcoa Durabrite polished aluminum. Wheels must be sized to accommodate disc brakes at all wheel locations.

TS 32.2 Tires

Tires shall be suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. Load on any tire at GVWR shall not exceed the tire Supplier's rating.

The tires shall be provided under a lease agreement between LACMTA and the tire Supplier. Tires are to be furnished to the Contractor by the LACMTA or authorized representative. Contractor shall provide the LACMTA with a record listing tires installed for each bus delivered. The information shall include the LACMTA brand serial number and mounting location on the bus. Contractor shall conform to tire manufacturer specifications for maximum road speed and duty cycle during bus delivery.

TS 33. Steering

Electrically driven hydraulic assisted or electrically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated. Steering torque applied by the Operator shall not exceed 10 foot-pounds with the front wheels straight ahead. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops. Steering effort shall be measured with the Bus at Seated Load Weight (SLW), stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement with the tires inflated to recommended pressure. Power steering failure shall not result in loss of steering control. While the bus is in operation, the steering effort shall not exceed 55 pounds at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

TS 33.1 Steering Axle (Transit Bus)

Solid Beam Axle and Grease-Type Front Bearings and Seals

The front axle shall be solid beam, non-driving with a load rating sufficient for the bus loaded to GVWR and shall be equipped with preferred unitized grease type front wheel bearings and seals.

All friction points on the front axle shall be equipped with replaceable bushings or inserts and, if needed, lubrication fittings easily accessible from a pit or hoist.

The steering geometry of the outside wheel shall be within two degrees of true Ackerman up to 50 percent lock measured at the inside wheel. The steering geometry shall be within three degrees of true Ackerman for the remaining 100 percent lock measured at the inside wheel.

TS 33.2 Steering and Tag Axles (Commuter Bus)

Not applicable.

TS 33.3 Steering Wheel

TS 33.3.1 Turning Effort

Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement and the tires inflated to recommended pressure.

Under these conditions, the torque required to turn the steering wheel 10 degrees shall be no less than 5 foot-pounds and no more than 10 foot-pounds. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops, as the relief valve activates.

Power steering failure shall not result in loss of steering control. With the bus in operation, the steering effort shall not exceed 55 pounds at the steering wheel rim, and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

Caster angle shall be selected to provide a tendency for the return of the front wheels to the straight position with minimal assistance from the driver.

TS 33.3.2 Steering Wheel, General

The steering wheel diameter shall be approximately 18 to 20 inches; the rim diameter shall be $\frac{7}{8}$ to $1\frac{1}{4}$ inches and shaped for firm grip with comfort for long periods of time.

Steering wheel spokes and wheel thickness shall ensure visibility of the dashboard so that vital instrumentation is clearly visible at center neutral position (within the range of a 95th-percentile male, as described in SAE 1050a, Sections 4.2.2 and 4.2.3). Placement of steering column must be as far forward as possible, but either in-line with or behind the instrument cluster.

Foam-covered steering wheel is not acceptable. The steering wheel shall be removable with a standard or universal puller.

TS 33.3.3 Steering Column Tilt

The steering column shall have full tilt capability with an adjustment range of no less than 35 degrees and easily adjustable by the driver.

Steering column shall be a tilt and telescopic model. Column shall be easily adjustable while driver is seated in the driver's seat. The mechanism for adjustments shall be designed for ease of use, durability, utilize detents to position and lock the steering column and not require tightening by hand to apply a clamping force.

TS 33.3.4 Steering Wheel Telescopic Adjustment

The steering wheel shall have full telescoping capability and have a minimum telescopic range of two inches (but no more than 5 inches) and a minimum low-end adjustment of 32 inches, measured from the top of the steering wheel rim in the horizontal position, (0 degrees slope), to the cab floor at the heel point.

TABLE 6

Steering Wheel Height¹ Relative to Angle of Slope

At Minimum Telescopic Height Adjustment (+0 in.)		At Maximum Telescopic Height Adjustment (+5 in.)	
Angle of Slope	Height	Angle of Slope	Height
0 degrees	32 inches	0 degrees	34 inches
15 degrees	26.2 inches	15 degrees	31.2 inches
25 degrees	24.6 inches	25 degrees	29.6 inches
35 degrees	22.5 inches	35 degrees	27.5 inches

1. Measured from bottom portion closest to driver.

TS 34. Drive Axle

The bus shall be driven by a heavy-duty axle with a load rating sufficient for the bus loaded to GVWR. The drive axle shall have a design life to operate for not less than 300,000 miles on the design operating profile without replacement or major repairs. The lubricant drain plug shall be magnetic type. If a planetary gear

design is employed, the oil level in the planetary gears shall be easily checked through the plug or sight gauge. The axle and driveshaft components shall be rated for both propulsion and retardation modes with respect to duty cycle.

NOTE: The retardation duty cycle can be more aggressive than propulsion.

The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, bus floor or the ground, in the event of a tube or universal joint failure.

End tubes shall be threaded to allow for adjustment of wheel bearing nuts.

Wheel bearings shall be sealed, unitized construction.

Rear axle shall use full synthetic oil meeting axle manufacturer's specifications.

NOTE: Trip recorder to be used in place of hub odometer. (Refer to Section TS 43.1.3)

TS 34.1 Non-Drive Axle

The non-drive axle is the drive axle without the drive gear with a load rating sufficient for the load to GVWR.

TS 35. Tag Axles (Commuter Coach)

Not applicable.

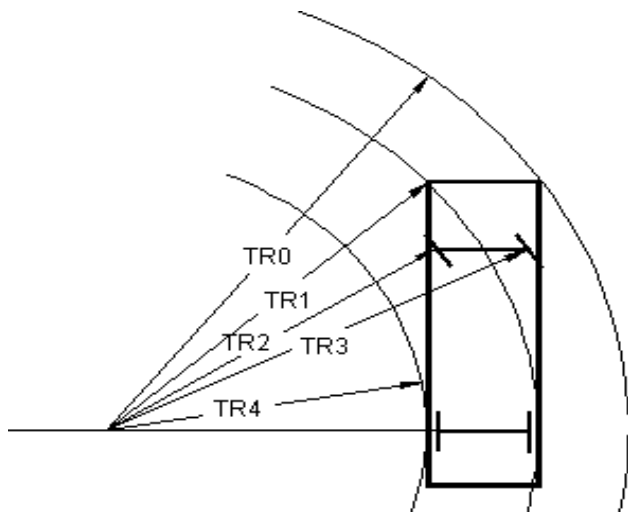
TS 36. Turning Radius

Outside body corner turning radius shall not exceed the maximum at SLW. The front tires shall not rub or interfere in any manner with the bus body parts when turned in either direction under all operating conditions. The turning radius shall be consistent from bus to bus and left to right with no more than six inch difference in measured radius.

TABLE 7
Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius (see Figure 4)
40 ft.	44 ft. (TR0)

FIGURE 4
Turning Radius



TS 37. Brakes

TS 37.1 Service Brake

The entire service brake system, including ABS controls, friction material, shall meet applicable FMVSS standards. The entire brake system, including friction material, shall have overhaul or replacement life goal of at least 45,000 miles when operated under LACMTA service.

Brakes shall be self-adjusting. Mechanical Brake Wear indicators, (visible brake sensors), shall utilize stainless steel exposed push rods.

TS 37.2 Actuation

Air-Actuated Brakes

Service brakes shall be controlled and actuated by a compressed air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed 70 pounds at a point seven inches above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when his or her foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. The ECU for the ABS system shall be protected, yet in an accessible location to allow for ease of service.

The total braking effort shall be distributed between all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations. Manufacturer shall demonstrate compliance by providing a copy of a thermodynamic brake balance test upon request.

TS 37.3 Friction Material

The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or chamfer indicating the thickness at which replacement becomes necessary shall be provided on each brake lining. No bolts or rivets shall be used to retain the brake lining.

TS 37.4 Hubs and Drums/Discs

Replaceable unitized wheel bearing seals shall run on replaceable wear surfaces. Wheel bearings and hub seals and unitized hub assemblies shall not leak or weep lubricant when operating on the design operating profile for the duration of the initial manufacturer's warranty or 100,000 miles, whichever is longer.

Axle hubs shall be HUB pilot wheel mounting. Hubs shall be painted semi-gloss (50 percent) black with no paint on mating surfaces.

Disc Brakes on All Axles

The bus shall be equipped with disc brakes on all axles, and the brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

The brake system material and design shall be selected to absorb and dissipate heat quickly so that the heat generated during braking operation does not glaze brake linings.

TS 37.5 Hubs and Drums (Commuter Bus)

Not applicable

TS 37.6 Parking/Emergency Brake

Air Brakes

The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121.

The parking brake shall be actuated by a valve mounted convenient to the Operator, subject to LACMTA approval in Pre-Production meetings. In the event of total loss of air pressure, spring brakes shall be applied automatically.

An audible warning alarm shall be activated when the Master Run switch is in "Off" position or transmission is in neutral and parking brake is not actuated.

Emergency Brake

An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. The driver shall be able to manually depress and hold down the emergency brake release valve to release the brakes and maneuver the bus to safety. Once the driver releases the emergency brake release valve, the brakes shall engage to hold the bus in place.

Parking and Emergency brake controls shall be equipped with powder coated metal knobs (no plastic knobs). Colored "yellow" for Parking, and "green" for Emergency release functions.

TS 38. Interlocks (Transit Bus)

TS 38.1 Passenger Door Interlocks

To prevent opening mid and rear passenger doors while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the mid/rear doors from being enabled or opened unless the bus speed is less than 3 mph.

To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus when the driver's door control is moved to a mid/rear door enable or open position, or a mid or rear door panel is opened more than three inches from the fully closed position (as measured at the leading edge of the door panel). This interlock shall also be applied when the emergency release system for the doors is activated.

The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a six percent grade, with the engine at idle and the transmission in gear, until the interlocks are released. These interlock functions shall be active whenever the vehicle master run switch is in any run position.

All door systems employing brake and accelerator interlocks shall be supplied with supporting failure mode effects analysis (FEMA) documentation, which demonstrates that failure modes are of a failsafe type, thereby never allowing the possibility of release of interlock while an interlocked door is in an unsecured condition, unless the Master Door Interlock switch has been actuated to intentionally release the interlocks. Built in redundancy shall prevent the system from becoming unsafe while a single point failure exists anywhere in the system.

Brake interlock regulator shall be non-adjustable.

Once activated the brake interlock shall not release until the operator makes a 6 psi service brake application.

Accelerator and brake interlock shall not be applied when front door is opened.

TS 38.2 Lift Interlocks

When front ramp/kneel enable switch is activated an accelerator interlock shall disable the accelerator and a brake interlock shall engage the service brake system to stop movement of the bus. Interlocks shall not be released until ramp is fully stowed and the operator makes a 6 psi service brake application.

TS 38.3 Kneel Interlocks

When front ramp/kneel enable switch is activated an accelerator interlock shall disable the accelerator and a brake interlock shall engage the service brake system to stop movement of the bus. Interlocks shall not be released until bus returns to normal operating height and the Operator makes a 6 psi service brake application.

TS 38.4 Fuel/Charging System Interlocks

CNG

The bus shall be designed to remove ignition power from the engine, prevent the transmission from going into gear and disable the engine starter when the sensor detects a fuel nozzle connected to the fast fill receptacle. The interlock shall be of the type such that if the sensor fails, the bus will not start. The system shall provide a separate interlock preventing starting of the engine when fuel fill door is in open position. Both sensing systems shall be a high-reliability design with minimum 95 percent availability for correct operation and function. This interlock shall also be of the type such that if the sensor fails, the bus will not start.

~~The bus shall ignore a failure of the CNG fuel nozzle proximity sensor as long as the fuel door is closed and the engine is running. It shall not remove ignition power to the engine under these conditions. However, when an operator parks the bus and shuts down the engine, he/she shall not be able to restart the engine. The fuel nozzle proximity sensor shall prohibit the engagement of the starting circuit and engage the "FUELING IN PROCESS" indication on the dash monitor. That will be a cue to a mechanic that the fuel nozzle proximity sensor or its connection is faulty and needs to be checked or replaced. The fuel nozzle proximity sensor prohibits the engagement of the starting circuit and engages the "Fueling in Process" indication on the dash monitor.~~

Zero Emission

The bus shall be designed to remove ignition power from the PPU and prevent the drive system from engaging when the sensor detects a charger connected to the charge port. The interlock shall be of the type such that if the sensor fails, the bus will not run. The sensing systems shall be a high-reliability design with minimum 95 percent availability for correct operation and function. This interlock shall also be of the type such that if the sensor fails, the bus will not run.

PNEUMATIC SYSTEM (TS39)

TS 39. Pneumatic System

TS 39.1 General

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity. The bus air system shall meet requirements of California Code 13 CCR 1245 for air leakage and shall not leak as defined by the following tests:

- The air pressure in new buses shall not decrease by more than 10 psi over the first 10-minute period of time immediately following initial air build up, as indicated on the brake reservoir dash gauges, (as per TP-FMVSS121).
- With the air system fully charged, cooled off and stabilized for 10 minutes, the brake interlock applied, and no other accessories in use (i.e., opening/closing the doors, air actuated wipers), a new bus shall not leak more than 1 psi over the following 15 minutes as indicated on the brake reservoir dash gauges.

Provision shall be made to apply shop air to the bus air systems. A quarter turn manual shut-off valve with quick disconnect fitting shall be easily accessible and located in the engine compartment and shall supply air prior to the air dryer, subject to LACMTA approval in Pre-Production meetings.

Air for the compressor shall be filtered. The air system shall be protected per FMVSS 121 (S5.1.2.3).

Air System Design Operating Profile

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity, as defined by using the following test(s):

With bus loaded to GVWR and operating under normal conditions, the air system and its major components (air compressors, air dryers) shall be designed to operate under the Manhattan Operating Profile as defined per SAE J2711 or an equivalent, without exceeding the technical specifications of the major components. Operating under normal conditions implies –

- All air actuated accessories on.
- Retarders/regenerative brakes in use.
- Ambient temperatures between 32°F and 100°F;
- One kneel operation on every 4th bus stop as defined per SAE J2711.
- Interlock shall be set at each stop.

TABLE 8

Air System Test Profiles

Operating profile (Extract from SAE J2711)	Speed [mph]		Stops [#]	Distance [miles]	Stops [# /miles]
	Top	Average			
UDDS (high speed bus operation)	58.00	19	28.00	11.10	2.53
Orange County (intermediate speed bus operation)	40.63	12.7	31.00	6.54	4.75
Manhattan (low speed bus operation)	25.30	6.8	40.00	4.13	9.69

Kneeling operation shall be achieved as per TS 31.3.4 and implies:

- Bus brought to a complete stop;
- Open all doors (implies activation of brake interlock(s))
- Kneel to meet TS 31.3.4 requirements;
- Wait 10 seconds;

- Close all doors;
- Apply service brakes to release brake interlock(s);
- Raise the bus to safe operation of suspension systems

TS 39.2 Air Compressor

The electrically-driven air compressor shall be sized (designed) to charge the entire air system on new buses from 0 psi to 120 psi in less than five minutes for a single unit bus not exceeding the fast idle speed (~1000 rpm) setting of the engine.

Charge time procedure and conditions: with air spring inflated and the bus at curb weight, all air tanks except emergency tank(s) fully drained, brake interlock, service brakes and air system accessories (i.e., doors, wipers, kneeling device or leveling), must not be activated or engaged during charge up procedure.

The electrically-driven air compressor shall be designed to supply air operating under the Air System Design Operating Profile while remaining within the manufactures air compressor specifications. The discharge temperature (measured at the compressor outlet using a probe thermocouple) shall not exceed 360° F, (410° F for oil-less compressors) excluding temperature spikes of durations less than two seconds and two percent of compressor charge time. Air compressor duty-cycle shall not exceed the compressor manufacturers rating in any 10-minute period under the Manhattan Operating Profile.

Air Compressor Governor

Air governor shall be adjustable with a cap and a red stripe from the cap to the governor body using tamper resistant paint and be mounted in a suitable location which will be easily accessible for maintenance.

TS 39.3 Air Lines and Fittings

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 ° F. The air on the delivery side of the compressor where it enters nylon housing shall not be above the maximum limits as stated in SAE J844. Nylon tubing shall be installed in accordance with the following color-coding standards:

- **Green:** Indicates primary brakes and supply.
- **Red:** Indicates secondary brakes.
- **Brown:** Indicates parking brake.
- **Yellow:** Indicates compressor governor signal.
- **Black:** Indicates accessories.

Line supports shall prevent movement, flexing, tension, strain and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Bends shall be provided with large radius, (sweeps), to minimize restrictions to lines. Rigid lines shall be supported at no more than 5-ft. intervals. Nylon lines may be grouped and shall be supported at 30-inch intervals or less. Nylon lines shall incorporate press-to-connect type fittings allowing rapid replacement of lines.

The compressor discharge line between PPA/PPU and body-mounted equipment shall be flexible Teflon hose with a braided stainless steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flared, swivel-type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2-ft. intervals or less.

Air lines shall be clean before installation and shall be installed to minimize air leaks. All air lines shall be routed to prevent water traps to the extent possible. Grommets or insulated clamps shall protect the air lines at all points where they pass through understructure components.

TS 39.4 Air Reservoirs

All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with guarded or flush type drain valves below floor level. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have drain valves mounted below floor level with lines routed to eliminate the possibility of water traps. All air tanks shall have check valves at the inlet side for isolation.

TS 39.5 Air System Dryer

The air system shall be equipped with an air dryer located before the first (supply system) air tank. The air dryer system shall operate automatically and be sized to eliminate moisture and oil in the air system at maximum air compressor discharge volume when engine is at full rated speed and load. The air dryer system shall require minimum routine maintenance. Desiccant shall be replaceable by spin-on filter in 15 minutes or less.

Air system dryer components shall be readily accessible for service and inspection. To the extent practical, disconnection or removal of components unrelated to a specific maintenance and/or repair task shall be unnecessary. Alternating tower air dryers will not be permitted. The air system air dryer shall be located as far from the compressor as possible and in ambient air flow to allow air to cool prior to entering the air dryer. Inlet air temperature to the dryer shall not exceed 150 degrees F.

Requirement for Additional Oil Separator Provision

A provision shall be included to collect/remove oil from the air system to prevent affecting function and/or damaging pneumatic system components. The oil separator shall operate automatically and be sized to eliminate moisture and oil in the air system at maximum air compressor discharge volume when engine is at full rated speed and load.

ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS (TS 40-TS 45)

TS 40. Overview

The Contractor shall coordinate a technical review with the LACMTA covering control system integration, installation, and design. As part of the technical review, the Contractor shall advise the LACMTA concerning control system features, options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality. The Contractor shall provide documentation including a description of control system operation and system schematics.

A listing of the software part number and revision number and procedure for obtaining new releases shall be identified for each component which is software controlled.

The electrical system will consist of vehicle battery systems and components that generate, distribute and store power throughout the vehicle (i.e., generator, voltage regulator, wiring, relays and connectors).

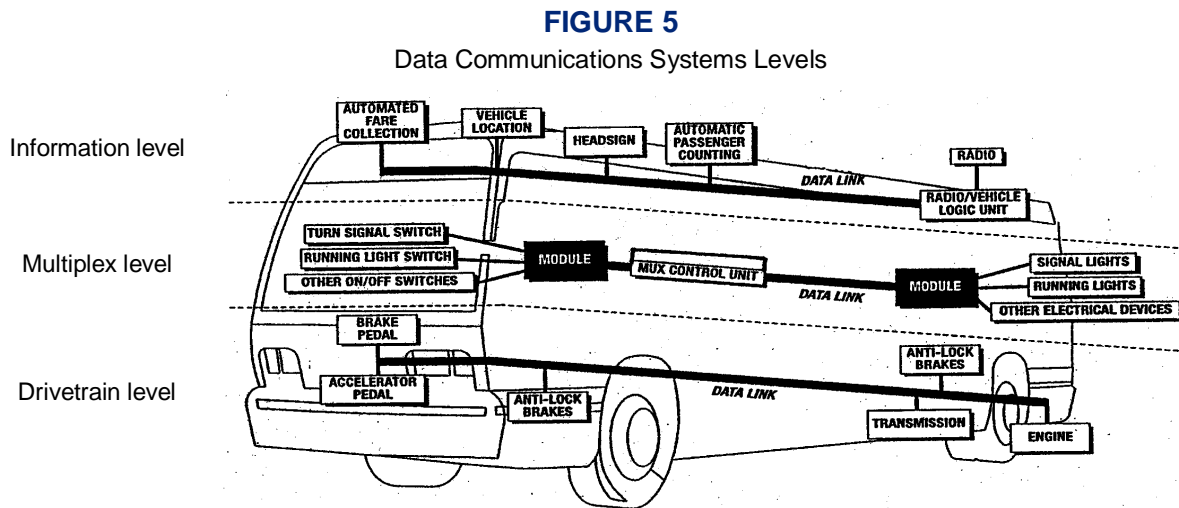
Electronic devices are individual systems and components that process and store data, integrate electronic information or perform other specific functions.

The data communication system consists of the bi-directional communications networks that electronic devices use to share data with other electronic devices and systems. Communication networks are essential to integrating electronic functions, both onboard the vehicle and off.

Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.

Data communications systems are typically divided into three levels to reflect the use of multiple data networks:

- **Drivetrain level:** Components related to the drivetrain including the propulsion system components (engine and transmission), and anti-lock braking system (ABS), which may include traction control.
- **Information level:** Components whose primary function is the collection, control or display of data that is not necessary to the safe drivability of the vehicle (i.e., the vehicle will continue to operate when those functions are inoperable). These components typically consist of those required for automatic vehicle location (AVL) systems, destination signs, fare boxes, passenger counters, radio systems, automated voice and signage systems, video surveillance and similar components.
- **Multiplex level:** Electrical or electronic devices controlled through input/output signals such as discrete, analog and serial data information (i.e., on/off switch inputs, relay or relay control outputs). Multiplexing is used to control components not typically found on the drivetrain or information levels, such as lights; wheelchair lifts; doors; heating, ventilation and air conditioning (HVAC) systems; and gateway devices.



TS 40.1 Modular Design

Design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.

Propulsion system wiring shall incorporate an independent wiring harness(es). Replacement of the engine/propulsion compartment wiring harness(es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

TS 41. Environmental and Mounting Requirements

The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed, as recommended in SAE J1455.

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system when operating within the design operating profile. No vehicle component shall generate, or be affected by, electromagnetic interference or radio frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54 (R 10).

The LACMTA shall follow recommendations from bus manufacturers and subsystem Suppliers regarding methods to prevent damage from voltage spikes generated from welding, jump starts, shorts, etc.

TS 41.1 Hardware Mounting

The mounting of the hardware shall not be used to provide the sole source ground, and all hardware shall be isolated from potential EMI/RFI, as referenced in SAE J1113.

All electrical/electronic hardware mounted in the interior of the vehicle shall be inaccessible to passengers and hidden from view unless intended to be viewed. The hardware shall be mounted in such a manner as to protect it from splash or spray.

All electrical/electronic hardware mounted on the exterior of the vehicle that is not designed to be installed in an exposed environment shall be mounted in a sealed enclosure.

All electrical/electronic hardware and its mounting shall comply with the shock and vibration requirements of SAE J1455.

All system components shall be easily accessible without requiring any special tools.

TS 42. General Electrical Requirements

TS 42.1 Batteries

TS 42.1.1 Low-Voltage Batteries (24V)

Four Group 31 Maintenance-Free Batteries

Batteries shall be a minimum of four absorbed glass mat thin plate pure lead technology group 31 series, heavy-duty, lead-acid, sealed top battery units for: a) engine starting (including fuel controls, electronic control units and ignition system), and b) other bus loads as needed, subject to LACMTA approval during proposal period. Each battery shall have a purchase date no more than six months from the date of release for shipment to the LACMTA. Positive and negative terminal ends shall be the same size.

Each battery shall have a minimum of 1,000 cold cranking amps and a reserve capacity of no less than 200 minutes. Warranty shall begin at the date of bus acceptance and shall cover an unconditional 48 months.

Starting Batteries

Batteries used for starting the engine shall be located as close to the starter as possible. Starting batteries shall be protected from power loss in the event that lights or other loads are inadvertently left on, up to two hours, which would normally drain the batteries when the engine is not running. Starting with a full charge, starting batteries shall have sufficient energy to provide adequate power after a minimum of five continuous days (Master Run switch "Off", Master Battery switch "On", all lights off, LACMTA installed ITS equipment operating) without charging or engine operation to then properly start the bus.

TS 42.1.2 Battery Cables

The battery terminal ends and cables shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other if at all possible, be flexible and sufficiently long to reach the batteries with the tray in the extended position without stretching or pulling on any connection and shall not lie directly on top of the batteries. Except as interrupted by the master battery switch, battery and starter wiring shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE Standard J1127 – Type SGT, SGX or GXL and SAE Recommended Practice J541.

2100 strand 4/0 cable or greater recommended. Battery cables shall be flexible and of sufficient length to reach the batteries when the battery tray is in the extended position without stretching or pulling on any connection or resting on top of the batteries or on the compartment floor when the tray is stowed. A diagram showing proper

cable connections and interconnections shall be located in the battery enclosure. Cables shall be arranged to prevent incorrect installation. Except as interrupted by the master battery disconnect switch(s), solenoid battery cutoff and necessary bus bar(s), battery wiring shall be continuous cables with connections secured by bolted terminals. Heavy-duty battery cables shall not be bent in a radius which stresses insulation and promotes propagation of cracking.

TS 42.1.3 Jump Start

Jump-Start Connector

Independently wired quick connect-disconnect receptacles (one for systems which use a battery equalizer) shall be provided. Connections to jump start connector assembly(s) shall be made through 4/0 cables to the respective battery circuit. Female receptacles equipped with approximately one-foot 2/0 pigtail cables shall be provided, which are spliced with 4/0 cables that lead to the battery circuit. One 12-volt (if not an equalizer equipped system), and one 24-volt, female labeled receptacles shall be provided to boost start the bus. The receptacles shall be designed to prevent incorrect connection of the LACMTA's jumper cable(s) and shall be provided with protective cover attached with a lanyard. The receptacle(s) shall be located on the curbside rear corner of the bus for convenient jumper cable connection, subject to LACMTA approval in Pre-Production meetings. The receptacle(s) must be labeled. Cables used shall not be bent in such a manner that the radius places stresses on the cable insulation, promoting propagation of cracks.

TS 42.1.4 Battery Compartment

The battery compartment shall prevent accumulation of water and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. Battery enclosure, including access door or cover, shall be constructed of fiberglass, suitable plastic material, or stainless steel.

The battery quick disconnect access door shall be identified with a decal.

The battery hold-down bracket shall be constructed of a non-metallic material (plastic or fiberglass).

This access door shall not require any special locking devices to gain access to the switch. The door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.

The batteries shall be securely mounted on a self-draining stainless steel or other non-corrosive material tray that can accommodate the size and weight of the batteries without deformation. The battery tray shall pull out easily and properly support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced and filled. A locking device shall retain the battery tray to the stowed position. A maximum of four batteries shall be securely mounted on each heavy-duty battery tray which shall accommodate the battery system. Tray(s) shall pull out on heavy-duty rollers or swing out easily from outside the bus for service, inspection, and replacement.

If not located in the engine compartment, the same fire-resistant properties must apply to the battery compartment. Sparking devices shall not be located within the battery box.

TS 42.1.5 Auxiliary Electronic Power Supply

If required, gel-pack, or any form of sealed (non-venting) batteries used for auxiliary power are allowed to be mounted on the interior of the vehicle if they are contained in an enclosed, non-airtight compartment and accessible only to maintenance personnel. This compartment shall contain a warning label prohibiting the use of vented lead-acid batteries.

TS 42.1.6 Master Battery Switch

A single master switch shall be provided near the battery compartment for disconnecting of all battery positives (12- and 24 volts), except for safety devices such as the fire suppression system and other systems as specified. The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service.

Turning the master switch "Off" with the PPA/PPU operating shall shut off the engine/PPU and shall not damage any component of the electrical system. The master battery switch shall be capable of carrying and interrupting the total circuit load. Master battery switch shall be capable of being locked in the "Open" or "Off" position.

Single Switch

The batteries shall be equipped with a single switch for disconnecting both 12- and 24 volt power.

Solenoid Battery Cutoff

A low voltage disconnect(s) shall be provided to monitor the battery bank voltage. When the voltage drops below the disconnect voltage, the device(s) opens the solenoid(s), removing power from all parasitic 12- and 24 volts loads that cannot be disconnected through the Master Battery Switch, ensuring that the batteries will maintain the ability to start the bus after being parked for extended periods of up to two months. A toggle switch for overriding automatic operation of Solenoid Battery Cutoff shall be provided.

TS 42.1.7 Low-Voltage Generation and Distribution

The low-voltage generating system shall properly charge batteries with a low state of charge and maintain the state of charge on fully charged batteries. When the vehicle is at standard idle the total low voltage generator load shall not exceed 60 percent of the low voltage generator nameplate rating. The Contractor shall estimate the parasitic loads during the initial stage of the bus design and shall submit a draft report to LACMTA at the Pre-Production meetings. A final report shall be submitted during the Pilot Bus configuration audit. The report shall include:

- Nominal current draw of each 12- and 24 volt system and subsystem
- Calculations of parasitic loads in sleep mode, including LACMTA installed equipment
- The estimated battery discharge time before Low Voltage Disconnect is activated

Voltage monitoring and over-voltage output protection (recommended at 32 volt) shall be provided.

Dedicated power and ground shall be provided as specified by the component or system manufacturer. Cabling to the equipment must be sized to supply the current requirements of heavy-duty systems with no greater than a five percent voltage drop across the length of the cable. Cables with bolted connections shall also meet requirements of SAE J541 for heavy-duty applications.

TS 42.1.8 Circuit Protection

All branch circuits, except battery-to-starting motor and battery-to-generator/alternator circuits, shall be protected by current-limiting devices such as circuit breakers, fuses or solid state devices sized to the requirements of the circuit. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time to prevent overheating. The circuit breakers or fuses shall be easily accessible for authorized personnel.

Fuses shall be used only where it can be demonstrated that circuit breakers are not practical. This requirement applies to in-line fuses supplied by either the Contractor or a Supplier. Fuse holders shall be constructed to be rugged and waterproof. All manual reset circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the LACMTA mechanic with visible indication of open circuits. LACMTA shall consider

the application of automatic reset circuit breakers on a case-by-case basis. The Contractor shall show all in-line fuses in the final harness drawings. Any manually resettable circuit breakers shall provide a visible indication of open circuits.

Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

TS 42.2 Grounds

The battery shall be grounded to the vehicle chassis/frame at one location only, as close to the batteries as possible. When using a chassis ground system, the chassis shall be grounded to the frame in multiple locations, evenly distributed throughout the vehicle to eliminate ground loops. No more than three ground ring/spade terminal connections shall be made per ground stud. Electronic equipment requiring an isolated ground to the battery (i.e., electronic ground) shall not be grounded through the chassis. Redundant grounds shall be provided for all electrical equipment except where it can be demonstrated that they are not feasible or practical. Grounds shall not be carried through hinges, bolted joints (unless they are specifically designed as electrical connectors), or power plant mountings. Ground shall be installed in accordance with SAE J1908, Electrical Grounding Practice.

Buses shall include grounding straps mounted under the bus near both front and rear axle areas to dissipate any static electric charge that may accumulate on the buses during use.

TS 42.3 Low Voltage/Low Current Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292 for type GXL and SXL wiring. Double insulation shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulation shall be met by wrapping the harness with plastic electrical tape or by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit. All wires for electrical components and terminations, either at the harness level or individual wires, including bus controls, A/C, engine, transmission, and door systems, with the exception of battery cables, shall be labeled, stamped or color-coded in a fashion that allows unique identification at a spacing not exceeding four inches. All exposed wiring connections for power and ground shall be protected against corrosion by application of an anti-corrosive paste.

Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage present in the harness. Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.

Strain-relief fittings shall be provided at all points where wiring enters electrical compartments. Grommets or other protective material shall be installed at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and non-conductive at areas of wire contact and shall not be damaged by heat, water, solvents or chafing.

To the extent practicable, wiring shall not be located in environmentally exposed locations under the vehicle. Wiring and electrical equipment necessarily located under the vehicle shall be insulated from water, heat, corrosion and mechanical damage. Where feasible, front to rear electrical harnesses should be installed above the window line of the vehicle.

All Bus OEM attributed wiring harnesses over five feet long and containing at least five wires shall include 10 percent (minimum one wire) excess wires for spares. This requirement for spare wires does not apply to data links and communication cables. A minimum of 50 percent of the spare wire shall be the same size as the largest wire in the harness excluding the battery cables. Wiring harness length shall allow a minimum of four inches service loop to permit end terminals to be replaced twice without pulling, stretching or replacing the wire.

Crimp on terminals shall use a clear heat shrinkable sleeve that seals the connection and improves the pull out resistance of the termination. Terminals shall be crimped to the wiring according to the connector manufacturer's recommendations for techniques and tools. All cable connectors shall be locking type, keyed and sealed, unless enclosed in watertight cabinets or vehicle interior. Pins shall be removable, crimp contact type, of the correct size and rating for the wire being terminated. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall either use different inserts or different insert orientations to prevent incorrect connections.

Terminals shall be crimped, corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. When using pressure type screw terminal strips, only stranded wire shall be used. Insulation clearance shall ensure that wires have a minimum of "visible clearance" and a maximum of two times the conductor diameter or 1/16 inch, whichever is less. When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands that can penetrate the insulation of the inner wires. Individual slip-on "spade" or "blade" type connectors are acceptable on a case-by-case basis.

Ultra-sonic and T-splices may be used with 7 AWG or smaller wire. When a T-splice is used, it shall meet these additional requirements:

- It shall include a mechanical clamp in addition to solder on the splice.
- The wire shall support no mechanical load in the area of the splice.
- The wire shall be supported to prevent flexing.

All splicing shall be staggered in the harness so that no two splices are positioned in the same location within the harness. Wiring harnesses shall include labeling for harness part number, connector identification and splice locations.

Wiring located in the engine compartment shall be routed away from high-heat sources or shielded and/or insulated from temperatures exceeding the wiring and connector operating requirements.

The instrument panel and wiring shall be easily accessible for service from the driver's seat or top of the panel. The instrument panel shall be separately removable and replaceable without damaging the instrument panel or gauges. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

TS 42.4 Electrical Components

All electrical components, including switches, relays, flashers and circuit breakers, shall be heavy-duty designs with either a successful history of application in heavy-duty vehicles or design specifications for an equivalent environment. To the extent practical, these components shall be designed to last the service life of the Bus and shall be replaceable in less than 5 minutes by an LACMTA mechanic. Sockets for plug-in components, such as relays and circuit breakers, shall be keyed for proper installation and alignment. Plug-in components shall be positively retained in sockets.

All electric motors shall be heavy-duty brushless type where practical, and have a continuous duty rating of no less than 40,000 hours (except cranking motors, washer pumps and wiper motors). Electric motors shall be located for easy replacement and shall be replaceable in less than 30 minutes by an LACMTA mechanic.

Location of electronic modules shall be reviewed for environmental suitability such as heat, water, vibrations, contamination from dust and debris, and other electrical equipment. The system including modules, external wire, connectors, and data bus wiring shall be designed to operate under LACMTA's Design Operating Profile. All electrical components including relays and circuit breakers must remain unaffected while bus is operated in up to 15 inches of standing water.

TS 42.5 Electrical Compartments

All relays, controllers, flashers, circuit breakers and other electrical components shall be mounted in easily accessible electrical compartments. All compartments exposed to the outside environment shall be corrosion-resistant and sealed to prevent moisture from normal sources, including engine compartment cleaning, reaching the electrical components and circuits in each box. The components and their functions in each electrical compartment shall be identified and their location recorded on a schematic drawing permanently attached to the inside of the access panel or door. The drawing shall be protected from oil, grease, fuel and abrasion. Electrical compartment fires shall not propagate outside the box.

The front compartment shall be completely serviceable from the driver's seat, vestibule or from the outside. "Rear start and run" controls shall be mounted in an accessible location in the engine compartment and shall be protected from the environment.

TS 43. General Electronic Requirements

If an electronic component has an internal real-time clock, it shall provide its own battery backup to monitor time when battery power is disconnected, and/or it may be updated by a network component. If an electronic component has an hour meter, it shall record accumulated service time without relying on battery backup.

Suppliers shall ensure that their electronic equipment is self-protecting in the event of shorts in the cabling, and also in over-voltage (over 32V DC on a 24V DC nominal voltage rating with a maximum of 50V DC) and reverse polarity conditions. If an electronic component is required to interface with other components, it shall not require external pull-up and/or pull-down resistors. Where this is not possible, the use of a pull-up or pull-down resistor shall be limited as much as possible and easily accessible, shielded, and labeled.

TS 43.1 Wiring and Terminals

Kinking, grounding at multiple points, stretching and reducing the bend radius below the manufacturer's recommended minimum shall not be permitted. The load side shall have a minimum of 18 gage load transfer wire.

Individual slip-on "spade" or "blade" type connectors are acceptable on a case-by-case basis during Pre-Production meeting review.

TS 43.1.1 Discrete I/O (Inputs/Outputs)

All wiring to I/O devices, either at the harness level or individual wires, shall be labeled, stamped or color-coded in a fashion that allows unique identification at a spacing not exceeding four inches. Wiring for each I/O device shall be bundled together. If the I/O terminals are the same voltages, then jumpers may be used to connect the common nodes of each I/O terminal.

TS 43.1.2 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable.

When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

TS 43.1.3 Communications

The data network cabling shall be selected and installed according to the selected protocol requirements. The physical layer of all network communication systems shall not be used for any purpose other than communication between the system components, unless provided for in the network specifications.

Communications networks that use power line carriers (e.g., data modulated on a 24 volt-power line) shall meet the most stringent applicable wiring and terminal specifications.

Mounting and electrical provisions shall be provided to allow LACMTA installation of existing Fleetwatch JX-55 Vehicle Interface Module in the Operator's area, subject to LACMTA approval during proposal period. A separate J1708 and J1939 interface connector shall be provided inside the ITS enclosure for connection to the existing LACMTA's JX-55 device.

TS 43.1.4 Radio Frequency (RF)

RF components, such as radios, video devices, cameras, global positioning systems (GPS), etc; shall use coaxial or approved cable to carry the signal. All RF systems require special design consideration for losses along the cable. Connectors shall be minimized, since each connector and crimp has a loss that will attribute to attenuation of the signal. Cabling should allow for the removal of antennas or attached electronics without removing the installed cable between them. If this cannot be done, then a conduit of sufficient size shall be provided for ease of attachment of antenna and cable assembly. The corresponding component vendors shall be consulted for proper application of equipment, including installation of cables.

TS 43.1.5 Audio

Cabling used for microphone level and line level signals shall be 22 AWG minimum with shielded twisted pair. Cabling used for amplifier level signals shall be 18 AWG minimum.

TS 44. Multiplexing

TS 44.1 General

The primary purpose of the multiplexing system is control of components necessary to operate the vehicle. This is accomplished by processing information from input devices and controlling output devices through the use of an internal logic program.

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs through the addition of new modules and/or the utilization of existing spare inputs and outputs. All like components in the multiplex system shall be modular and interchangeable with self-diagnostic capabilities. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Multiplex input/output modules shall use solid-state devices to provide extended service life and individual circuit protection.

Ten percent of the total number of inputs and outputs, or at least one each for each voltage type utilized (0V, 12V, and 24V), at each module location shall be designated as spares.

TS 44.2 System Configuration

Multiplexing may either be distributed or centralized. A distributed system shall process information on multiple control modules within the network. A centralized system shall process the information on a single control module. Either system shall consist of several modules connected to form a control network.

TS 44.2.1 I/O Signals

The input/output for the multiplex system may contain three types of electrical signals: discrete, analog or serial data.

Discrete signals shall reflect the on/off status of switches, levers, limit switches, lights, etc. Analog signals shall reflect numerical data as represented by a voltage signal (0-12V, 10-24V, etc.) or current signal (4-20 mA). Both types of analog signals shall represent the status of variable devices such as rheostats, potentiometers, temperature probes, etc. Serial data signals shall reflect ASCII or alphanumeric data used in the communication between other on-board components.

TS 45. Data Communications

TS 45.1 General

All data communication networks shall be either in accordance with a nationally recognized interface standard, such as those published by SAE, IEEE or ISO, or shall be published to the LACMTA with the following minimum information:

- Protocol requirements for all timing issues (bit, byte, packet, inter-packet timing, idle line timing, etc.) packet sizes, error checking and transport (bulk transfer of data to/from the device).
- Data definition requirements that ensure access to diagnostic information and performance characteristics.
- The capability and procedures for uploading new application or configuration data.
- Access to revision levels of data, application software and firmware.
- The capability and procedures for uploading new firmware or application software.
- Evidence that applicable data shall be broadcast to the network in an efficient manner such that the overall network integrity is not compromised.

Any electronic vehicle components used on a network shall be conformance tested to the corresponding network standard.

TS 45.2 Drivetrain Level

Drivetrain components, consisting of the engine, transmission, retarder, anti-lock braking system and all other related components, shall be integrated and communicate fully with respect to vehicle operation with data using SAE Recommended Communications Protocols such as J1939 and/or J1708/J1587 with forward and backward compatibilities or other open protocols.

TS 45.2.1 Diagnostics, Fault Detection and Data Access

Drivetrain performance, maintenance and diagnostic data, and other electronic messages shall be formatted and transmitted on the communications networks.

The drivetrain level shall have the ability to record abnormal events in memory and provide diagnostic codes and other information to service personnel. At a minimum, this network level shall provide live/fail status, current hardware serial number, software/data revisions and uninterrupted timing functions. The communication port(s) shall be located in the Operator's area, Engine Compartment Control Panel, and ITS Enclosure area, subject to LACMTA approval in Pre-Production meetings.

TS 45.2.2 Programmability (Software)

The drivetrain level components shall be programmable by LACMTA with limitations as specified by the sub-system Supplier.

TS 45.3 Multiplex Level

TS 45.3.1 Data Access

Diagnostic and status information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible inside or adjacent to the ITS Enclosure subject to LACMTA approval in Pre-Production meetings.

A J1708 hardware gateway shall be included to interface with the ATMS wireless communications system for transmittal of diagnostic fault codes from multiplex and drivetrain systems.

TS 45.3.2 Diagnostics and Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (online) or inactive (offline) faults through the use of on-board visual/audible indicators.

In addition to the indicators, the system shall employ an advanced diagnostic and fault detection system, which shall be accessible via either a personal computer or a handheld unit. Either unit shall have the ability to check logic function. The diagnostic data can be incorporated into the information level network or the central data access system.

TS 45.3.3 Programmability (Software)

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through any or all of the following procedures:

- Password protection.
- Limited distribution of the configuration software.
- Limited access to the programming tools required to change the software.
- Hardware protection that prevents undesired changes to the software.

Provisions for programming the multiplex system shall be possible through a PC or laptop. The multiplex system shall have proper revision control to ensure that the hardware and software are identical on each vehicle equipped with the system. Revision control shall be provided by all of the following:

- Hardware component identification where labels are included on all multiplex hardware to identify components.
- Hardware series identification where all multiplex hardware displays the current hardware serial number and firmware revision employed by the module.
- Software revision identification where all copies of the software in service displays the most recent revision number.
- A method of determining which version of the software is currently in use in the multiplex system.

Revision control labels shall be electronic.

TS 45.4 Electronic Noise Control

Electrical and electronic sub-systems and components on all buses shall not emit electromagnetic radiation that will interfere with on-board systems, components or equipment, telephone service, radio or TV reception or violate regulations of the Federal Communications Commission.

Electrical and electronic sub-systems on the Buses shall not be affected by external sources of RFI/EMI. This includes, but is not limited to, radio and TV transmission, portable electronic devices including computers in the vicinity of/on board the buses, AC or DC power lines, and RFI/EMI emissions from other vehicles.

DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION (TS 46-TS 49)

TS 46. Driver's Area Controls

TS 46.1 General

In general, when designing the driver's area, it is recommended that SAE J833, "Human Physical Dimensions," be used.

Switches and controls shall be divided into basic groups and assigned to specific areas, (Refer to Table 9), in conformance with SAE Recommended Practice J680, Revised 1988, "Location and Operation of Instruments and Controls in Motor Truck Cabs," and be essentially within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach".

All controls (switches, pushbuttons, knobs, etc.) and indicators shall be labeled and lighted for optimum visibility in all operating conditions. Switches and controls shall be ergonomically placed in a manner which prevents accidental operation. Knobs shall be securely mounted and affixed to preclude loosening. The side console shall be insulated to IP56 level of protection to prevent ingress of water into the components of the panel.

All controls, indicators, and signals necessary for the operation of the bus shall be conveniently positioned in the Operator's area in one of the following locations.

- Front Console Panel.
- Side Console (located on left side of the Operator).
- Floor Mounted.

TS 46.2 Glare

The driver's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.

TS 46.3 Visors/Sun Shades

A sun visor and scissor type sun shade/screen shall be provided to maximize driver's visibility.

Front and Side Window Sun Shade/Visor

An adjustable scissor type pull down solid band sun shade shall be provided for the driver's windshield.

Driver's side window shall have both sun visor and scissor type sun screen.

The sun shade/screen shall be provided in accordance with the California Vehicle Code §26708.2 and must have a sticker or label indicating that the shade/screen should only be used by operators who possess a letter or other document signed by a licensed optometrist certifying that the person must be shaded from the sun due to a physical condition.

Sun shades/screens or visors shall be shaped or positioned to minimize light leakage between the device and windshield pillars. Sun shades/screens or visors shall store out of the way and shall not obstruct airflow from the climate control system or interfere with other equipment, such as the radio handset or the destination control. Deployment of the sun shades/screens or visors shall not restrict vision of the rearview mirrors. Sun shade/screen or visor construction and materials shall be strong enough to resist breakage during adjustments. Sun shades/screens or visors, when deployed, shall be effective in the driver's field of view at angles more than five degrees above the horizontal. Sun shades and visors shall not be transparent.

Visor adjustments shall be made easily by hand with positive locking and releasing devices and shall not be subject to damage by over-tightening. Visors used on driver's window shall extend across the entire width of window and cover a minimum of six inches when flipped down.

For driver's window, scissor type sun shades/screens shall have minimum 35 percent light transmittance and shall be capable of being lowered to the midpoint of the driver's window. When deployed, the shade/screen shall be secure, stable and shall not rattle, sway or intrude into the driver's field-of-view due to the motion of

the Bus or as a result of air movement. Once lowered, the shade/screen shall remain in the lowered position until returned to the stowed position by the driver.

TS 46.4 Driver's Controls

Frequently used controls must be in easily accessible locations. These include the door control, kneel control, windshield wiper/washer controls, ramp, and lift and run switch. Any switches and controls necessary for the safe operation of the bus shall be conveniently located and shall provide for ease of operation. They shall be identifiable by shape, touch and permanent markings. Controls also shall be located so that passengers may not easily tamper with control settings.

All panel-mounted switches and controls shall be marked with easily read identifiers. Graphic symbols shall conform to SAE Recommended Practice J2402, "Road Vehicles – Symbols For Controls, Indicators, and Tell Tales," where available and applicable. Color of switches and controls shall be dark, or red for emergency use, with contrasting typography or symbols.

Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from a convenient location. Switches, controls and instruments shall be dust- and water-resistant.

TS 46.5 Normal Bus Operation Instrumentation and Controls

The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the Operator. The Operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.

Systems or components monitored by onboard diagnostics system shall be displayed in clear view of the Operator and provide visual and/or audible indicators. The intensity of indicators shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall be illuminated using backlighting.

The instrument display monitor shall be LCD color touch screen that displays safety related information in a large easy to read gauge or graphic format. LACMTA prefers a system which incorporates the instruments, and diagnostics.

Wherever possible, sensors shall be of the closed circuit type so that failure of the circuit and/or sensor shall activate the malfunction indicator.

The indicator panel shall be located in Area 1 or Area 5, within easy view of the operator instrument panel. All indicators shall have a method of momentarily testing their operation. The audible alarm shall be tamper-resistant and shall have an outlet level between 80 and 83 dBA when measured at the location of the Operator's ear.

On-board displays visible to the Operator shall be limited to indicating the status of those functions described herein that are necessary for the operation of the bus. All other indicators needed for diagnostics and their related interface hardware shall be concealed and protected from unauthorized access. Table 9 represents instruments and alarms. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

Gauges shall be readable in all direct or reflected sunlight conditions. All lighting in the dash area shall be a red, orange or blue color, clear incandescent, or an approved equal. No unlit dash markings shall be permitted.

Space shall be provided on the panel for future additions of no less than five spare indicators as the capability of onboard diagnostic systems improves.

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
Instruments					
1.	Air pressure gauge	Air Brake Reservoir gauge(s) 0-150 psi range- Accuracy \pm 3.5% at cut-out pressure, 10 psi increments, 2-inch minimum. Green needle for Primary system and Red needle for Secondary system	Dash zone 2	Visual indication of primary and secondary air systems	Red Light and buzzer
2.	Destination sign interface	Destination sign interface panel	In approved location on head sign door	Facilitates driver interaction with destination sign system, manual entry	LCD display
3.	Farebox interface/ OCU	Farebox Bus operator interface panel	Near farebox	Facilitates driver interaction with farebox system	LCD display
4.	Mobile data terminal/ATMS	Mobile data terminal Bus operator interface panel	Above operators left	Facilitates driver interaction with communication system and master log-on	LCD display with visual status and text messages
5.	Speedometer	Speedometer 0-75 mph range - with odometer, and diagnostic capability, 5-mile increments. Accuracy \pm 2 mph. Unit shall be installed so as to be easily readable by the operator.	Dash zone 2	Visual indication of speed and distance traveled, accumulated vehicle mileage, fault condition display	Visual
Controls					
1.	Automatic Fire Suppression System (AFSS) Manual Discharge	Red push button with protective cover	Side console or dash zone 1	Permits driver to override and manually discharge fire suppression system	Red light
2.	AFSS Shutdown over ride	Momentary push button	Over operator's left	Restarts the engine shutdown timer each time the switch is pressed	
3.	Auxiliary power	12-volt power receptacle	Radio Compartment	Power diagnostic equipment	
4.	Dash panel lights	Rotary rheostat or stepping switch	Side Console or Dash zone 1	Provides adjustment for light intensity in night run position	
5.	Defroster fan	Rotary, minimum three-position with detent	Side console or Dash zone 1	Permits defroster fan: off, low, medium or high	
6.	Defroster temperature	Variable position	Side console or Dash zone 1	Adjusts defroster water flow and temperature	
7.	Diagnostic test port- front	SAE data port	Operator's area subject to approval	J1708 and J1939 communications ports	
8.	Drive selector	Touch panel switch	Side console or right front dash	Provides selection of propulsion: forward, reverse and neutral	Gear selection
9.	Driver's ventilation	Infinitely variable speed	Side console or Dash zone 1	Permits supplemental ventilation with infinitely variable speed fan	

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
10.	Engine run, rear	Three-position switch	Engine compartment control panel	Permits running engine from rear start, normal front run position and off	Amber light on dash
11.	Engine shutdown override	Momentary switch with operation protection	Side console	Permits driver to override auto engine shutdown	
12.	Engine start, front	Approved momentary switch	Side console	Activates engine starter motor	
13.	Engine start, rear	Approved momentary switch	Engine compartment control panel	Activates engine starter motor Starter switch marked "START" shall operate the starter motor only when the rear run switch is in the "REAR" position and transmission is in neutral, and fuel fill door is closed. The Operators start button shall be deactivated when the Rear Run Switch is in "REAR" Position	
14.	Exterior Door Switch	Key Switch	Switch shall be located behind an exterior access door near the front curb side of the Bus a minimum of 45 inches above the ground.	Allows operator to close/open, and lock/unlock the front door from outside the bus	
15.	Farebox Lighting Bypass Switch	Switch, ON-OFF	Side console	Controls farebox light	
16.	Fast idle	Two-position switch	Side console	Selects high idle speed of engine	
17.	Front door ramp	Three-position momentary switch	Dash zone 3 or 5	Permits deploy and stow of front ramp	Red light
18.	Front door ramp/kneel enable	Two-position switch	Dash zone 5	Permits ramp and kneel activation from front door area, key required	Red dash indicator Exterior alarm and Amber light
19.	Front kneel	Three-position momentary switch	Dash zone 3 or 5	Permits kneeling activation and raise and normal at front door remote location	Amber or red dash indicator. Ext alarm and Amber light
20.	Gas Detection System (GDS) Shutdown over ride	Momentary push button	Over operator's left	Restarts the engine shutdown timer each time the switch is pressed	
21.	Hazard flashers	Two-position switch	Side console	Activates emergency flashers	Two green lights and Click
22.	High beam	Push button with detent	Left foot panel	Permits driver to go between low and high beam	Blue light

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
23.	Horn Button	Push button	Button in steering wheel	Activates horn	Dual Horn sound 410 and 500 Hz at 110 dB
24.	HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, cool, heat, low fan, high fan or full auto with on/off only	
25.	Indicator/ alarm test button	Momentary switch or programming ¹		Permits driver to activate test of sentry, indicators and audible alarms	All visuals and audible
26.	Interior lights	Three-position switch	Side console	Selects mode of passenger compartment lighting: off, on, normal	
27.	Left remote mirror	Four-position type	Side console	Permits two-axis adjustment of left exterior mirror	
28.	Master door/ interlock	Two position	Out of operator's reach behind the destination sign door	Permits driver override to disable door and brake/throttle interlock	Red light/Buzzer
29.	Master run switch	Rotary, four-position detent	Side console	Master control for bus with; "off," "Day" run, "Night" run and "Night Park" lights positions	
30.	Microphone	Flexible mounting	Subject to LACMTA approval	Permits driver to make announcements with both hands on the wheel and focusing on road conditions	
31.	Operator's area light switch	Switch	Side console	Controls operator light	
32.	Operator's Heater Control	Rotary knob	Dash zone 3 or 5	Controls operator heater	
33.	PA manual switch	Slide switch	In approved location	Permits driver to manually activate public address microphone	
34.	Park brake release	Pneumatic PPV – Green knob	Side console	Permits driver to push and hold to release brakes	Green knob
35.	Parking brake	Pneumatic PPV –Yellow knob	Side console or Dash zone 1	Permits driver to apply and release parking brake	Red light
36.	Passenger Chime Switch	Switch, ON-OFF	Side console	Controls chime sound	
37.	Passenger door control	Five-position handle type detent	Side console, forward	Permits open/close control of front and rear passenger doors	
38.	Public Address System, Speaker Selector	Switch INTERIOR-BOTH-EXTERIOR	Side console	Select speaker location	
39.	Public Address System, Volume Control	Pushbutton	DCM	Select speaker volume	

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
40.	Remote Engine Speed Control	Rotary rheostat or spring-loaded toggle switch	Engine compartment control panel	Permits technician to raise and lower engine RPM from engine compartment. A spring return control Knob marked "ENGINE SPEED" shall be provided which will increase engine RPM from idle to maximum controlled free speed. The control shall be activated only when the Rear Run Switch is in the "REAR" position, the transmission is in neutral and parking brake set.	
41.	Retarder disable	Single-pole with detent	Behind the destination sign door	Permits driver override to disable brake retardation/regeneration	Red light
42.	Right remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of right exterior mirror	
43.	Silent alarm	Guarded toggle switch, NO and NC contacts	Side console	Activates emergency radio alarm at dispatch and permits covert microphone and/or enables destination sign emergency message	
44.	Turn signals	Momentary push button (two required) raised from other switches	Left foot panel	Activates left and right turn signals	Two green lights and audible indicator
45.	Windshield washer	Push button	Side console or Dash zone 1	Activates windshield washers	
46.	Windshield wiper	One-variable rotary position operating both wipers	Side console or Dash zone 1	Variable speed control of left and right windshield wipers	
Alarms/Indicators					
1.	ABS indicator	Detects system status	Dash zone 2	Displays system failure	Amber light
2.	AFSS Fire detection	Bus operator display	Above operators left	Indication of fire detection activation	Buzzer and red light fire bell
3.	AFSS Status	Okay	Above operators left		Green light
4.	Back-Up	Intermittent sonic alarm	Rear of bus	Reverse gear activated alarm	Beep
5.	Bike rack deployed indicator	Detects bike rack position	Dash zone 2	Indication of bike rack not being in fully stowed position	Amber or red light. Mirror or direct visual allowed.
6.	Charging system indicator (12/24 V)	Detect charging system status	Dash zone 2	Detects no charge condition	Solid red light and buzzer
7.	Check Engine	Engine Check	Dash zone 2		Amber light
8.	Check Transmission	Transmission Check	Dash zone 2		Amber light
9.	Door obstruction	Sensing of door obstruction	Dash zone 2	Indication of rear door sensitive edge activation	Red light and buzzer

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
10.	GDS Methane detection	Indication of 20% LEL	Above operators left	Detects levels of methane	Flashing red at 20% LEL
11.	GDS Methane detection	Indication of 50% LEL	Above operators left	Detects levels of methane	Solid red at 50% LEL sonic horn
12.	GDS Methane detection function	Detection of system integrity	Above operators left	Detects system failure	No start condition, amber light
13.	HVAC indicator	Detects system status	Dash zone 2	Displays system failure	Amber or red light
14.	Low fuel indicator	Amber light	Dash zone 2	Indication of low fuel system level	Amber light
15.	Low system air pressure	Sensing low primary and secondary air tank pressure	Dash zone 2	Indication of low air system pressure	Buzzer and red light
16.	SCR gauge	Level Indicator	Dash zone 2	Displays level of SCR tank and indicates with warning light when low	Red light
17.	Seat Belt Warning	Switch on seat belt latch. Audible alarm and red light	Dash zone 2	Indicates when seat belt is not latched as required	Buzzer and red light
18.	Security Camera System	Camera Fail	Dash zone 2	Indicates system readiness including hard drive installed and system functionality.	Amber light
19.	Speed	Speed	Dash zone 2	Indicates bus speed is less than or equal to 3 mph	Amber light
20.	Stop Engine	Stop Engine	Dash zone 2		Buzzer and red light
21.	Stop Request	Stop Requested	Dash zone 2		Green light, chime
22.	Warning interlocks deactivated	Red indicator light	Dash panel center	Illuminates to warn driver that interlocks have been deactivated.	Red light, sonic alarm
23.	Wheelchair Stop Request	Stop Requested	Wheelchair Chime		Amber light, chime

TS 46.6 Driver Foot Controls

Accelerator and brake pedals shall be designed for ankle motion. Foot surfaces of the pedals and the floor adjacent to pedals shall be faced with wear-resistant, nonskid, replaceable material. Heel rests shall be provided. All foot controls must be installed in a manner that removal can be accomplished by one mechanic working inside the bus.

TS 46.6.1 Pedal Angle

The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50 degrees at the point of initiation of contact and extend downward to an angle of 10 to 18 degrees at full throttle.

The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield, and vertical H-point.

TS 46.6.2 Pedal Dimensions and Position

The floor-mounted accelerator pedal shall be 10 to 12 inches long and three to four inches wide. Clearance around the pedal must allow for no interference precluding operation.

Pedal travel shall be limited by stops under the pedals. Contractor must provide proof that the ergonomics are appropriate before the Pilot Bus is accepted.

1 to 2 inches Between Brake and Accelerator Pedals

The accelerator and brake pedals shall be positioned such that the spacing between them, measured at the heel of the pedals, is between one and two inches. Both pedals should be located approximately on the same plane coincident to the surface of the pedals.

TS 46.7 Brake and Accelerator Pedals

Brake Pedal

Non-adjustable brake pedal

TS 46.8 Driver Foot Switches

Floor-Mounted Foot Control Platform

The angle of the turn signal platform shall be determined from a horizontal plane, regardless of the slope of the cab floor. The turn signal platform shall be angled at a minimum of 10 degrees and a maximum of 37 degrees. It shall be located no closer to the seat front than the heel point of the accelerator pedal.

Contractor must provide proof that the ergonomics are appropriate before the Pilot Bus is accepted.

Turn Signal Controls

Turn signal controls shall be floor-mounted, foot-controlled, water-resistant, heavy-duty, momentary contact switches.

Foot Switch Control

The control switches for the turn signals shall be mounted on an inclined, floor-mounted stainless steel enclosure or metal plate mounted to an incline integrated into the driver's platform, located to the left of the steering column. The location and design of this enclosure shall be such that foot room for the operator is not impeded. The inclined mounting surface shall be skid-resistant. All other controls, including high beam shall be in a location approved in Pre-Production meetings.

The foot switches shall be UL-listed, heavy-duty type, of a rugged, corrosion-resistant metal construction. The directional foot switches shall be momentary type, while those for the high beam shall be latching type. The spacing of the switches shall be such that inadvertent simultaneous deflection of switches is prevented.

TS 47. Driver's Amenities

TS 47.1 Coat Hanger

Coat Hook

A stainless steel, aluminum, or approved equal, coat hook shall be furnished and installed, subject to LACMTA approval in Pre-Production meetings.

TS 47.2 Drink Holder

No drink holder.

TS 47.3 Storage Box

Storage Box

An enclosed driver storage area shall be provided with a positive latching door and/or lock. The minimum size shall be 2,100 cubic inches.

TS 47.4 Repair Card Holder

A card holder shall be provided in the Operators' area at a location accessible to mechanics standing in the front entry area with the passenger door open, subject to LACMTA approval in Pre-Production meetings, (Refer to Section TS 88.6 for Reference). Sample card holder shall be provided by the LACMTA upon request.

TS 47.5 Safety Equipment

The following items shall be provided and installed within seven feet of the Operator's seat in a location that is easy reach, subject to LACMTA approval in Pre-Production meetings.

- DOT approved heavy-duty emergency reflector kit stored in a storage box.
- Five-pound multipurpose fire extinguisher mounted with universal bracket.

TS 47.6 Bus Registration Holders

A Bus registration holder shall be installed above the Operator near the ceiling, subject to LACMTA approval in Pre-Production meetings.

TS 47.7 Trash Hooks

The Contractor shall provide two interior metal hooks in the area near the farebox for LACMTA supplied plastic trash bags (see attachment). Placement and selection of the hooks shall be reviewed on the Pilot Bus and are subject to LACMTA approval.

TS 48. Windshield Wipers and Washers

TS 48.1 Windshield Wipers

The bus shall be equipped with either a single-control or dual-control, electric, variable speed intermittent windshield wiper(s). At 65 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. For two-piece windshields, both wipers shall park along the center edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service. The fastener that secures the wiper arm to the drive mechanism shall be corrosion-resistant. After each stroke, the wiper arm shall return to the parked position.

No part of the windshield wiper mechanism shall be damaged by manual manipulation of the arms for cleaning. Windshield wiper motors and mechanism shall be easily accessible for repairs or service from inside or outside the bus and shall be removable as complete units.

Intermittent Wiper with Variable Control

A variable-speed feature shall be provided to allow adjustment of wiper speed for both sides of the windshield between approximately 5 to 16 or 5 to 30 cycles per minute.

An intermittent wiper control shall be provided. The unit shall provide an Operator 5 to 30 second's variance in dwell time of the wiper arms.

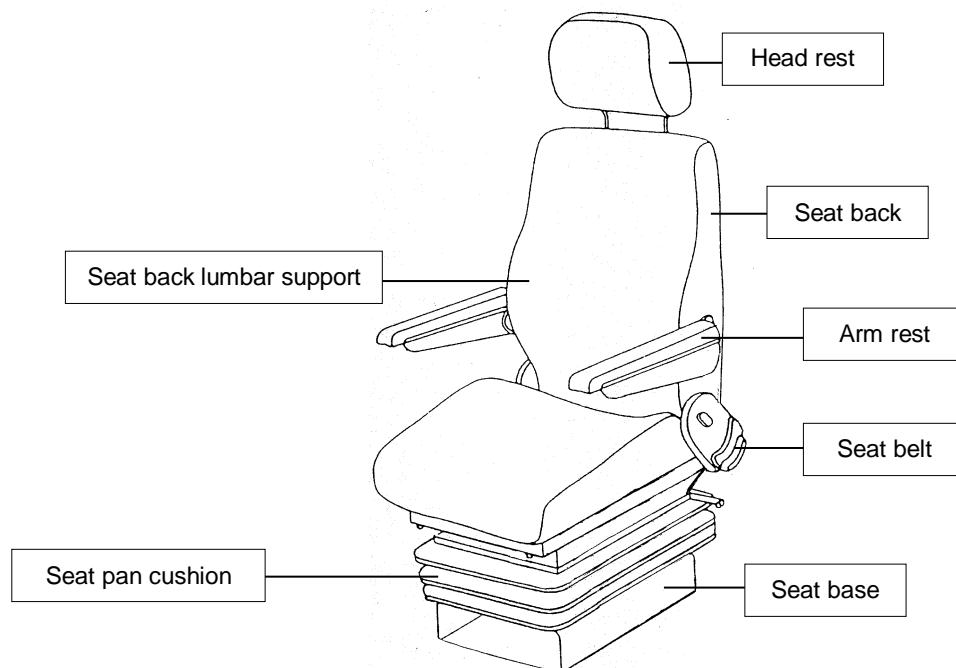
TS 48.2 Windshield Washers

The windshield washer system, when used with the wipers, shall deposit washing fluid evenly and completely wet the entire wiped area.

The windshield washer system shall have a minimum three-gallon reservoir, located for easy refilling from outside of the bus. Reservoir pumps, lines and fittings shall be corrosion-resistant. The reservoir shall be translucent for easy determination of fluid level, if visible, or a fluid level indicator shall be provided.

TS 49. Driver's Seat

FIGURE 6
Driver's Seat



TS 49.1 Dimensions

The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus.

The heavy-duty Operator's seat shall support Operators' in the orthopedically correct seating position.

TS 49.1.1 Seat Pan Cushion Length

Measurement shall be from the front edge of the seat pan to the rear at its intersection with the seat back. The adjustment of the seat pan length shall be no less than 16.5 inches at its minimum length and no more than 20.5 inches at its maximum length.

TS 49.1.2 Seat Pan Cushion Height

Measurement shall be from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from a minimum of 14 inches, with a minimum six- inch vertical range of adjustment.

TS 49.1.3 Seat Pan Cushion Slope

Measurement is the slope of the plane created by connecting the two high points of the seat, one at the rear of the seat at its intersection with the seat back and the other at the front of the seat just before it waterfalls downward at the edge. The slope can be measured using an inclinometer and shall be stated in degrees of incline relative to the horizontal plane (0 degrees). The seat pan shall adjust in its slope from no less than plus 12 degrees (rearward "bucket seat" incline), to no less than minus five degrees (forward slope).

TS 49.1.4 Seat Base Fore/Aft Adjustment

Measurement is the horizontal distance from the heel point to the front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (approximately 15 inches). On all low-floor buses, the seat-base shall travel horizontally a minimum of 11 inches. It shall adjust no closer to the heel point than six inches.

TS 49.1.5 Seat Pan Cushion Width

The driver's seat shall be appropriately dampened to support a minimum weight of 380 pounds. The suspension shall be capable of dampening adjustment in both directions.

Rubber snubbers shall be provided to prevent metal-to-metal contact. Seat suspension shall incorporate a primary and secondary system to minimize bottoming during travel when driving over uneven street surfaces and potholes.

TS 49.1.6 Seat Suspension

The driver's seat shall be appropriately dampened to support a minimum weight of 380 pounds. The suspension shall be capable of dampening adjustment in both directions.

Rubber bumpers shall be provided to prevent metal-to-metal contact.

TS 49.1.7 Seat Back

Width

Measurement is the distance between the outermost points of the front of the seat back, at or near its midpoint in height. The seat back width shall be no less than 19 inches. Seat back will include dual recliner gears on both sides of the seat.

Height

Standard height seat back

TS 49.1.8 Headrests

Four-way adjustable headrest

TS 49.1.9 Seat Back Lumbar Support

Measurement is from the bottom of the seat back at its intersection with the seat pan to the top of the lumbar cushioning. The seat back shall provide adjustable depth lumbar back support with three individual operating lumbar cells within a minimum range of seven to 11 inches.

TS 49.1.10 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 degrees is the upright position and 90 degrees-plus represents the amount of recline.

The seat back shall adjust in angle from a minimum of no more than 90 degrees (upright) to at least 110 degrees (reclined), with infinite adjustment in between.

TS 49.2 Seat Belt

The belt assembly should include a dual sensitive FMVSS209 emergency-locking retractor (ELR) with maximum inertia tolerance within the lock mechanism. All seat belts should be stored in automatic retractors. The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt. Seat belt shall latch on the operator's right side and include a standard 4.7-inch receptor with seat belt alarm. Seat belt shall include orange three-point webbing and shall have an adjustable shoulder strap D-loop

capable of accommodating a 95th-percentile male to a 5th-percentile female. The design of seat belt retraction and driver's area shall incorporate features to prevent damage to the bus or switches and controls when seat belt is released.

The seat and seat belt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210. An audible alarm and warning light shall be installed to alert the driver when the seat belt is not in use and the parking brake is released and the master run switch is in "Day Run" or "Night Run".

Belt Length

The lap/shoulder belt assembly shall accommodate all drivers ranging in size from a 95th-percentile male to a 5th-percentile female and shall extend a minimum of 74 inches in length from the retractor.

TS 49.3 Adjustable Armrest

No armrests.

TS 49.4 Seat Control Locations

While seated, the driver shall be able to make seat adjustments by hand without complexity, excessive effort or being pinched. Heavy-duty adjustment mechanisms and controls shall hold the adjustments and shall not be subject to inadvertent changes.

TS 49.5 Seat Structure and Materials

Cushions

The seat bottom shall be at least 4.5 inches of molded silicone foam material in the seating area. The seat back shall be at least three inches of molded polyurethane foam material.

Cushion Materials

Solid black vinyl upholstery (non-perforated vinyl - pleather)

TS 49.6 Pedestal

Four-inch powder coated steel riser with internal tethers.

TS 49.7 Seat Options

Not applicable.

TS 49.8 Mirrors

TS 49.8.1 Exterior Mirrors

The bus shall be equipped with a corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss of adjustment with a breakaway or snap/spring-back mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors shall be positioned in a way that will minimize blind spots and high enough to avoid contact with pedestrians and bicyclists. Mirrors shall have integrated turn signals on both sides. Mirrors shall retract or fold sufficiently to allow bus washing operations but avoid contact with windshield. Mechanical stops shall prevent the mirror from contacting the windshield. Detents or friction plates shall be provided to allow positive positioning of mirror arms at pre-determined angles along their adjustment range.

Mirror head assemblies shall be replaceable with simple hand tools in less than 5 minutes. Mirrors shall be made of tempered plate glass or have safety backing to prevent shattering subject to approval during proposal period. Convex mirrors shall be provided, located below the exterior mirrors, on the curb and street side. The

convex mirrors shall be integral to the main mirror arm in a similar manner to prevent damage to the exterior mirrors if the convex mirror is hit during operation.

Electrical connection shall be water proof, and located in area protected from bus wash action, and accessible for maintenance to replace mirrors and electrical connections. Adjustment of the mirrors shall be provided by two nubbin switches located to the left of the Operator, subject to LACMTA approval during proposal period. Mirror control wires shall terminate at the bus body adjacent to the mirror bracket attachment point with break-away connector plugs designed to prevent damage to bus wiring in the event the mirror head is damaged due to impact.

Curbside Mirrors

The mirror shall be mounted such that its lower edge is as high as possible but at least 76 inches above the street surface and is visible through the right side portion of the windshield that is cleaned by the windshield wiper. Front door operation shall not affect the view provided by the right side mirror.

Street Side Mirrors

The street side mirror shall be accessible through the Operator's side window. Mirror control wires shall terminate at the bus body adjacent to the mirror bracket attachment point with break-away connector plugs designed to prevent damage to bus wiring in the event the mirror head is damaged due to impact. Street side mirror shall be overhead mounted in a position to minimize potential contact with vehicles or cyclists, subject to LACMTA approval during proposal period.

Remote Adjustment of Curbside Mirror

The driver shall be able to adjust the curbside mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

Remote Adjustment of Street Side Mirror

The driver shall be able to adjust the street-side mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

TS 49.8.2 Interior Mirrors

Mirrors shall be provided to permit the Operator to observe passengers throughout the bus, including entrances and exits, and directly in front of the bus during bicycle loading and unloading activities without leaving his seat and without shoulder movement, subject to LACMTA approval in Pre-Production meetings. Inside mirrors shall not be in the line of sight and obstruct the view of the right outside mirror. Mirror installations shall be placed such that there is no obstruction of the view in other mirrors.

- A convex mirror shall be provided above the front door for use by the Operator in determining that the front door is clear of passengers.
- Mirror(s) shall be provided so that with a full standee load, including standees in the entry area, the Operator will be able to observe passengers in the front and rear door, anywhere in the aisle, and in the rear seats.

Mirror Dimensions

TABLE 10
Mirror Dimensions

SIZE	DESCRIPTION
8"X15" or 8"x16 "	Convex, Operator's Rearview

12" Diameter	Convex, Exit Door
6" Diameter	Relay Mirror
7"x10"	Convex, Front Entrance

WINDOWS (TS 50-TS 53)

TS 50. General

A minimum of 10,000 sq. inches of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

TS 51. Windshield

The windshield shall permit an Operator's field-of-view as referenced in SAE Recommended Practice J1050. The vertically upward view shall be a minimum of 15 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3.5 ft. high no more than two feet. in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90-degree requirement, provided that the divider does not exceed a three-degree angle in the Operator's field-of-view. Windshield pillars shall not exceed 10 degrees of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshields shall not be used. Winglets may be bonded.

TS 51.1 Glazing

The windshield glazing material shall have a ¼ inch nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping 1A and the Recommended Practices defined in SAE J673.

Glazing shall be solar management glass (SMG) tinted green. The hue shall be consistent throughout the procurement.

Shaded Band

The upper portion of the windshield above the driver's field-of-view shall have a blue or green, shaded band with a luminous transmittance of six to 10 percent when tested in accordance to ASTM D-1003.

TS 52. Driver's Side Window

The driver's side window shall be a high-visibility sliding type, that minimizes window frame or other obstructions to driver's visibility, requiring only the front half of sash to open and latch upon closing, and shall open sufficiently to permit the seated Operator to easily adjust the street-side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. This window section shall slide in tracks or channels designed to last the service life of the bus. The Operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single-density tint.

The driver's view, perpendicular through Operator's side window glazing, should extend a minimum of 29 inches (736 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 26 inches (560 mm) above the Operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.

The driver's side window glazing material shall have a ¼ inch nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673.

Light transmittance shall be a maximum of 75 percent on the glass area below 53 inches from the Operator platform floor. On the top fixed over bottom slider configuration, the top fixed area above 53 inches may have a maximum one percent light transmittance.

The window frame shall not block the view of the street side mirror when in the fully closed or fully open positions. Operator's side window upper portion above the sunshade shall be shaded dark. Glazing shall be solar management glass tinted blue or green to match the windshield. The hue shall be consistent throughout the procurement.

TS 53. Side Windows

TS 53.1 Configuration

Side window assemblies shall be constructed of heavy-duty aluminum shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. Window assemblies shall incorporate "change in place" design to permit replacement (removal and installation) of each glazing (transparent glass piece less any framing) from windows installed on the bus. This requirement shall permit one mechanic to enter the bus and remove and install each glazing using common hand tools in 60 minutes, or less. The window shall be fully serviceable immediately following replacement of glazing. Change in place method shall be tamper resistant. An additional six minutes will be added for each glazing replacement, if necessary, for replacement of the associated anti-vandalism sacrificial film.

All frame surfaces and components (except the emergency escape handles) shall be finished with black anodizing. Emergency escape latches shall be red, and labeled to indicate their purpose and function. Miscellaneous hardware, such as fasteners and latches, shall be the window manufacturer's standard hardware.

Transom style side windows shall extend from the shoulder height of a seated 5th-percentile female passenger to the eye level of a standing 95th-percentile male passenger in the front section; the rear section window upper edge shall be approximately 56 inches above the floor at the start of the raised deck and no less than 51 inches at the rearmost window's upper edge. Each individual window glazing shall be easily replaceable without removing the entire window assembly or disturbing adjacent window assemblies and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. To the extent practical, the number of different sizes of windows should be minimized.

Quick Change Passenger Side Windows

Glazing in the window assembly shall be capable of being replaced without removing the window from its installed position on the bus using simple hand tools. The glazing shall be held in place mechanically by a system constructed to last the life of the vehicle.

Traditional Frame

- Fully fixed.
- Openable windows with inward-opening transom panels

TS 53.2 Emergency Exit (Egress) Configuration

Minimum Egress

All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.

TS 53.3 Configuration

Operable Windows with Inward-Opening Transom Panels (Fixed Bottom, Tip-In Top)

Each side window shall incorporate an upper transom portion. The transom shall be between 20 and 35 percent of the total window area. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward.

Side windows shall have an upper section that can be opened inward a minimum of four inches to provide maximum interior ventilation. When opened the upper window section shall not interfere with access to the passenger signal pull cable. The operable section shall be a minimum of eight inches and a maximum of 10 inches in height, hinged at the bottom, and shall be the full width of all windows. In the event of a latch failure the upper window section shall remain in the closed position, and shall latch in the closed position by means of a gas filled cylinder or mechanical spring. Rearmost windows which are lower than shoulder height for seated passengers shall not be opened or equipped with emergency escape provisions, subject to LACMTA approval in Pre-Production meeting.

TS 53.4 Materials

Safety Glass Glazing Panels

Side windows glazing material shall have a minimum of 3/16-inch nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 Safety Glazing Materials and the Recommended Practices defined in SAE J673. Windows on the bus sides and in the rear door shall be grey tint (13 percent) luminous transmittance as measured by ASTM D-1003), complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 20 percent, as measured by ASTM E-424. Luminous transmittance shall be measured by ASTM D-1003. Windows over the destination signs shall not be tinted. To the extent practical, side window glazing for fixed and emergency egress windows shall be interchangeable.

Anti-Vandalism Sacrificial Film

All glazing material that is aft of the front standee line, and in front of the exit door, shall be equipped with an interior single layer 6 mil minimum laminated film. All glazing material that is aft of, and including, the exit door shall be equipped with an interior four layer laminated film. Both types of window film installations are subject to LACMTA approval during proposal period. This material shall be easily installed and removed without the use of specialized tools. Film shall adhere to the window and be resistant to peeling, curling and discoloration by ultraviolet rays. The film shall withstand normal cleaning operations.

TS 53.5 Rear Window

No requirement for rear window.

HEATING, VENTILATING AND AIR CONDITIONING (TS 54-TS 61)

TS 54. Capacity and Performance

The HVAC climate control system shall be modular design and capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs. Contractor shall supply an all-electric driven A/C system with full hermetic or semi-hermetic sealed compressor (no open drive compressor). System shall include - brushless; AC compressor, condenser fan, and evaporator blower motors. High voltage alternator/generator shall be brushless.

With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall control the average passenger compartment temperature within a range between 65 ° to 80°F, while maintaining the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10° to 95°F and at any ambient relative humidity levels between five and 50 percent.

When the bus is operated in outside ambient temperatures of 95° to 115°F, the interior temperature of the bus shall be permitted to rise 0.5° for each degree of exterior temperature in excess of 95°F.

System capacity testing, including pull-down/warm-up, stabilization and profile, shall be conducted in accordance to the APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System."

The recommended locations of temperature probes are only guidelines and may require slight modifications to address actual bus design. Care must be taken to avoid placement of sensing devices in the immediate path of an air duct outlet. In general, the locations are intended to accurately represent the interior passenger area.

To the extent practical, self-sealing couplings shall be used to break and seal the refrigerant lines during removal of major components such as the refrigerant compressor or condenser.

The condenser shall be located to efficiently transfer heat to the atmosphere, and shall not ingest air warmed by the bus mechanical equipment above the ambient temperature or discharge air into any other system of the bus. The condenser and evaporator fan motors shall be brushless and shall be easy to replace in a maximum of one man-hour using simple hand tools. Fan motor replacement shall not require removal of fan housing or air ducting.

The air conditioning system shall employ an accumulator or other strategy in the low pressure circuit to prevent liquid refrigerant from entering the compressor during operation.

Additional testing shall be performed as necessary to ensure compliance to performance requirements stated herein.

Capacity and Performance Requirements

The air-conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110 ° to 90 °F in less than 20 minutes after engine start-up. Engine temperature shall be within the normal operating range at the time of start-up of the cool-down test, and the engine speed shall be limited to fast idle, which may be activated by a driver-controlled device. During the cool-down period, the refrigerant pressure shall not exceed safe high-side pressures, and the condenser discharge air temperature, measured 6 inches from the surface of the coil, shall be less than 45 °F above the condenser inlet air temperature. The appropriate solar load as recommended in the APTA "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System," shall be used. There shall be no passengers on board, and the doors and windows shall be closed. The air conditioning system shall meet these performance requirements using R134a or 407c.

TS 55. Controls and Temperature Uniformity

The HVAC system excluding the driver's heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data. The system shall be compliant with J1939 Communication Protocol for receiving and broadcasting of data.

Hot engine coolant water shall be delivered to the HVAC system driver's defroster/heater and other heater cores by means of an auxiliary coolant pump, sized for the required flow, which is brushless and seal-less having a minimum maintenance free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

If provided, outside openings for air intake shall be located to ensure cleanliness of air entering the climate control system, particularly with respect to exhaust emissions from the bus and adjacent traffic. All intake openings shall be baffled to prevent entry of water.

Manual Mode Selection of Climate Control System

After manual selection and/or activation of climate control system operation mode, all interior climate control system requirements for the selected mode shall be attained automatically to within $\pm (2)^{\circ}\text{F}$ of specified temperature control set-point.

Manually Adjustable Temperature Control Set Point

The climate control system shall have the provision to allow the driver to adjust the temperature control set-point at a minimum of between 68 and 72°F. From then on, all interior climate control system requirements shall be attained automatically, unless re-adjusted by driver.

The driver shall have full control over the defroster and driver's heater. The driver shall be able to adjust the temperature in the driver's area through air distribution and fans. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.

Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the passenger compartment in the same vertical plane, and six to 72 inches above the floor, shall not vary by more than five (5) °F with doors closed. The interior temperatures, measured at the same height above the floor, shall not vary more than \pm five (5) °F from the front to the rear from the average temperature determined in accordance with APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System." Variations of greater than \pm five (5) °F will be allowed for limited, localized areas provided the majority of the measured temperatures fall within the specified requirement.

TS 55.1 Auxiliary Heater

No auxiliary heater.

TS 56. Air Flow

TS 56.1 Passenger Area

The cooling mode of the interior climate control system shall introduce air into the bus at or near the ceiling height at a minimum rate of 25 cubic feet per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. Airflow shall be evenly distributed throughout the bus, with air velocity not exceeding 100 feet per minute on any passenger. The ventilating mode shall provide air at a minimum flow rate of 20 cfm per passenger. Air vents shall direct air flow away from open windows, if provided.

Airflow may be reduced to 15 cfm per passenger (150 percent of seated load), when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to ensure at least 70 °F air outlet temperature. The heating air outlet temperature shall not exceed 120 °F under any normal operating conditions.

Heater circulating pump shall be brushless and seal-less.

The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level requirements.

TS 56.2 Driver's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the driver's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shutdown of the airflow. Airflow in the heating mode shall be reduced proportionally to the reduction of airflow into the passenger area. The windshield defroster unit shall meet the requirements of SAE Recommended Practice J381, "Windshield Defrosting Systems Performance Requirements," and shall have the capability of diverting

heated air to the driver's feet and legs. The defroster or interior climate control system shall maintain visibility through the driver's side window.

TS 56.3 Controls for the Climate Control System (CCS)

The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements:

- The heat/defrost system fan shall be controlled by a separate switch that has an "Off" position and at least two positions for speed control.
- A manually operated or electronically modulated control valve shall control the coolant flow through the heater core.
- If a cable-operated manual control valve is used, the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be "positive" type, when closed. The method of operating remote valves shall be subject to LACMTA approval during proposal period.

TS 56.4 Driver's Compartment Requirements

A separate heating, ventilation and defroster system for the driver's area shall be provided and shall be controlled by the driver. The system shall meet the following requirements:

- The heater and defroster system shall provide heating for the driver and heated air to completely defrost and defog the windshield, driver's side window, and the front door glasses in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or the exterior through a control device and pass it through the heater core to the defroster system and over the driver's feet. A minimum capacity of 100 cfm shall be provided. The driver shall have complete control of the heat and fresh airflow for the driver's area.
- The defroster supply outlets shall be located at the lower edge of the windshield. These outlets shall be durable and shall be free of sharp edges that can catch clothes during normal daily cleaning. The system shall be such that foreign objects such as coins or tickets cannot fall into the defroster air outlets. Adjustable ball vents or louvers shall be provided at the left of the driver's position to allow direction of air onto the side window in order to maintain visibility.

A ventilation system shall be provided to ensure driver comfort and shall be capable of providing fresh air. Vents shall be controllable by the driver from the normal driving position. Decals shall be provided, indicating "operating instructions" and "fresh air" and "recirculating air" positions. When closed, vents shall be sealed to prevent the migration of water or air into the bus.

TS 56.5 Driver's Cooling

A separate booster fan unit shall provide 100 cfm of air to the driver's area through directionally adjustable nozzles and an infinitely variable fan control, both of which shall be located above the driver.

TS 57. Air Filtration

Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.2 requirement for five percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service.

More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation. Moisture drains from air intake openings shall be located so that they will not be subject to clogging from road dirt.

TS 58. Roof Ventilators

At least one roof ventilator shall be provided in the roof of the bus.

Each ventilator shall be easily opened and closed manually. Ventilators with lever type release handles are not permitted. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq. inches and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than four inches, or with all four edges raised simultaneously to a height of no less than 3.5 inches. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator(s) shall be sealed to prevent entry of water when closed.

TS 59. Maintainability

Manually controlled shut-off valves in the refrigerant lines shall allow isolation of the compressor and dehydrator filter for service. To the extent practicable, self-sealing couplings utilizing O-ring seals shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor.

The condenser shall be located to efficiently transfer heat to the atmosphere and shall not ingest air warmed above the ambient temperature by the bus mechanical equipment, or to discharge air into any other system of the bus. The location of the condenser shall preclude its obstruction by wheel splash, road dirt or debris. HVAC components located within six inches of floor level shall be constructed to resist damage and corrosion. The condenser and evaporator fan motors shall be easy to replace in a maximum of one man-hour using simple hand tools. Fan motor replacement shall not require removal of fan housing or air ducting.

TS 60. Entrance/Exit Area Heating

No requirements for entrance/exit area heating.

TS 61. Floor-Level Heating

TS 61.1 Transit Bus

No requirements for floor-level heating.

TS 61.2 Commuter Bus

Not applicable

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING (TS 62-TS 73)

TS 62. Design

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria. With the exception of required VIN information, exterior manufacturer's emblem plate or decals shall not be installed unless approved by the LACMTA. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any bus body feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking of air, dust or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus.

Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. However, if entry of moisture into the interior of the vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches and doors shall be able to be sealed. Accumulation of spray and splash generated by the bus's wheels shall be minimized on windows and mirrors.

TS 62.1 Materials

Body materials shall be selected and the body fabricated to reduce maintenance, extend durability and provide consistency of appearance throughout the service life of the bus. Detailing shall be kept simple, and add-on devices and trim shall be minimized and integrated into the basic design.

The total structure shall be designed for maximum; strength, reliability, and durability, while maintaining minimum weight. The overall structure shall be designed to prevent the penetration of fluids, including lubricants, into the structure of the bus. All exposed surfaces shall be uniform in appearance with no unevenness or random irregularities in finish, including seam areas.

TS 62.2 Roof-Mounted Equipment (Transit Bus)

The bus roof shall be coated with “anti-slip” paint applied to areas that will accommodate safe access for routine inspections of the fuel cylinders.

TS 62.3 Curb Feelers

The bus shall be equipped with one curb feeler located at front door area. Curb feeler sample shall be provided by the LACMTA upon request. Installation of curb feeler shall be subject to LACMTA approval at the Pilot Bus.

TS 63. Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ inch and within 80 inches of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors, cameras and required lights and reflectors are exempt from the protrusion requirement. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize toeholds or handholds.

Exterior protrusions shall not cause a line-of-sight blockage for the driver.

TS 64. Repair and Replacement

TS 64.1 Side Body Panels (Transit Bus)

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 feet. Exterior panels shall not be installed or retained with visible rivets or fasteners unless specifically approved by LACMTA. Exterior panels that function as service and access doors shall be similar in construction, being made of aluminum, fiberglass, or stainless steel. All body panels, including those with louvers or ventilation openings, shall be designed to prevent persons from gaining a hand or foot hold if attempting to climb the exterior of the bus.

TS 64.2 Side Body Panels (Commuter Bus)

Not applicable.

TS 65. Rain Gutters

Rain gutters shall be provided to prevent water flowing from the roof onto the full length of both curb and street sides of the bus. When the bus is decelerated, the gutters shall not drain onto the windshield, driver’s side window, passenger windows or door boarding area. Gutter cross section shall be no less than 0.25 square inches.

TS 66. License Plate Provisions

Provisions shall be made to mount standard-size U.S. license plates per SAE J686 on the front and rear of the bus. These provisions shall direct-mount or recess the license plates so that they can be cleaned by automatic bus-washing equipment without being caught by the brushes, subject to LACMTA approval in Pre-Production meetings. The rear license plate provision shall be illuminated per SAE J587. License plates shall be mounted on the center or to the left of center and shall not allow a toehold or handhold for unauthorized riders. Front license plate shall be mounted sufficiently to the left of the center to allow clearance for Metro installed bicycle rack banners.

TS 66.1 Rub Rails

No requirement for rub rails.

TS 67. Fender Skirts

Features to minimize water spray from the bus in wet conditions shall be included in wheel housing design. Any fender skirts shall be easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable with the fender skirts in place.

TS 68. Wheel Covers (Transit Bus)

Wheel covers not required.

TS 68.1 Splash Aprons

Standard Splash Aprons

Splash aprons, composed of ¼ inch minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and protect underfloor components. The splash aprons shall extend downward to within six inches off the road surface at static conditions. Apron widths shall be no less than tire widths. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons shall not be included in the road clearance measurements. Splash apron shall be installed as necessary to protect the wheelchair loading device from road splash. Other splash aprons shall be installed where necessary to protect bus equipment.

TS 69. Service Compartments and Access Doors

TS 69.1 Access Doors (Transit Bus)

Hinged doors shall be used for the engine compartment and for all auxiliary equipment compartments. Access openings shall be sized for easy performance of tasks within the compartment, including tool operating space. Access doors shall be provided at the front of the bus, only if needed, to service and/or replace the front windshield defroster unit, windshield wiper units, brake application valve, steering gear box, throttle pedal assembly, and associated pressure and electrical switches, airline fittings, and electrical connections. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus.

The use of expanded metal for side and rear service doors is prohibited. All access doors shall be aluminum, fiberglass, or stainless steel. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems. Gas springs used for the engine access door shall be designed to operate in temperatures encountered within the engine compartment. In the event of a spring failure, an adequate mechanical locking device shall be provided at a minimum for the engine and air conditioner access doors which is capable of retaining a minimum of 200 percent of the door weight when in the open position. The locking device shall be identified by a distinctive yellow or orange color and be simple to operate by one person when closing the door. Access doors shall hinge up and out of the way to within 30 to 45 degrees of the side of the bus. The fuel fill/charge port door shall be hinged at the top and shall open fully up against the side of the bus subject to LACMTA approval in Pre-Production meetings. Pantographic door mechanisms and barn type doors for engine and A/C system access doors are not acceptable. Large access doors shall be opened and closed by one person including the 5th-percentile female. These doors, when opened, shall not restrict access for servicing other components or systems.

If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

TS 69.2 Access Doors (Commuter Bus)

Not applicable.

TS 69.3 Access Door Latch/Locks

Requirement for Latches on Access Doors

Access doors larger than 100 sq. inches in area shall be equipped with corrosion-resistant flush-mounted latches or locks except for coolant and fuel fill or battery-switch access doors. All such access doors that require a tool to open shall be standardized throughout the vehicle and will require a nominal 5/16-inch square male tool to open or lock. The locks shall be standardized so that only one tool is required to open all major access doors on the bus. It is required that locking devices lock clockwise and unlock counter clockwise.

Other Locks and Latches

A key switch shall be provided to lock the front door. The switch shall be located behind an exterior access door near the front curb side of the bus a minimum of 45 inches above the ground. The access door shall be hinged to allow the door to open completely to view and aid inserting the switch key. Access to the switch shall not be obstructed by the bicycle rack in the stowed position. The switch shall use a LACMTA standard key. A sample key will be provided by the LACMTA following the Pre-Production meetings.

The Door Lock system shall be controlled by the bus multiplex system. When the Master Run Switch is in the "Off" position and the Park Brake is applied, the door key switch shall close and lock the front door. If left unattended with the front door locked, the front door lock system shall go to sleep with the bus multiplex system and door shall remain locked. If there is a loss of battery power when the door is locked the door shall remain in the closed unpowered position. When the Operator unlocks the front door with the key, the door shall automatically open and the bus multiplex system shall wake up.

TS 70. Bumpers

TS 70.1 Location

Bumpers shall provide impact protection for the front and rear of the bus with the top of the bumper being 27 inches, ± 2 inches, above the ground. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.

TS 70.2 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's longitudinal centerline. The bumper shall return to its pre-impact shape within 10 minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4,000 pounds parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30-degree angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than seven inches.

TS 70.3 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a two mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper two feet wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to five mph, over pavement discontinuities up to one inch high, and at accelerations up to two mph/sec. The rear bumper shall protect the bus, when impacted anywhere along its width by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4,000 pounds, at four mph parallel to or up to a 30-degree angle to, the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude

unauthorized riders standing on the bumper. The bumper shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than six inches.

TS 70.4 Bumper Material

Bumper material shall be corrosion-resistant black polyurethane type material and withstand repeated impacts of the specified loads without sustaining damage. Visible surfaces shall be semi-gloss black. These bumper qualities shall be sustained throughout the service life of the bus.

TS 70.5 Bicycle Rack

A front mounted fold-up three-position black bicycle rack shall be provided to conform to amended Section 35400 of California Vehicle Code that took effect in September 2014. The installed bicycle rack shall not interfere with towing the bus. California Code Title 13 requires that bike racks be installed with a way for the Operator to determine whenever the bike rack is deployed.

TS 71. Finish and Color

TS 71.1 Appearance

Contractor shall utilize the LACMTA's existing local color scheme in its exterior paint design, (see Technical Specification Attachment 1-Metro Local Exterior and Interior Fleet Standards for reference). Exterior colors shall be applied over a white base color. The manufacturer shall submit for LACMTA's approval, a drawing showing painting layout including striping bends and breaks during Pre-Production meetings. Drawing shall show location of bends as dimensioned from a convenient reference point. The Pilot Bus shall be painted according to this color scheme for approval by the LACMTA prior to application to the remainder of the buses.

Contractor shall submit to LACMTA all material safety data sheet (MSDS) for all exterior and interior finishing, coatings, adhesives, sealants and paints. Paints and coatings including finishes and sealants shall not contain lead or asbestos.

All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system supplier prior to application of paint to assure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be completely painted in such a manner that replacement of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus shall not leave paint outline. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.

Paint shall be applied smoothly and evenly with the finished surface free of visible dirt and the following other imperfections:

- Blisters or bubbles appearing in the topcoat film.
- Chips, scratches, or gouges of the surface finish.
- Cracks in the paint film.
- Craters where paint failed to cover due to surface contamination.
- Overspray.
- Peeling.
- Runs or sags from excessive flow and failure to adhere uniformly to the surface.
- Chemical stains and water spots.
- Dry patch due to incorrect mixing of paint activators.
- Buffing swirls.

All exterior finished surfaces shall be impervious to diesel fuel, gasoline and commercial cleaning agents. Finished surfaces shall resist damage by controlled applications of commonly used graffiti-removing chemicals. The interior of both passenger doors shall be primed with suitable acid-resistant paint.

Proper adhesion between the basic surface and successive coats of the original paint shall be measured using an Elcometer adhesion tester as outlined in ASTM D4541-85. Adhesion shall be a minimum 300 foot.-pounds. The bus manufacturer shall supply test samples of the exterior surface for each step of the painting process that may be subject to adhesion testing per ASTM G4541-87 and ASTM D4145-85. ASTM D4541-93 may be used for inspection testing during assembly of the vehicle.

High Gloss External Paint Finish Quality

Painted surfaces shall have an average 90 gloss as measured in ASTM E97-92, "Standard Test Method For Directional Reflectance" and an orange peel rating of five or more on the Advanced Coating Technologies, Inc., orange peel standard panels set #APR 14941 or LACMTA accepted wave scan equipment. Exterior painted surfaces shall have a minimum of 0.5-mil thick primer coat and a minimum 2.5-mil thick finish coat. Mil thickness shall conform to paint manufacturer's specifications.

TS 72. Decals, Numbering and Signing

Contractor shall furnish and apply all decals. Final size and locations shall be approved by LACMTA. Signs shall be durable and fade, chip, and peel-resistant. All "screened" markings shall be coated with a protective abrasion resistant film that resists damage from cleaning chemicals, graffiti, and sunlight. The Contractor shall provide LACMTA with scaled electronic format drawings of the bus interior and exterior on DVD, compatible with AutoCAD, Adobe Illustrator or other LACMTA approved file format. LACMTA shall utilize these drawings to illustrate the locations of all exterior and interior bus decals to be available at the first Pre-Production meeting or upon request. Contractor shall furnish any other markings necessary for identification of windows, hatches, etc., in both English and Spanish. Roof decals should be applied so that the bottom of the numbers point toward the street side. (Refer to Section TS 88.4 for Tables 18-19.)

TS 72.1 Passenger Information

A total of two information "Take One" boxes and one minimum "Take Twelve" unit shall be supplied (Refer to Section TS 88.1 for Approved Products). "Take One" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the minimum "Take Twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval in Pre-Production meetings.

TS 73. Exterior Lighting

Exterior lighting and reflectors shall comply, as applicable, with Part 393, Subpart B of the FMCSA and FMVSS 108. All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Commercially available LED-type lamps shall be utilized at all exterior lamp locations. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Two hazard lamps at the rear of the bus shall be visible from behind when the engine service doors are opened. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer. Front marker (clearance) lights along with lights located on the roof and sides of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts, and be installed in such a manner to prevent water leakage through the roof or side panels. Separate from any marker lights required by FMVSS, LED clearance lamps shall be provided on the roof surface at each bus corner to delineate bus height in accordance with Title 13 of the California Administrative Code Section 641. These four corner clearance lamps shall be lighted when the master switch is in the "Night Run" position.

Standard Lamps

All LED lamps shall be standard installation of the OEM. The entire assembly shall be specifically coated to protect the light from chemical and abrasion degradation.

Potted Lamps

LED lamps shall be potted type and designed to last the life of the bus.

Lamp Size

LED lamps used for tail, brake and turn signal lamps shall be a minimum of seven inches in diameter.

TS 73.1 Backup Light/Alarm

Visible and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visible reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994 Type C or D.

TS 73.2 Doorway Lighting

Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than one foot-candle for a distance of three feet outward from the outboard edge of the door threshold with a passenger standing in the threshold. The lights must be positioned overhead and shall be shielded to protect passengers' eyes from glare.

Lighting for the ramp areas shall be designed to meet Title 13 and ADA and FMVSS 404 standards. Lighting shall be provided to effectively illuminate the ramp area. Light shall be controlled by the ramp master switch on the driver's dash and shall automatically illuminate when this switch is in the "On" position. The lighting design shall minimize the effect of glare on passengers entering the bus through the wheelchair ramp door. During ramp operation, the street surface shall be illuminated to a minimum of six candlepower a distance of three feet beyond the external dimensions of the ramp platform once deployed.

TS 73.3 Turn Signals

Standard Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable. Two LED seven-inch diameter amber turn/hazard warning lights, one on each side of engine compartment, shall be furnished.

Forward and rear facing supplemental LED cornering lights shall be provided on the curb side of bus only. With the master switch in the "Night Run" position, the cornering lights shall illuminate the street surfaces no less than three feet outward of the body only when activated by right-hand turn signal at 15 mph or less.

Cornering lights shall illuminate the street surfaces for 15 seconds when the doors close and the master switch is in "Night Run" position to assist an operator determine whether or not the areas by the doors are clear of people.

Wraparound Front Turn Signals

Front turn signals shall be of wrap-around design or shall be designed to be visible from the front and the near side of the bus.

TS 73.4 Headlights

Headlamps shall be designed for replacement of bulb without removing the headlamp bezel.

Standard Installation

Standard OEM headlight installation shall be provided in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.

Daytime Running Lights

Headlamps shall not incorporate a daytime running light feature.

LED/Halogen

Low beam headlamps shall be LED. High beam headlamps shall be halogen or LED. Lenses shall be resistant to hazing and yellowing, and have proper hardness to resist surface scratches and stone chips, subject to LACMTA approval during proposal period.

TS 73.5 Brake Lights

TS 73.5.1 Transit Bus

Brake lights shall be provided in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.

High and Center Mount Red Brake Lamp

Bus shall include red, high and center mount brake lamp(s) along the backside of the bus in addition to the lower brake lamps required under FMVSS 108. The high and center mount brake lamp(s) shall illuminate steady with brake application. Two LED seven-inch diameter sealed tail lights shall be mounted on each side of the engine closure door or rear end panels, so that the lights are not affected by engine heat (Refer to Section TS 88.1 for Approved Products). The (red) stop/tail lights shall be mounted directly above the (amber) directional signal lights. Two additional LED (red) stop lights shall be located above the engine compartment door on the centerline of the bus. If stop and tail lights are not visible from the rear when engine door is in the open position, two LED four-inch diameter amber hazard warning lights, one on each side of engine compartment, shall be furnished and activated by the turn signals. Each light shall be replaceable as an individual unit. Plastic lenses shall be protected with a high performance scratch and chemical resistant coating to prevent deterioration.

TS 73.5.2 Commuter Bus

Not applicable.

TS 73.6 Service Area Lighting (Interior and Exterior)

LED lamps with a minimum 264 lumens each shall be provided in the engine and all other compartments where service may be required to generally illuminate the area for night emergency repairs or adjustments. These service areas shall include, but not be limited to, PLC compartment(s), battery box(es), the engine compartment, the communication box, junction/apparatus panels and passenger door operator compartments. Lighting shall be adequate to light the space of the service areas to levels needed to complete typical emergency repairs and adjustments. The service area lamps shall be suitable for the environment in which they are mounted. A minimum of five lamps shall be provided for engine compartment illumination. A common automotive electric lighter accessory socket shall be provided on, or adjacent to, the rear control panel to power 12-volt portable service lights and diagnostic computers, subject to LACMTA approval in Pre-Production meetings.

Engine compartment lamps shall be controlled by a switch mounted near the rear start controls. All other service area lamps shall be controlled by switches mounted on or convenient to the lamp assemblies. Power to the service area lighting shall be programmable. Power shall latch on with activation of the switch and shall be automatically discontinued (timed out) after 60 minutes to prevent damage caused by inadvertently leaving the service area lighting switch in the "On" position after repairs are made.

INTERIOR PANELS AND FINISHES (TS 74-TS 77)

TS 74. General Requirements

Materials shall be selected on the basis of maintenance, durability, appearance, safety, flammability and tactile qualities. Materials shall be strong enough to resist everyday abuse and be vandalism and corrosion resistant. The interior shall be light colored, well lighted, simple, modern, and free from superficial design motifs. There shall be no sharp depressions or inaccessible areas, and it shall be easy to clean and maintain. Trim and attachment details shall be kept simple and unobtrusive. Interior trim shall be secured to avoid resonant vibrations under normal operational conditions.

Interior surfaces more than 10 inches below the lower edge of the side windows or windshield shall be shaped so that objects placed on them fall to the floor when the bus is parked on a level surface. With the exception of the Operators' area and dash, the entire interior shall be cleanable with a hose that utilizes a liquid soap attachment. Interior shall accommodate periodic usage of commercially available cleaning agents, solvents and other chemicals for graffiti cleaning and pest control. Any components and other electrical components within close proximity to these surfaces shall also be resistant to this cleaning method.

Additional anti-graffiti/vandalism treatments shall be applied to interior surfaces, subject to LACMTA approval during proposal period, to allow easy cleaning and removal of markings, adhesives, paint, scribing and etching on surfaces.

Interior surfaces, where possible, to be stainless steel or other vandalism resistant material.

TS 75. Interior Panels

Panels shall be easily replaceable and tamper-resistant. They shall be reinforced, as necessary, to resist vibration, denting, vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable.

Interior panel required to meet FMVSS 302.

Interior panels installed behind the exit door, (except for ceiling), shall be textured stainless steel only. Panels in other areas of the bus shall be stainless or other material as determined to best match appearance with the rear section of the bus subject to LACMTA approval during proposal period.

Fire Resistance

Materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision.

TS 75.1 Driver Area Barrier

TS 75.1.1 Transit Bus

A barrier or bulkhead between the driver and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. Location and shape must permit full seat travel and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The partition shall have a side return and stanchion to prevent passenger from reaching the driver by standing behind the driver's seat. The lower area between the seat and enclosure must be accessible to the driver. The partition must be strong enough in conjunction with entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2 kg), microcomputer, public address amplifier, etc. Dark or black enclosures are preferred behind the driver's head. The enclosure should be isolated for noise control.

Wheel-Well-to-Ceiling Configuration of Driver's Barrier

The driver's barrier shall extend from the top of the wheel well to the ceiling the level of the seated driver and shall fit close to the bus side windows and wall to prevent passengers from reaching the driver or the driver's personal effects.

Driver's Area Barrier Door

A driver door of a ruggedized design intended for use in a transit bus environment shall be provided. It shall be a split door design. Upper and lower doors shall be opened or closed independently of each other. LACMTA may consider a single door with sliding glass. Each door, when closed, shall have a mechanism to latch from inside the operator compartment. Provision shall be made for emergency responders to gain access to a latched operator compartment. Door panels shall be standardized so that they are interchangeable from bus to bus. The door must allow access to all panels, dash and destination sign without requiring removal of the door.

The clear see-through AS2 polycarbonate panel or laminated safety glass in the driver door shall have no speaker holes. The clear panel shall resist clouding and discoloration by ultraviolet rays and by use of the cleaners currently in use at LACMTA.

The driver door shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. It shall be installed in compliance with Driver Provisions, Controls and Instrumentation specified in TS 46 and any applicable ADA or safety standards.

The driver door shall not block boarding passengers from viewing the live display video monitor that is mounted above the driver's seat.

The driver door shall be supported by tapping plates in bus frame structure in order for the door to blend in with bus interior decor.

The farebox handrail and driver's paddle clipboard shall be designed and positioned so that the driver door will automatically latch upon closing without interfering with full farebox function while allowing mounting the farebox OCU, RAM dual pivot arm and driver's paddle clipboard in a manner that is ergonomic to an operator in the driver's seat.

With the bus on level ground, upper and lower doors, when open but not secured to the side, shall stay put where they are left, neither opening nor closing, without application of an external force. When closed, these doors shall not adversely impact the ingress and egress of passengers including those in a wheelchair or other mobility assistive device (i.e. fully ADA compliant). When fully open and secured, these doors shall be designed to minimize the impact on the ingress and egress of passengers including those in a wheelchair or other mobility assistive device.

The entire drive door assembly shall be replaceable in 30 minutes or less. The see-through panel in the barrier shall be replaced in 15 minutes or less using simple hand tools. Door hinges shall be a quick-release type to allow easy, rapid removal of the door panels.

TS 75.1.2 Commuter Bus

Not applicable.

TS 75.2 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, stainless steel complementing the interior shall be provided to act as both a physical and visual barrier for seated passengers in front of each leading row of forward facing seats.

Design and installation of modesty panels located in front of forward-facing seats shall include a handhold or grab handle along its top edge. These dividers shall be mounted on the sidewall and shall project toward the

aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend from at least the window opening of the side windows, and those forward of transverse seats shall extend downward to one and 1.5 inches above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways shall provide no less than a 2.5 inches clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails if passengers assist are not provided by other means.

The modesty panel and its mounting shall withstand a static force of 250 pounds applied to a four x four inch area in the center of the panel without permanent visible deformation.

At the rear door area a clear non-glass panel from above the modesty panel to the top of the daylight opening and attached to the stanchion.

Modesty panels shall be bolted or riveted to handrails or installed in U-channels with self-locking nuts and securely attached to stanchion and body side. Modesty panels located at the forward edge of the upper floor area shall be attached along the top to handrails for added stiffness. Panels shall be attached to bottom extruded anodized aluminum rails for stiffness.

TS 75.3 Front End

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the driver's feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing at the front of the standee line area of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the driver's compartment shall be formed metal or composite material. Composite dash panels shall be reinforced as necessary, vandal-resistant and replaceable. All colored, painted and plated parts forward of the driver's barrier shall be finished with a surface that reduces glare. Any mounted equipment must have provision to support the weight of equipment.

TS 75.4 Rear Bulkhead

The rear bulkhead and all rear interior surfaces, including air return grille, access doors and covers, with the exception of bus ceiling and enclosures adjacent to ceiling, shall be embossed stainless steel with "leather grain" finish. Ceiling and enclosures adjacent to ceiling shall be made of durable, corrosion resistant, easily cleanable material subject to LACMTA approval. Surfaces, other than ceiling, not made of stainless material shall be uniform in color and match lighting panels to the extent possible. Finish shall permit easy removal of paint, grease, fingerprints, and ink. They shall be designed and reinforced, as necessary, to resist vibration, denting, vandalism, and other rigors encountered in LACMTA service. The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat backs so that any litter or trash will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this area shall be louvered to reduce airflow noise and to reduce the probability of trash or litter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, the panel shall be hinged or shall be able to be easily removed and replaced. Grilles where access to or adjustment of equipment is required shall be heavy-duty and designed to minimize damage and limit unauthorized access. Unless otherwise specified, all wiring harnesses in the engine compartment shall terminate there for ease of replacement. Wire harnesses going through the bulkhead shall have a junction at the bulkhead.

TS 75.5 Headlining

Ceiling panels shall be made of durable, corrosion resistant, easily cleanable material subject to LACMTA approval during proposal period. Headlining shall be supported to prevent buckling, drumming or flexing and shall be secured without loose edges. Headlining materials shall be treated or insulated to prevent marks due to condensation where panels are in contact with metal members. Moldings and trim strips, as required to make the edges tamperproof, shall be stainless steel, aluminum or plastic, colored to complement the ceiling material. Headlining panels covering operational equipment mounted above the ceiling shall have an access panel installed to permit access to the equipment. Antenna access panel may be hinged or removable using

captive tamper proof screws. Individual head lining panels shall be easily replaceable by one mechanic using simple hand tools in a maximum of 30 minutes not including stanchion removal.

TS 75.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Fasteners should be corrosion resistant. Panels and fasteners shall not be easily removable by passengers. Exposed interior fasteners should be minimized, and where required shall be tamper-resistant.

TS 75.7 Insulation

Any insulation material used between the inner and outer panels shall minimize the entry and/or retention of moisture. Insulation properties shall be unimpaired during the service life of the bus. The insulation material shall be non-hygroscopic, non-asbestos, and resistant to fungus and breeding of insects. Any insulation material used shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations.

The combination of inner and outer panels on the sides, roof, wheel wells and ends of the bus, and any material used between these panels, shall provide a thermal insulation sufficient to meet the interior temperature requirements. The bus body shall be thoroughly sealed so that the driver or passengers cannot feel drafts during normal operations with the passenger doors closed.

FTA Docket 90-A

All insulation materials, except for insulation entirely enclosed from the passenger compartment, shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision.

TS 75.8 Floor Covering

All interior floor areas shall be covered with a combination of gray colored smooth and ribbed slip resistant rubber or equivalent floor covering bonded to the subfloor that remains effective in all weather conditions with 12-year unconditional warranty, subject to LACMTA approval. The floor covering, as well as transitions of flooring materials from the main floor area and to the step areas shall be smooth and present no tripping hazards. The floor covering shall closely fit the sidewall cove or extend to the top of the cove. Floor covering applied to wheel housing may be separate pieces. To the extent practical, the center strip may be two-piece and shall extend from the rear seat between the aisle seats to the front standee line.

The floor covering in the entry area shall be ribs aligned transversely (perpendicular to the entrance door), and longitudinally (in line with the aisle), and shall be joined together smoothly. The integrally molded yellow standee line shall be integrally molded yellow at least two inches ($\pm 1/8$ inch) wide and shall have a consistent dimension across the bus aisle in line with the operator's barrier.

The floor covering in the passenger area shall match the flooring in the entry area. The center strip shall be ribs aligned with the aisle. At the rear door a separate ribbed strip as wide as the door opening shall extend from the center strip to the door with ribs aligned transversely (perpendicular to the door). The floor under the seats shall be covered with smooth surface flooring material. The floor covering shall closely fit the sidewall cove or extend to the top of the cove. The wheel housings may be separate pieces. The wheelchair parking area floor shall be covered with blue smooth flooring material that extends into adjacent senior seating areas.

Interior step treads (if required) shall be covered with ribbed flooring material or other non-slip flooring material. The first step shall be yellow, and the second (if needed) shall have two inches wide yellow nosing the full width of the tread, which is fully blended, into the tread material. Sides of the steps shall be the same color as the yellow nosing or rest of the floor, and fully sealed to prevent peeling, tripping hazards, and water intrusion. The edge of any interior steps shall have minimal overhang. Special coating for the step tread section may be acceptable subject to LACMTA approval during the Pre-Production meeting.

TS 75.9 Interior Lighting

Commercially available LED-type lamps shall be utilized at all interior lamp locations. The light source shall be located to minimize windshield glare, with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. The lighting system may be designed to form part of or the entire air distribution duct. The lighting system shall meet FCC Part 18; Class A regulation for EMI conducted and radiated emissions.

TS 75.10 Passenger

An overhead LED lighting system shall provide general illumination in the passenger compartment. The lens material shall be translucent polycarbonate. Lenses shall be designed to effectively "mask" the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet be easily removable for service. Access panels shall be provided to allow servicing of components located behind light panels. The entire light fixture shall be hinged to provide easy access to bus wiring and equipment mounted behind the light fixture. The fixture lens cover shall be easy to remove and clean and shall be retained by vandal resistant threaded screws.

Automatically Dimming First Row Lights

The first light on each side (behind the driver and the front door) is normally turned on only when the front door is opened, in "Night Run" and "Night Park" As soon as the door closes, these lights shall go out. These lights shall be turned on at any time if the switch is in the "On" position. Access to the wiring interconnects shall not require removing the fixture from the bus structure.

Dimming Second Row Lights

To help eliminate windshield reflection on suburban roads where street lighting is at a low level, the second light on each side, when "Night Run" or "Night Park" is selected, shall be controlled by the switch; off in "Off" and dimmed in "Normal." These lights shall be turned fully on at any time if the switch is in the "On" position.

The interior lighting design shall be subject to LACMTA approval during proposal period.

TS 75.11 Driver's Area

The driver's area shall have a light to provide general illumination, and it shall illuminate the half of the steering wheel nearest the driver to a minimum level of five foot-candles. This light shall be controlled by a switch that is convenient to the operator. The Operator's light shall be off when the Master Run Switch is in the "Off" position.

TS 75.12 Seating Areas (Transit Bus)

The interior lighting system shall provide a minimum 15 foot-candle illumination on a one square foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be seven-foot-candles.

TS 75.13 Seating Areas (Commuter Bus)

Not applicable.

TS 75.14 Vestibules/Doors (Transit Bus)

Floor surface in the aisles shall be a minimum of 10 foot-candles, and the vestibule area a minimum of four foot-candles with the front doors open and a minimum of two foot-candles with the front doors closed. The front entrance area and curb lights (if needed) shall illuminate when the front door is open and master run switch is in the "lights" positions. Rear exit area and curb lights shall illuminate when the rear door is unlocked.

TS 75.15 Vestibules/Doors (Commuter Bus)

Not applicable.

TS 75.16 Step Lighting

Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of four (4) foot-candles and shall illuminate in all engine run positions. The step lighting shall be low-profile to minimize tripping and snagging hazards for passengers and shall be shielded as necessary to protect passengers' eyes from glare.

Front and rear passenger door areas shall be lighted to meet ADA requirements.

When the Master Switch is in the "Night Run" position, the front and rear door area lights shall be on when the doors are open and off when the doors are closed.

TS 75.17 Ramp Lighting (Transit Bus)

Exterior and interior ramp lighting shall comply with CFR Part 49, Section 38.31.

Lights shall be provided at the doorway equipped with the wheelchair access system to floodlight the loading area.

Lighting for the ramp areas shall be designed to meet Title 13 and ADA and FMVSS 404 standards. Lighting shall be provided to effectively illuminate the ramp area. The light shall be wired through the ramp master toggle switch on the driver's dash and shall automatically illuminate when this switch is in the "On" position. The lighting design shall minimize the effect of glare on passengers entering the bus through the wheelchair ramp door. During ramp operation, the street surface shall be illuminated to a minimum of six candlepower a distance of three feet beyond the external dimensions of the ramp platform once deployed.

TS 75.18 Turntable Lighting (Articulated Bus)

Not applicable.

TS 75.19 Farebox Lighting

TS 75.19.1 Transit Bus

A light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. The light shall illuminate the top of the fare box and the surrounding floor area to a minimum of 15 foot-candles. This light will automatically come on whenever the front doors are opened and the run switch is in the "Night Run" or "Night Park" position. A by-pass switch shall be provided on the Operator's side console to keep the fare box light on when activated.

TS 75.19.2 Commuter Bus

Not applicable.

TS 76. Fare Collection

Space and structural provisions shall be made for installation of 41-inch GFI Genfare Odyssey Validation farebox and shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver area, shall not restrict operation of driver controls and shall not — either by itself or in combination with stanchions, transfer mounting, cutting and punching equipment, or route destination signs — restrict the driver's field-of-view per SAE Recommended Practice J1050. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The farebox location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the farebox shall be readable on a daily basis. The floor under the farebox shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the farebox.

Adjacent to the farebox area and within easy reach of the Operator, Contractor shall provide a small clipboard approximately 4.5 inches by 5.5 inches to hold the operator schedule, (paddle).

The Contractor shall provide and install GFI Genfare Odyssey Validation farebox base plate, power leads and ITS interface cable, subject to LACMTA approval in Pre-Production meetings.

Note: Proposers are to contact GFI Genfare directly to determine correct part numbers, harness length requirements, etc. The under floor reinforcement shall be of adequate strength to anchor the farebox using GFI installation kit D22581-0005 or equivalent. Reinforcement plate shall include permanently attached nuts to secure the farebox base plate to the floor.

A circuit breaker protected, 20-amp, 24-Volt DC battery circuit, shall be provided and powered through the battery connect switches. This power circuit shall include a grounded lead. A one-inch inside diameter waterproof conduit shall be provided from the ITS enclosure to the farebox base plate mounting location, through the bus floor, to protect the power leads and ITS interface cable, subject to LACMTA approval in Pre-Production meetings. Farebox end of conduit shall protrude above the floor at a minimum 1/2 inch to prevent moisture from entering the conduit.

TS 77. Interior Access Panels and Doors (Transit Bus)

Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Removal of fixtures or equipment unrelated to the repair task to gain access shall be precluded or used only subject to LACMTA approval in Pre-Production meetings. Access doors shall be hinged with gas props or over-center springs, where practical, to hold the doors out of the mechanic's way, subject to LACMTA approval during pre-production meetings. All overhead doors shall be hinged at the top and shall be prevented from coming loose or opening during transit service or in bus cleaning operations. Access doors, when opened, shall not restrict access for servicing other components or systems. Retention of all interior access panels shall be with tamper proof screws. Panel fasteners shall be standardized so that only one tool is required to service all special fasteners within the Bus subject to LACMTA approval in Pre-Production meetings. All fasteners that retain access panels, excluding wheel well housing, and floor access panels, shall be captive in the cover. Removable light panels are not considered access panels unless specifically approved by LACMTA. Access doors in the Operators' area forward of the standee line (including the front door actuator compartment) shall be secured with hand screws or latches and shall prevent entry of mechanism lubricant into the Bus interior.

TS 77.1 Floor Panels

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material at or around access openings shall be flush with the floor and shall be edge-bound with stainless steel or another material that is acceptable to the LACMTA to prevent the edges from coming loose. Access openings shall be asymmetrical so that reinstalled flooring shall be properly aligned. Fasteners shall tighten flush with the floor.

The number of special fastener tools required for panel and access door fasteners shall be minimized.

PASSENGER ACCOMMODATIONS (TS 78-TS 82)

TS 78. Passenger Seating

TS 78.1 Arrangements and Seat Style (Transit Bus)

The passenger seating arrangement in the bus shall be such that seating capacity is maximized with a minimum of 38 seats, and in compliance to the following requirements:

Note: The LACMTA recognizes that ramp location, foot room, hip-to-knee room, doorway type, width, seat construction, floor level type, seat spacing requirements, ramp or lift, number of wheelchair positions, etc. ultimately affect seating capacity and layout.

Forward-Facing Seat Configuration

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings and turntable, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at wheelchair securement areas and platforms (such as for fuel tank storage space). The first forward facing seats at the curbside and street side shall be designated as reserved seating for the senior, the blind and a person on a cane or crutch. All reserved seating shall use seat inserts covered with Blue Chips fabric.

Rear Seats

The rear seat assembly shall accommodate four or five passengers as needed to meet the minimum seating requirement. A maximum of three of the rear seat(s) shall be hinged to fully open for easy access to the engine compartment. The hinged seats shall latch in the closed position and be supported by a convenient prop in the open position.

USB Ports

Type A USB device charging ports shall be provided for all seat locations. For transverse seats there shall be a dual port USB connector at double passenger seat locations, and a single port USB connector at the single passenger seat locations, mounted along the seat rails. At the rear settee there shall be a dual USB connector on each end of the settee positions along the seat rails. At the wheelchair flip up seat locations, a dual USB connector shall be positioned such that it is easily accessible with the seat in either wheelchair or seating position. On any fixed longitudinal seats, a single port USB connector per seat shall be located on the seat rail adjacent to the seat. The exact locations of the charging ports shall be reviewed and approved by LACMTA during Proposal period. The USB connectors shall include spring loaded access doors that provide dust and water resistance to IP 64 rating. The ports shall be powered only when engine is running and shall provide five volts at two amps minimum power.

TS 78.2 Rearward Facing Seats (Transit Bus)

Rearward facing seats not allowed.

TS 78.3 Turntable Seating (Articulated Bus)

Not applicable.

TS 78.4 Padded Inserts/Cushioned Seats (Transit Bus)

Non-Padded Inserts

The passenger seats shall be equipped with vandal-resistant non-padded inserts throughout the bus.

Non-Padded Seat Configuration

Seats inserts shall be securely attached and shall be detachable by means of a simple release mechanism so that they are easily removable by the maintenance staff but not by passengers. To the extent practicable, seat inserts shall be interchangeable throughout the bus. Materials shall have high resistance to tearing, flexing and wetting.

TS 78.5 Seat Back Fitness

Back Insert Seat Configuration

The seat back insert thickness shall not exceed one inch in the knee room area.

TS 78.6 Drain Hole in Seats

The bottom insert shall be fitted with a riveted drain hole.

TS 78.7 Arrangements and Seat Style (Commuter Bus)

Not applicable.

TS 78.8 Hip-to-Knee Room

Hip-to-knee room measured from the center of the seating position, from the front of one seat back horizontally across the highest part of the seat to vertical surface immediately in front, shall be a minimum of 26 inches. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to-knee room shall be no less than 26 inches.

TS 78.9 Foot Room

Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 inches. Seats immediately behind the wheel housings and modesty panels may have foot room reduced.

TS 78.10 Aisles (Transit Bus)

The aisle between the seats shall be no less than 20 inches wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 inches at 32 inches above the floor (standing passenger hip height).

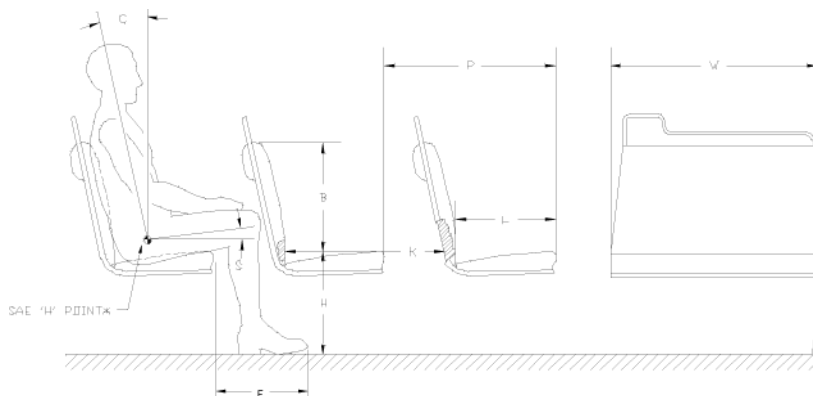
TS 78.11 Aisles (Commuter Bus)

Not applicable.

TS 78.12 Dimensions (Transit Bus)

FIGURE 7

Seating Dimensions and Standard Configuration



Seat dimensions for the various seating arrangements shall have the dimensions as follows (Refer to Figure 7):

- The width, W, of the two-passenger transverse seat shall be a minimum 35 inches.
- The length, L, shall be 17 inches, ± 1 inch.
- The seat back height, B, shall be a minimum of 15 inches.
- The seat height, H, shall be 17 inches, \pm one inch for the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of under-floor components, a cushion height of up to 18 inches, \pm two inches, will be allowed. This shall also be allowed for limited transverse seats, but only with the expressed approval of the LACMTA during proposal period.
- Foot room = F.
- The seat cushion slope, S, shall be between five and 11 degrees.

- The seat back slope, C, shall be between eight and 17 degrees.
- Hip to knee room = K.
- The pitch, P, is shown as reference only.

TS 78.13 Structure and Design (Transit Bus)

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized and is completely free of obstructions to facilitate cleaning.

Seats, structures and restraints around the securement area should not infringe into the mobility device envelope or maneuverability.

The transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 inches of the aisle shall be at least 10 inches above the floor.

In locations at which cantilevered installation is precluded by design and/or structure, other seat mounting may be allowed.

All transverse objects — including seat backs, modesty panels, and longitudinal seats — in front of forward-facing seats shall not impart a compressive load in excess of 1,000 pounds onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at 0.05 to 0.015 seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the seat back during this 10g deceleration shall not exceed two inches, measured at the aisle side of the seat frame at height H. The seat back should not deflect more than 14 inches, measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 pounds applied to the top of the seat cushion in each seating position with less than ¼-inch permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 pounds evenly distributed along the top of the seat back with less than ¼-inch permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40-pound sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10, and 12 inches. Seats at both seating positions shall withstand 4,000 vertical drops of a 40-pound sandbag without visible deterioration. The sandbag shall be dropped 1,000 times each from heights of 6, 8, 10 and 12 inches. Seat cushions shall withstand 100,000 randomly positioned 3.5-inch drops of a squirming, 150 pounds, smooth-surfaced, buttocks-shaped striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

The back of each transverse seat shall incorporate a handhold no less than ⅞ inch in diameter for standees and seat access/egress. The handhold shall not be a safety hazard during severe decelerations. The handhold shall extend above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than four inches long that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th-percentile male passenger. The handhold shall also be usable by a 5th-percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. The upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy absorbing materials. During a 10g deceleration of the bus, the HIC number (as defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 5th percentile female through a 95th percentile male.

The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where a vertical assist is provided.

Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Longitudinal seats may be mounted on the wheelhouses. Armrests shall be included on the ends of each set of longitudinal seats except on the forward end of a seat set that is immediately to the rear of a transverse seat, the driver's barrier, or a modesty panel, when these fixtures perform the function of restraining passengers from sliding forward off the seat. Armrests are not required on longitudinal seats located in the wheelchair parking area that fold up when the armrest on the adjacent fixed longitudinal seat is within 3.5 inches of the end of the seat cushion. Soft padded arm rests shall not be utilized. Armrests shall not be included in the design of forward facing seats. Armrests shall be located from seven to nine inches above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of one inch and shall be free from sharp protrusions that form a safety hazard.

Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 pounds applied anywhere along their length with less than ¼-inch permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 pounds with less than ¼-inch permanent deformation and without visible deterioration.

TS 78.14 Structure and Design (Commuter Bus)

Not applicable.

TS 78.15 Construction and Materials (Transit Bus)

Passenger seats and supporting structure shall be stainless steel. Complete seat assemblies shall be interchangeable to the extent practical. Seats panels shall be brushed (180 grit polish) stainless steel and shall be attached to the seat frame with tamperproof fasteners. Surface texture shall be consistent throughout the seat material, with no visually exposed portion painted. All visually exposed metal of the standard seat structure including mounting brackets and other components shall be stainless steel.

The seats shall be contoured for individuality, lateral support, and maximum comfort and shall fit the framework to reduce exposed edges. Objects within any portion of the head or chest impact zone such as handholds and seat backs shall not have sharp corners or edges less than ¼-inch radius.

Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners and is subject to LACMTA approval in Pre-Production meetings. To the extent practical, seat inserts shall be interchangeable throughout the bus. Each seat insert shall be easily replaceable in less than one minute using simple hand tools and shall be demonstrated not to fail for a minimum of ten insert changes. The fabric material shall have high resistance to tearing, flexing, and wetting and the coloring shall be consistent throughout the seat material, with no visually exposed portion painted. Any exposed metal touching the sides or the floor of the bus shall be stainless steel. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges.

The minimum radius of any part of the seat back, handhold or modesty panel in the head or chest impact zone shall be a nominal ¼-inch. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy-absorbing materials to provide passenger protection and, in a severe crash, allow the passenger to deform the seating materials in the impact areas. Complete seat assemblies shall be interchangeable to the extent practicable.

Refer to Section TS 88.1 for seat fabric.

TS 78.16 Construction and Materials (Commuter Bus)

Not applicable.

TS 79. Passenger Assists (Transit Bus)

Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the safety of standees and for ingress/egress. Passenger assists shall be convenient in location, shape, and size for both the 95th-percentile male and the 5th-percentile female standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided on the aisle side of each forward facing aisle seating position. The vertical assists on the first forward facing reserved seats at the curbside and street side shall include an easily cleaned tactile feedback surface for passengers, such as knurling. All handholds and stanchions at front doorway, around farebox, and at interior steps for bi-level designs shall be yellow PVC coated, yellow powder coated or yellow nylon coated. Coating shall be 3-mil minimum thickness. Six overhead grey grab straps are to be provided on each side of the wheelchair areas. Vertical assists shall additionally be provided toward the center of three and four passenger aisle facing seats attached to seat frame and overhead assist. Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than seven inches higher than the wheel well housing.

The forward-most vertical stanchions on either side of the aisle immediately behind the driver's area shall be stainless steel finish.

TS 79.1 Assists (Transit Bus)

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1.5 inches or shall provide an equivalent gripping surface with no corner radii less than ¼ inch. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. All passenger assists shall permit a full hand grip with no less than 1.5 inches of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

A crash resulting in a one- foot intrusion shall not produce sharp edges, loose rails, or other potentially dangerous conditions associated with a lack of structural integrity of the assists.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Seat handholds may be of the same construction and finish as the seat frame. Door mounted passenger assists shall be of anodized aluminum, stainless steel or powder-coated metal. Connecting tees and angles may be powder-coated metal castings or molded plastic. Assists shall withstand a force of 300 pounds applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation. Assists shall be provided on both sides of passenger doors to provide safe ingress and egress. All passenger assist components, including brackets, clamps, screw heads and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

TS 79.2 Front Doorway

Front doors, or the entry area, shall be fitted with ADA-compliant assists and shall be no less than 0.75 inch in width. Assists shall be as far outward as practicable, but shall be located no farther inboard than six inches from the outside edge of the entrance step and shall be easily grasped by a 5th-percentile female boarding from street level. Door assists shall be functionally continuous with the horizontal front passenger assist and the vertical assist and the assists on the wheel housing or on the front modesty panel.

TS 79.3 Vestibule (Transit Bus)

The aisle side of the driver's barrier, the wheel housings, and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 inches of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm.

A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. Passengers shall be able to lean against the assist for security while paying fares. The assist shall be no less than 36 inches above the floor. The assists at the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist, to the front assist, to vertical assists on the driver's barrier, wheel housings or front modesty panel. The front assist should not impede wheelchair boarding and provide adequate clearance and access to the farebox during vaulting and maintenance.

TS 79.4 Rear Doorway(s) (Transit Bus)

Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Passenger assists shall be provided on modesty panels that are functionally continuous with the rear door assists. Rear doors, or the exit area, shall be fitted with assists having a cross-sectional diameter between 1¼ and 1.5 inches or providing an equivalent gripping surface with no corner radii less than ¼ inch, and shall provide at least 1.5 inches of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than six inches from the outside edge of the rear doorway step.

TS 79.5 Overhead (Transit Bus)

Except forward of the standee line and at the rear door, a continuous, full grip, overhead assist shall be provided. The assist shall be convenient to standees anywhere in the Bus and shall be located over the center of the aisle seating position of the forward facing seats. The assist shall be no less than 70 inches above the floor and shall terminate at the rear bulkhead or curve up to the ceiling with a minimum six-inch radius.

Grab straps shall be vinyl fabric. A minimum of six grab straps or other extensions as necessary shall be provided for overhead sections above each wheelchair securement area for the use by passengers that cannot reach to 70 inches.

Overhead assists shall simultaneously support 150 pounds on any 12-inch length. No more than five percent of the full grip feature shall be lost due to assist supports.

TS 79.6 Longitudinal Seat Assists (Transit Bus)

Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 inches apart or functionally continuous for a 5th percentile female passenger. A vertical assist or grab rail shall be provided convenient to the outer rear settee seats if they are immediately behind an aisle facing seat subject to LACMTA approval in Pre-Production meetings.

TS 79.7 Wheel Housing Barriers/Assists (Transit Bus)

Unless passenger seating is provided on top of wheel housing, passenger assists shall be mounted around the exposed sides of the wheel housings no more than seven inches higher than the wheel well housing, (and propulsion compartments if applicable), which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housing.

TS 80. Passenger Doors

TS 80.1 Transit Bus

Doors shall be fully electrically powered.

Doorways will be provided in the locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

All passenger door components, except door panels and glazing, must come from one single manufacture, subject to LACMTA approval during proposal period.

TABLE 11
Door Locations and Styles

Front Door						
Location	Slide Glide	Double (Two-Piece Pantograph		Single (One-Piece Pantograph)	Outside Sliding Plug	
Forward of the front wheels and under direct observation of the driver.	X					
Rear Door(s)						
Location	Slide Glide	Outward Opening Swing With Manual Emergency Reset	Outward Opening Swing With Auto Emergency Reset	Double (Two-Piece Pantograph	Single (One-Piece Pantograph)	Outside Sliding Plug
Alternative 1: Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.	X					X

TS 80.1.1 Front Door

Door shall be forward of the front wheels and under direct observation of the driver.

TS 80.1.2 Rear Door(s)

Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.

TS 80.2 Commuter Bus

TS 80.2.1 Front door

Not applicable.

TS 80.3 Materials and Construction

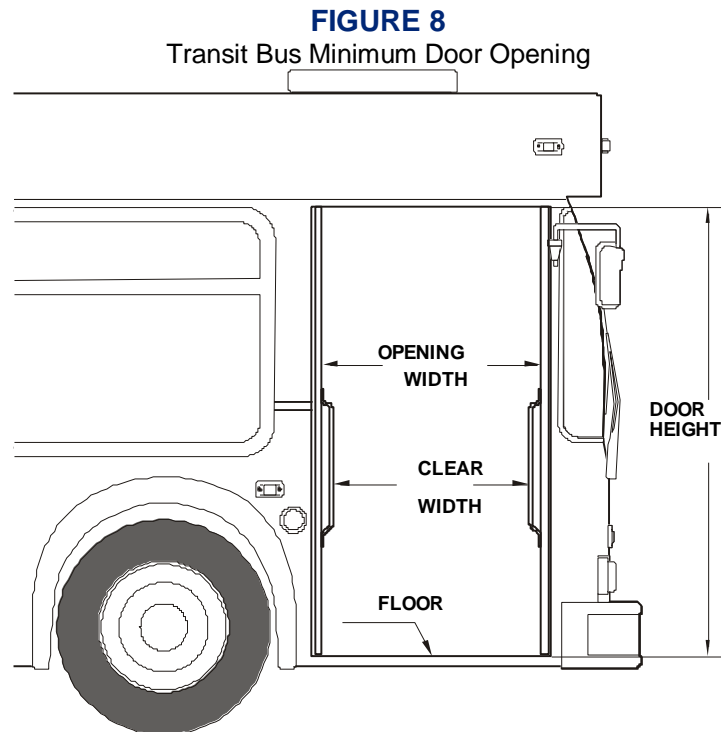
Structure of the doors, their attachments, inside and outside trim panels and any mechanism exposed to the elements shall be durable and corrosion-resistant. Pantographic type passenger rear doors are not acceptable. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. When fully opened, the doors shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. Door edges shall be sealed to prevent infiltration of exterior moisture,

noise, dirt and air elements from entering the passenger compartment, to the maximum extent possible based on door types.

The closing edge of each door panel shall have no less than two inches of soft weather stripping. The doors, when closed, shall be effectively sealed, and the hard surfaces of the doors shall be at least four inches apart. The combined weather seal and window glazing elements of the front door shall not exceed 10 degrees of binocular obstruction of the driver's view through the closed door. The lower section of the rear door shall be solid and constructed of the same material as the door. The interior rear door surface below the door glass shall be protected by a replaceable stainless steel or aluminum "Kick Panel" that is easily replaceable with simple hand tools.

TS 80.4 Dimensions

TS 80.4.1 Transit Bus



When open, the doors shall leave an opening no less than 76 inches in height.

31¾-inch Minimum Doorway Clear Width

Front door clear width shall be a minimum of 31¾ inches with the doors fully opened.

Rear door opening clear width shall be a minimum of 24 inches with the doors fully opened.

TS 80.4.2 Commuter Bus

Not applicable.

TS 80.5 Door Glazing

The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section.

Door glazing shall be easily replaceable.

Zip type glazing rubber or quick change glazing exterior frame.

The front door glazing material shall have a minimum of 3/16-inch nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 Safety Glazing Materials and the Recommended Practices defined in SAE J673. Tinting shall be blue or green to match the windshield.

The rear door panel glazing material shall have a nominal ¼-inch thick tempered glass conforming to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

TS 80.6 Door Projection (Transit Bus)

TS 80.6.1 Exterior

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the curb side mirror when the doors are fully open. The exterior projection of both doors shall be minimized and shall not exceed 13 inches during the opening or closing cycles or when doors are fully opened.

TS 80.6.2 Interior

Projection inside the bus shall not exceed 21 inches, cause an obstruction of the rear door mirror, or cause a hazard for standees.

TS 80.7 Door Height Above Pavement

It shall be possible to open and close either passenger door when the bus loaded to gross vehicle weight rating is not knelt and parked with the tires touching an eight-inch high curb on a street sloping toward the curb so that the street side wheels are five inches higher than the right side wheels.

When the bus is at operating level, opened doors shall be 14 to 16 inches above the ground.

TS 80.8 Closing Force

Closing door edge speed shall not exceed 12 inches per second, and opening door speed shall not exceed 19 inches per second. Power doors shall not slam closed under any circumstance, even if the door is obstructed during the closing cycle. If a door is obstructed during the closing cycle, the pressure exerted on the obstruction shall not increase once initial contact has been made.

Doors closed by a return spring or counterweight-type device shall be equipped with an obstruction-sensing device that, at a minimum, alerts the driver if an obstruction is detected between the closing doors. Doors closed by a return spring or counterweight type device, when unlocked, shall be capable of being pushed to the point where the door starts to open with a force not to exceed 25 pounds applied to the center edge of the forward door panel.

Whether or not the obstruction sensing system is present or functional, it shall be possible to withdraw a 1.5 inches diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 pounds.

The door system shall be designed in accordance with Title 13 of the California Administrative Code Section 1267.

TS 80.8.1 Rear Door Closing Force (Transit Bus)

Power-close rear doors shall be equipped with an obstruction-sensing system such that if an obstruction is within the path of the closing doors, the doors will stop and/or reverse direction prior to imparting a 10-pound

force on one sq. inch of that obstruction. A contactless obstruction sensing system shall also be employed, and it shall be capable of discriminating between the normal doorway environment and passengers or other obstructions within the doorway, and of altering the zones of detection based upon the operating state of the door system.

TS 80.9 Actuators

Doors shall open or close completely in 1.5 to 3 seconds from the time of control actuation and shall be subject to the closing force requirements.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing.

Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

The rear door actuator(s) shall be under the control of the vehicle operator and shall open and close in response to the position of the driver's door control.

Doors that employ a "swing" or pantograph geometry and/or are closed by a return spring or counterweight-type device shall be equipped with a positive mechanical holding device that automatically engages and prevents the actuation mechanism from being back-driven from the fully closed position. The holding device shall be overcome only when the driver's door control is moved to an "Exit Door Enable" position and the vehicle is moving at a speed of less than 2 mph, or in the event of actuation of the emergency door release.

Locked doors shall require a force of more than 300 pounds to open manually. When the locked doors are manually forced to open, damage shall be limited to the bending of minor door linkage with no resulting damage to the doors, actuators or complex mechanism.

TS 80.9.1 Actuator (Commuter Bus)

Not applicable.

TS 80.9.2 Rear Door Interlocks (Transit Bus)

Refer to Section TS 38 "Interlocks" for door system interlock requirements.

TS 80.10 Emergency Operation

In the event of an emergency, it shall be possible to manually open doors designated as emergency exits from inside the bus using a force of no more than 25 pounds after actuating an unlocking device at the door. The unlocking device shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The respective door emergency unlocking device shall be accessible from the doorway area. Activation of the emergency unlocking device shall cause the concurrent application of an interlock to stop the bus. The unlocking device shall be easily reset by the Operator without special tools or opening the door mechanism enclosure. Doors that are required to be classified as "Emergency Exits" shall meet the requirements of FMVSS 217.

In the event of power failure, the doors shall include a means of activating an unlocking device to allow entry from the outside of the bus using a special tool or key.

TS 80.11 Door Control

The door control shall be located in the Operator's area within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach." The driver's door control shall provide tactile

feedback to indicate commanded door position and resist inadvertent door actuation. Door control shall be located on street side

TS 80.12 Door Controller

TS 80.12.1 Transit Bus

Five-Position Driver's Door Controller

The control device shall be protected from moisture. Mounting and location of the door control device handle shall be designed so that it is within comfortable, easy arm's reach of the seated driver. The door control device handle shall be free from interference by other equipment and have adequate clearance so as not to create a pinching hazard.

Position of the door control handle shall result in the following operation of the front and rear doors:

- **Center position:** Front door closed, rear door(s) closed or set to lock.
- **First position forward:** Front door open, rear door(s) closed or set to lock.
- **Second position forward:** Front door open, rear door(s) open or set to open.
- **First position back:** Front door closed, rear door(s) open or set to open.
- **Second position back:** Front door open, rear door(s) open or set to open.

TS 80.12.2 Commuter Bus

Not applicable.

TS 80.13 Door Open/Close

Operator-Controlled Front and Rear Doors

Operation of, and power to, the passenger doors shall be completely controlled by the Operator.

When the Master Control Switch is turned to the "Off" position and the bus is stopped with the parking brake applied the front door shall automatically open. When the Operator reenters the bus and turns the Master Control Switch to any position other than "Off", the door shall remain open until the door control handle is cycled back in the "Close" position and the parking brake is released. The front and rear doors shall remain in commanded state position even if power is removed or lost.

TS 81. Accessibility Provisions

Space and body structural provisions shall be provided at the front door of the bus to accommodate a wheelchair loading system for the widest spectrum of passengers including children, adults, the elderly, and the physically disabled. Buses shall conform to all applicable ADA regulations.

TS 81.1 Loading Systems

Bus shall utilize a low-floor fully-electrically operated preferably self-leveling wheelchair ramp system subject to LACMTA approval during proposal period.

TS 81.2 Lift

Heavy-Duty Ramp System

The wheelchair ramp control system must be capable of communicating with, and receiving commands from, vehicle multiplex system.

TS 81.3 Loading System for 30- to 60-foot Low-Floor Bus

Front Door Location of Loading System, Flip-Out Design Ramp with 1: 6 Slopes

The wheelchair loading system shall be located at the front door, with the preferably self-leveling ramp being of a simple hinged, flip-out type design being capable of deploying to the ground at a maximum 1:6 continuous slope.

An automatically-controlled, power-operated, ramp system designed to maintain minimum slope possible and compliant to requirements defined in 49 CFR Part 38, Subpart B, §38.23c shall provide ingress and egress quickly, safely and comfortably, both in forward and rearward directions, for a passenger in a wheelchair from a level street or curb.

In the stored position of the ramp, no tripping hazards shall be present, and any resulting gaps shall be minimized. The controls shall be simple to operate with no complex phasing operations required, and the loading system operation shall be under the surveillance and complete control of the driver. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The loading system shall be inhibited from stowing/deploying when a passenger is on the ramp. A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose. The system shall be designed to protect the ramp from damage and people on the sidewalk from injury during the lowering/raising phases of operation.

The loading platform shall be covered with a replaceable or renewable nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading.

Deployment or storage of the ramp shall require no more than 15 seconds. The deployment function shall be capable of providing the minimum possible continuous slope by automatically aligning the inner and outer ramp surfaces. Each operation shall require continuous manual pressure to the momentary switch by the operator and shall not allow unintentional improper access system operation. The device shall function without failure or adjustment for 500 cycles or 5,000 miles in all-weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 35 pounds of force. When manually activated the ramp shall not create a hazard for user through unintended movement of the ramp.

TS 81.4 Loading System for Level Boarding on a 45- to 60-foot Low-Floor BRT

Not applicable.

TS 81.5 Wheelchair Accommodations

General

Two wheelchair passenger parking spaces shall be provided, per applicable ADA regulations. Location of spaces shall be as close to the wheelchair ramp or system as practical. Two securement devices or systems shall secure the wheelchair or mobility aids facing toward the front of the vehicle. Two mobility aids shall face rearward.

Forward Facing

Forward facing wheelchair securement and occupant restraint systems shall be the QPod or approved equal, subject to LACMTA approval during proposal period, consisting of the self-tensioning, self-locking features on retractors, without tightening knobs. The retractors shall have the maximum amount of 7,000 pound red webbing attached to the large Transit "J" hooks.

Note: If knobs are required for operation of the system being offered, it shall be indicated at time of bid submission.

Additional equipment, including passenger restraint seat belts and wheelchair securement devices complying with all applicable provisions of 49 CFR part 571, shall be provided for the two forward facing wheelchair passengers per ADA requirements, subject to LACMTA approval during proposal period.

Rear Facing

Additional wheelchair securement devices and seat belts complying with all applicable provisions of 49 CFR Part 571; shall be provided for the two rearward facing wheelchair passengers.

Optional Third and Fourth Wheelchair Accommodations

Pricing shall be submitted for optional additional third and fourth wheelchair parking spaces. The additional spaces shall be provided per applicable ADA regulations. Location of spaces shall be as close to the wheelchair ramp or system as practical. The additional securement devices or systems shall secure the wheelchair or mobility aids facing toward the front of the vehicle.

Forward facing wheelchair securement and occupant restraint systems shall be the QPod or approved equal, subject to LACMTA approval during proposal period, consisting of the self-tensioning, self-locking features on retractors, without tightening knobs. The retractors shall have the maximum amount of 7,000 pound red webbing attached to the large Transit "J" hooks.

Note: If knobs are required for operation of the system being offered, it shall be indicated at time of bid submission.

Additional equipment, including passenger restraint seat belts and wheelchair securement devices complying with all applicable provisions of 49 CFR Part 571, shall be provided for the two forward facing wheelchair passengers per ADA requirements, subject to LACMTA approval during proposal period.

TS 81.5.1 Forward Facing Accommodations

The occupant restraints shall consist of the aisle side female retractor to be Automatic Locking Retractor [ALR] and the male or wall side retractor shall be Emergency Locking Retractor [ELR], equipped with a pin connector mounted on the tongue for attachment of the shoulder belt female fitting. The shoulder belt retractor shall be Emergency Locking Retractor [ELR], and equipped with a female pin connector, to attach to the male lap belt pin connector to form a Type 2-A lap and shoulder belt combination.

The securement system shall comply with the requirements of the Americans with Disabilities Act [ADA]. The system components shall be certified as being in compliance with the Society of Automotive Engineers, SAE J2249, Wheelchair Tie-Downs and Occupant Restraint Systems for use in Motor Vehicles.

Front Tie-Downs

The front retractors shall include a ratcheting mechanism. The retractors should be sized to accommodate large wheelchairs and be able to stabilize chairs of all types.

Rear Tie-Downs

The two rear retractors shall be equipped with a remote release, which operates both retractors simultaneously.

The retractors shall be mounted to the barrier. The spacing between the two retractors should be sized to accommodate all common wheelchairs, regardless of size.

Remote Release, Paddle Handle

The paddle handle remote release shall be mounted in either the front face of the barrier assembly, near the aisle side or in the forward facing flip-up seat bottom, near the aisle side, depending on the seating configuration.

Retractor Guards

Kick plates or retractor guards shall be installed to guard the retractors from being damaged or depressed by passengers seated behind or adjacent to the wheelchair area.

Guards must be of adequate strength to prevent bending or distortion when used as passenger footrests.

The system shall incorporate storage positions for the wheelchair tie-downs that allow easy access by users and keep the belts clear of the floor.

Occupant Restraints

The aisle side female lap belt retractor of ALR type should be mounted adjacent to or preferable on the same mounting bolt as the aisle side tie-down retractor. The red release lever should be accessible to the operator if release is necessary.

The wall side, male retractor of ELR type, should be mounted adjacent to or preferable on the same mounting bolt as the wall side tie-down retractor. This will ensure that the occupant lap belts may pass through the space between the wheelchair arms and backrest or between the backrest and seat bottom and be allowed to bear directly on the bony structure of the occupant's body or pelvic area.

Occupant restraints shall NOT be mounted in such a manner that belts must pass over wheelchair armrests, side panels, seat backs, barriers, through "D" rings, or other devices that will prevent the belts from following the proper path from the retractor to the occupant.

Male Lap Belt Stowage

A stowage device for the male lap belt Anchorage Adaptor should be mounted on the bottom of the side facing flip-up seat, to attach the male lap belt buckle or tongue when not in use. It should be mounted so it is easily accessible to the wheelchair occupant and/or the Operator.

Shoulder Belt

The shoulder belt retractor of ELR type should be mounted directly to the restraint assembly.

User Instructions

A durable metal instruction plate, describing the operation of the wheelchair securement and occupant restraint systems, shall be placed in an obvious location within the wheelchair securement area.

TS 81.5.2 Rear Facing Accommodations

The securement system shall be placed as near to the accessible entrance as practicable and shall have a clear floor area of 30 inches by 48 inches. Such space shall adjoin, and may overlap, an access path. Not more than six inches of the required clear floor space may be accommodated for footrests under another seat provided there is a minimum of nine inches from the floor to the lowest part of the seat overhanging the space. Fold down seats may be incorporated to accommodate other passengers when a wheelchair or mobility device is not occupying the area.

The securement system shall secure common wheelchairs and mobility aids and shall either be automatic or easily deployed by a person familiar with the system and mobility aid and having average dexterity.

The padded barrier shall extend from a height of 38 inches from the vehicle floor to a height of 56 inches from the vehicle floor with a width of 18 inches, laterally centered immediately in back of the seated individual. Fabric covering on the padded barrier shall be blue, subject to LACMTA approval. The barrier need not be solid provided equivalent protection is afforded.

TS 81.6 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device and from the designated securement area. It shall be designed so that no portion of the wheelchair protrudes into the aisle of the bus when parked in the designated parking space(s). When the positions are fully utilized, an aisle space of no less than 20 inches shall be maintained. As a guide, no width dimension should be less than 34 inches. Areas requiring 90-degree turns of wheelchairs should have a clearance arc dimension no less than 45 inches, and in the parking area where 180-degree turns are expected, space should be clear in a full 60-inches diameter circle. A vertical clearance of 12 inches above the floor surface should be provided on the outside of turning areas for wheelchair footrest.

TS 82. Wheelchair Lifts (Commuter Bus)

TS 82.1 Lift

Not applicable.

TS 82.2 Lift Door

Not applicable.

TS 82.3 Lift Width

Not applicable.

TS 82.4 Lighting Requirements

Not applicable.

TS 82.5 Securement System

Not applicable.

TS 82.6 Roof Ventilation/Escape Hatches

One roof ventilator with lanyard / tether shall be provided and designed to perform as escape hatches in the roof of the bus. The ventilator shall be easily opened and closed manually. Ventilator with lever type release handle is not permitted. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq. inches. and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than four) inches, or with all four edges raised simultaneously to a height of no less than 3.5 inches. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator shall be sealed to prevent entry of water when closed.

SIGNAGE AND COMMUNICATION (TS 83-TS 87)

TS 83. Destination Signs

An automatic electronic bright white LED destination sign system shall be furnished on the front, on the curbside near the front door, on the right-front windshield area and on the rear of the bus. The destination signs on the front and front curbside shall be bright white high definition. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. Sign system shall provide optimum visibility of the message display units for passengers and shall meet applicable ADA requirements.

The destination sign compartments shall meet the following minimum requirements:

- Compartments shall be designed to prevent condensation and entry of moisture and dirt.
- Compartments shall be designed to prevent fogging of both compartment window and glazing on unit itself.

- Access shall be provided to allow cleaning of inside compartment window and unit glazing, subject to LACMTA approval in Pre-Production meetings.
- Front window exterior display area shall be sized to allow full visibility of the front destination sign.

Destination signs shall be installed in such a manner as to facilitate easy access and replacement of the entire sign assembly, or components. Components such as electronic control modules shall be replaceable from inside the Bus. Where possible, parts shall be commercially available.

All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver.

The HMI shall include an Ethernet port. Alternatively, the designation sign devices shall be 802.11 Wi-Fi compliant.

Optional Full Color Destination Signs

Pricing for optional full color signs in; Front, Side, Rear and Run Number locations, shall be submitted on Price Form PF-1, Schedule of Optional Vehicle Configuration. The signs shall be capable of utilizing the full color spectrum for displaying characters and background with adjustable resolution to provide optimum clarity for passengers reading the messages. The color signs shall meet all sections of TS 83 requirements for white signs where applicable.

Front Destination Sign

The front destination sign shall have no less than 4,800 pixels, 24 rows by 200 columns, with a message display area of not less than 8.01 inches high by not less than 64.6 inches wide.

Side Destination Sign

Side display area shall have no less than 1,568 pixels, 14 rows by 112 columns with a message display area of not less than 4.3 inches high by not less than 41.6 inches wide. The sign located near the front door shall not block the driver's critical horizontal line of sight.

Rear Route Number Sign

The route number display area shall have no less than 768 pixels, 16 rows by 48 columns with a message display area of not less than 6.1 inches high by not less than 17.0 inches wide. The rear route number sign shall be located a minimum of 90 inches above ground on the curb side rear corner of the Bus.

Destination Sign Control

Power to the sign system shall be controlled by the Bus "Master Run" switch. Sign system shall be operable in all switch positions except "Off".

Destination messages, route designations, and public relations messages shall be independently selectable via the Operator's Control Unit (OCU) which shall include a display monitor. The OCU shall communicate to the main processor board via a standard RS 485 serial bus and SAE J1708. Software shall be capable of programming 10,000 message lines. The number of public relations messages shall be limited only by the remaining number of message lines not used for destination purposes. The three-digit destination code shall accept all hexadecimal numbers (i.e. 0-9, A, B, C, D, E, & F).

The rear route number sign shall be controlled by the same OCU that operates the destination signs. The OCU display monitor readout shall show the exact information displayed on the destination signs and route number sign.

Sign displays shall have alternating message capability with programmable blanking time between message lines as may be required. Variable blanking times shall be programmable between 0.5 to 25 seconds in duration. Each line message or blanking time for each message shall be individually programmable. The

message display units shall incorporate an automatic blanking feature that will cause the display area to blank within 30 seconds of the bus master power switch being turned "Off".

An emergency message shall be initiated by the closure, or opening, of a dry contact switch or relay. The emergency message shall be displayed on the exterior of the bus only. The OCU shall not display the emergency message. The destination sign shall automatically resume normal operation only after battery power to the destination sign system is removed and restored through the battery disconnect switch.

Destination Sign Programming

The electronic sign system shall be programmable via an integral connector located in the front destination sign area. Software shall be furnished for programming the sign system via an IBM compatible lap-top computer. Software shall be capable of providing a high degree of flexibility to create, or select preprogrammed, fonts and graphic displays. The sign shall have the capability of being programmed in the field using a PC or field programmer. Message program information shall be transferable to and/or from the field programmer device, via a USB 2.0 or better.

The LACMTA shall provide the Contractor with a complete listing of destination sign readings for initial sign programming by the manufacturer.

Run Number Sign

A three-character electronic run number display shall be provided at a LACMTA approved location in the right front windshield. All three character spaces shall have the capability to display 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and X readings.

TS 84. Passenger Information and Advertising (Transit Bus)

TS 84.1 Interior Displays

Provisions shall be made on the rear of the driver's barrier or equipment box located on the wheel well for a frame to retain information such as routes and schedules.

A total of two information "Take One" boxes and one minimum "Take Twelve" unit shall be supplied. The "Take One" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the "Take Twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval in Pre-Production meetings.

Advertising media 11 inches high and 0.09 inch thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior light system.

TS 84.2 Exterior Displays

Not applicable.

TS 85. Passenger Stop Request/Exit Signal

TS 85.1 Transit Bus

A "Stop Requested" message shall be displayed on AVA message sign in yellow or amber LED when the passenger "Stop Requested" signal system is activated. The "Stop Requested" message shall remain visible until one or both passenger doors are opened. The message shall be visible to the seated passengers. A switch to deactivate the signal system shall be provided on the Operator's control panel.

A minimum of 12 wireless stop request signal buttons utilizing a yellow housing shall be evenly distributed in the passenger cabin to be functionally accessible to all seated passengers subject to LACMTA approval in Pre-Production meetings. The buttons shall not incorporate internal battery power to operate and shall include, as part of the system, a means to easily troubleshoot failures. Of those, one each stop request button shall be

located after the standee line above the front wheel wells on the vertical stanchion and on the ITS enclosure. Stop Request buttons in the ADA and senior seating areas shall be located 45 inches above the floor. Two additional Stop Request buttons shall be placed in senior seating area.

TS 85.2 Commuter Bus

Not applicable.

TS 85.3 Signal Chime

TS 85.3.1 Transit Bus

A single "Stop Requested" chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas.

Buttons for exit signals located in the wheelchair and senior passenger areas shall be no higher than four feet above the floor. Instructions shall be provided to clearly indicate function and operation of the exit signals.

TS 85.3.2 Commuter Bus

Not applicable.

TS 86. Communications

An equipment enclosure shall be provided to accommodate installation of LACMTA provided equipment, such as the LACMTA's radio system and future ITS equipment. The ITS enclosure shall include a minimum of four modular slide out trays which are easily removable and can be repositioned to accommodate changes in equipment position as needed. The existing ATMS radio requires a clear space above the bottom slide out tray with a minimum of 15 inches high, 19.5 inches wide, and 25 inches deep. The clear space above the second and third slide out trays shall be sized to accommodate Contractor supplied DVR and other equipment. Unless otherwise specified, additional ITS equipment provided and installed by the Contractor shall also be installed within the ITS enclosure. The enclosure shall be located directly behind the Operator's area on the street side wheel housing.

The ITS enclosure shall be as large as practical to facilitate future expansion of ITS equipment. The ITS enclosure shall be splash-proof and properly ventilated when the service door is secured. Slide out trays shall incorporate heavy-duty slide or roller mechanism to support a minimum of 150 pounds of loading and shall be able to withstand the normal shock and vibration, (under full load) experienced in LACMTA revenue service, without damage to the locks, slide or roller mechanisms. Slide out trays shall have locking mechanisms which automatically lock the trays in the stored and extended positions. Once a tray is locked, slides shall not have any horizontal play. L-shaped aluminum plate shall be mounted on the bottom tray to secure ITS equipment. LACMTA shall provide sample slide out trays with L-shaped plate during Pre-Production meetings.

Service light(s) with suitable switch shall be provided within the enclosure, subject to LACMTA approval in Pre-Production meetings. The Contractor shall provide 12-volt power outlet in the ITS Compartment.

Communication System Integration

All bus subsystems shall be integrated to the maximum extent feasible with Metro's existing on-board communication systems. This may include using J1708 and J1939 CAN-Bus vehicle network, Wi-Fi and cell modem(s), Bluetooth, or Metro's ATMS voice and data radio VHF communication system. Sub-systems should avoid using designs that require the use of new, stand alone, dedicated and/or proprietary communication networks. Sub-systems should also avoid using fee based subscription services for communication or data processing. Other factors being equal, preference will be given to subsystems that take advantage of existing Metro vehicle communication infrastructure and management systems.

All on-board systems that use a date/time stamp for incident or fault code tracking should be designed to automatically synchronize with other on-board systems through a recognized communication standard such as

SAE J1939, and/or be synchronized to the recognized standard for time synchronization (such as "GPS" time). To the extent practical, when a GPS reference is used, the various systems shall share a common antenna or signal.

TS 86.1 Camera Surveillance System

An automatic digital video recording system shall be provided powered directly from batteries, bypassing the Master Battery Disconnect Switch(es), to operate (record images) at all times with the Master Control Switch in any position except "Off". The system shall operate up to one hour (independently programmable) after the Master Switch is turned off. The system shall be self-initiating and operate at any time, with the Master switch in any position, including "Off", if triggered by the activation of the Bus SAS. When triggered, the system shall tag images (write protect) to prevent overwrite.

All cameras must automatically adjust to light changes to capture images that have sufficient clarity at night, with bus lights on and off. A day-to-night demonstration shall be required to establish camera performance and final placement for optimum views and clarity. The LACMTA shall witness the demonstration and approve the final placement of the cameras. This demonstration must be successfully completed prior to approval of the Pilot Bus(es).

The types (part numbers), of cameras shall be minimized with a single camera type for interior, and a single camera type for exterior of Bus. Exceptions to this requirement shall be considered on a case-by-case basis during Pre-Production meetings.

Interior Cameras

The camera housing shall be vandal resistant but allow access for routine servicing. Field of view of the cameras shall be adjusted with a 60 degree vertical and 60 degree horizontal without relocating the camera. Each camera shall be IP type color images. Front interior camera(s) at front door passenger boarding area shall record audio subject to LACMTA approval during Pre-Production meetings.

Cameras shall be placed for best recording of the following five areas:

- a) Forward 1/3 of passenger area, view of front vestibule, farebox transactions and field-of-view to include Operator and image of bus number located on Operator's barrier.
- b) Front door, passenger boarding.
- c) Rear door, passenger exiting.
- d) Middle 1/3 passenger area.
- e) Rear 1/3 passenger seating area starting from behind rear door with a primary emphasis on the rearmost seats.

Interior Camera Monitors

A video monitoring system including two, color, LCD video monitors with a minimum 15 inch diagonal dimension and all necessary brackets, cabling and other equipment needed for installation shall be provided to allow passengers easy viewing of video images captured by existing interior bus cameras. Monitors and equipment shall be installed in compliance with Driver Provisions, Controls and Instrumentation (Refer to Sections TS 46 -TS 48) and any applicable ADA or safety standards.

The first monitor shall be mounted above the driver's area facing the entrance door and display a live video feed of the passengers boarding the bus.

The second monitor shall be mounted in passenger area of the bus facing the rear of the bus and display a live video feed of the passengers riding on the bus including those in wheelchair securement areas.

The monitors shall be of a ruggedized design intended for use in a transit bus environment including suitable protection from overvoltage and spikes generated from jump starts, shorts, etc. Monitors and equipment shall

not be installed in a manner or located such that the performance or life of the components or system will be shortened when operating within the design operating profile.

Monitors shall include a replaceable shield or durable film over the monitor screens to protect them from vandalism. This sacrificial layer shall be replaceable in 5e minutes or less using simple hand tools.

Monitor enclosures and screens shall not be affected by periodic cleaning using commercially available cleaning agents, solvents and other chemicals used for removal of graffiti.

Exterior Cameras

Cameras shall be IP type, rated for water spray and submersion, (IP65 and IP67), housed in impact resistant, moisture resistant, low profile housings which do not protrude more than 2.5 inches from the bus body. If used, a cover placed over the camera lens shall be glass. Curbside camera housings shall be ruggedized to protect from impacts with trees and other objects encountered during routine service. This shall include a supplemental metal shield if necessary to meet this requirement. The camera circuitry and lens shall be easily replaceable from inside the bus or by removing the housing from outside the bus using common hand tools. Camera positions and adjustment are subject to LACMTA approval at Pilot Bus. Reusable waterproof seals to prevent water damage to the camera and circuitry shall be provided which will not require the use of additional sealant such as silicon after servicing the camera. The system shall be designed or configured such that the failure of any individual camera will not affect operation of the remaining cameras.

Cameras shall be placed for best recording of the following four areas:

- a) Forward looking through windshield (Accident Surveillance)
- b) The curb side area of the bus, (including exit door), and street from 10 feet beyond front bumper to 10 feet beyond rear bumper
- c) Street side area of the bus and street from ten feet beyond the front bumper to 10 feet beyond the rear bumper
- d) Rear camera shall view the ground behind the bus from the bumper to approximately 25 feet back when gear select is placed in "Reverse" position.

Forward Accident Surveillance Camera

The forward looking surveillance camera shall be positioned to obtain images of the exterior front of the bus and forward approximately 100 feet of roadway to record images in the event of an accident.

Camera Monitor

Dash mounted monitor for viewing of selected camera images when; gear selector is placed in "Reverse" or passenger doors are open. Monitor shall be user configurable and capable of simultaneous display of images from multiple cameras. Final monitor configuration is subject to LACMTA approval during Pre-Production meetings

Central Processor

The video security system central processor shall be packaged in a suitable ventilated, shock mounted and splash resistant enclosure keyed to LACMTA standards, located within the ITS enclosure, subject to LACMTA approval in Pre-Production meetings. Images shall be stored by the system on a removable mobile rated hard drive provided with a security lock typical to the existing LACMTA base station.

Images stored on the hard drive shall be organized for automatic transmittal via a digital modem. The hard drive shall have capacity to store a minimum of 240 images per second for 30 continuous days (18 hours per day) before automatic overwrite occurs.

The DVR shall be capable of recording in multiple formats including JPEG and in H.264 compression with up to D1 resolution to avoid loss of detail on zoomed images. The DVR must be able to switch record rate,

compression and resolution seamlessly without loss of video during transition. System shall be capable of accepting both analog NTSC and high definition wide dynamic range IP cameras.

All image requests and subsequent downloaded files shall have the capability to be stored on a hard drive. The hard drive shall be easily removed and video files viewed at a separate location equipped with the same drive mechanism.

System Management Tool

Central Processor shall utilize GPS data to synchronize system time and tag video files with location coordinates allowing files to be searched on a geographic location basis using the System Management Tool. Camera Surveillance System shall utilize a WLAN compatible with wireless networks in use at LACMTA divisions and shall incorporate a system management tool for; wireless download of video files in a timely manner, software upgrades, camera checks, configuration changes and health reports as required. Final configuration is subject to LACMTA approval in Pre-Production meetings.

System management tool shall be a virtual implementation and provide expansion capability including compatibility with existing video management applications at LACMTA.

In addition, System Management Tool shall:

- Be configured to run in Master-Slave mode under Virtual Box.
- Provide the ability to replicate user accounts and passwords from Master to Slave.
- Include provisions for future application authentication to Metro Microsoft Active Directory.
- Allow user management at Master server and all Slave servers with inherent accounts from Master.
- Backup the restore virtual image via the host operating system to last backup state.
- Support Metro Enterprise backup and archive management tools such as IBM Tivoli.
- Support use of Metro's MS Windows 2008 R2 approval image on host servers with Metro domain and security policies.
- Allow NAS storage at remote sites.
- Include OS and application security and patch management process.
- Be optimized for hardware utilization in shared computing resources with Orbital DIS.

Given the current Metro wireless specification, Camera Surveillance System shall be able to wirelessly download 30 minutes of video in less than 30 minutes.

WLAN shall also be capable of transmitting encrypted video images or files on a real-time basis to a laptop PC held by law enforcement personnel adjacent to or behind the bus. DVR status and event data shall also be made available through J1708/1587 interface to ATMS VAN. DVR shall be individually programmable to record each camera sequentially.

The system management tool for use at up to 13 LACMTA operating divisions shall be provided, subject to LACMTA approval in Pre-production meetings.

Enhanced Video Recording System Option

Pricing for optional features to enhance the video recording system shall be provided on Price Form PF-1, Schedule of Optional Vehicle Configuration. The features shall include items listed below along with any other enhancements that Contractor believes would improve functionality and ease of use for the video recording system.

- Ability of video system to analyze and discern events such as wheelchair passengers and generate report information with summary data such as wheelchair passenger count and boarding/alighting locations, subject to LACMTA approval.
- The ability to utilize the dash mounted display for diagnostic work or configuration changes on the DVR.
- Incorporation of a 360 degree camera(s) for better surveillance of bus interior.

TS 86.2 Public Address System

Contractor shall install a public address (PA) system which enables the Operator to perform audible announcements. A switch shall be provided to allow the Operator to select announcements either inside, outside, or both. The location of the gooseneck microphone is subject to LACMTA approval in Pre-Production meetings.

PA Amplifier

The PA amplifier shall be supplied in the ITS compartment convenient for adjustments (Refer to Section TS 88.1 Approved Equals). The amplifier shall be supplied with a 12-volt DC switched service. The amplifying system shall be balanced such that no adjustment of volume is necessary when switching from inside to outside. The system shall automatically mute when not in use.

Gooseneck Microphone

A microphone shall be mounted on a heavy-duty black anti-glare gooseneck with quick release input jack. The gooseneck microphone shall be mounted in a position to allow the operators' to comfortably speak without using their hands. The microphone, when deployed, shall remain stable in its' position and be easily adjusted by the Operator to reach approximately four inches from their mouth, in all normal seat adjustment positions. A strain relief (p-clip or equal) shall be installed near the base as needed to prevent a gooseneck failure when the microphone is pulled to its adjustment limit. A padded bracket shall be provided to support the gooseneck when not in use.

TS 86.2.1 Speakers

Interior and exterior speakers shall be of sufficient capacity to ensure that they are not damaged when full amplified power is applied. Inside speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. Speakers shall be located in the light panel/HVAC duct to deter vandalism. The speakers shall not be mounted directly on the surface of the ceiling panels. A weather-proof speaker(s) shall be provided outside the bus so that announcements can be clearly heard by passengers standing near the door equipped with the wheelchair access. Interior loudspeakers shall be installed with proper phasing. Total impedance seen at the input connecting end shall be 4 to 8 Ohms. Mounting shall be accomplished with riv-nuts and machine screws.

Speaker wires from each individual speaker (inside and outside) shall terminate in the ITS enclosure.

TS 86.3 Automatic Passenger Counter (APC)

Provisions and necessary cables for installation of door sensors and analyzer(s) for IRMA-Matrix with J1708 infrared APC system; including software integration, testing, first article acceptance and any other items necessary for proper operation shall be provided, subject to LACMTA approval in Pre-Production meetings.

TS 86.4 Radio Handset and Control System

Make Ready Provisions

The Contractor shall provide "Make Ready Provisions" that will accommodate post-delivery installation of LACMTA provided equipment such as radio and future Intelligent Transportation System (ITS) equipment. Detail design of the ITS Make Ready Provisions shall be finalized during Pre-Production meetings and Pilot Bus build. Make Ready Provisions shall be approved by the LACMTA prior to start of production. The provisions shall include specified equipment, (such as antennas and preinstalled cabling), space for LACMTA provided ITS equipment, power supply circuits, conduit system, and structural mounting provisions.

The following devices are to be included in the LACMTA's ITS system for installation by the LACMTA after delivery of the bus:

- a) Voice Radio.
- b) Data Radio.

- ⇨ AVA System Processor (Part of In Vehicle Unit (IVU)).
- d) Automatic Passenger Counting (APC) Processor.
- e) Automatic Passenger Counting (APC) Door Sensors.
- f) J1708 Vehicle Area Network Controller (Part of IVU)
- g) Driver Control Module (DCM).
- h) Automatic Vehicle Locator (AVL) Processor (Part of IVU).

TS 86.4.1 Drivers Speaker

Not applicable.

TS 86.4.2 Handset

Contractor will supply and install a handset for driver use. (Refer to Section TS 88.1 Approved Equals).

TS 86.4.3 Driver Control Module (DCM)

Space and mounting provisions shall be provided for an ATMS Driver Control Module (DCM) (Orbital Sciences 111240-1DCM). The DCM installation provisions shall appear as an integral part of the operator area design. The location of the DCM shall provide the Operator with a free and unobstructed view of the DCM controls/display and be within easy reach of the Operator. The DCM shall be positioned to minimize glare and maximize readability in all lighting conditions and Operator seat positions.

Provisions for the DCM shall accommodate the following specifications:

TABLE 12
DCM Specifications

Property	Specification
Maximum height:	8 inches
Maximum width:	8.7 inches
Maximum depth:	3.1 inches
Housing:	Splash proof and UV resistant
Shock tolerance:	18g for 3 ms
Vibration tolerance:	4g peak rms @ 5 to 150 Hz

Contractor shall install a driver display unit as close to the driver's instrument panel as possible.

TS 86.4.4 Emergency Alarm

Contractor shall install an emergency alarm that is accessible to the driver but hidden from view. The guarded Silent Alarm System (SAS) switch shall be mounted on control panel located to the left of seated Operator, (Refer to Section TS 88.1 Approved Equals). The four-corner clearance lamps shall flash when the SAS is activated. Two 16ga leads, (color to be determined during Pre-Production meetings), shall be wired to the normally closed SAS switch terminals and routed to the ITS Equipment enclosure. SAS switch location and lead wire routing is subject to LACMTA approval in Pre-Production meetings.

TS 86.5 ITS Provisions Power Supply

The ITS enclosure shall be provided with protected power buss circuits for the future LACMTA installed ITS equipment. These power requirements are in addition to Contractor provided equipment power requirements. Each power buss will include mounting provisions for up to six individual manual resetting circuit breakers for branch circuits feeding equipment located within the enclosure.

TABLE 13
ITS Power Provisions

Source	Volt	Circuit	Quantity
Through Battery Disconnect Switch(es)	12	20-amp, DC	1
	24	20-amp, DC	1
	Gnd	Return for 20 amp circuits	1
Ignition	12	10-amp, DC multiplex controlled circuit.	2
	24	10-amp, DC multiplex controlled circuit.	2
	Gnd	Return for switched circuits	2

TS 86.6 ITS Provisions Conduits

A system of pre-installed “ITS conduits” will be provided to assist with future installation and replacement of wiring and cabling associated with the LACMTA’s ITS equipment listed in TS 86.4. ITS Conduits, in conjunction with existing bus wire ways, will be required where future LACMTA installation and replacement of cabling is not practical due to obstructions from items such as interior paneling, bus structure or other assemblies. In general, conduits exposed to the interior of the bus shall be water tight and have a minimum 1.5 inch inside diameter and be routed to permit pulling cables, including connectors, through the conduits using a preinstalled “pull wire”. Conduits will be terminated at the ITS enclosure using suitable reusable water tight fittings. Conduit installation shall follow best commercial practices with regard to drip loops and routing to avoid moisture problems.

Conduits, in conjunction with existing bus wire ways, shall permit interconnection of ITS sub-systems and devices as follows:

TABLE 14
ITS Conduits

From	Termination
Antenna, Data Radio Transceiver	ITS Enclosure
Antenna, GPS Receiver	ITS Enclosure
Antenna, Voice Radio Transceiver	ITS Enclosure
Antenna, Wireless LAN	ITS Enclosure
Antenna, Two spare positions	ITS Enclosure
APC Door Sensors, Front Door	ITS Enclosure
APC Door Sensors, Rear Door	ITS Enclosure
Engine Control Processor	ITS Enclosure
Exterior Speaker	ITS Enclosure
Farebox	ITS Enclosure, 1” ID
Front Dash	ITS Enclosure
Head sign Compartment	Front Dash
Interior Information Sign, Front	ITS Enclosure
Interior Information Sign, Rear	ITS Enclosure
Interior Speakers	ITS Enclosure

Operator Control Unit, Operator Dash	ITS Enclosure
PLC Compartment	ITS Enclosure
Radio Control Head	ITS Enclosure, 2 ¼ " ID
Security System Processor	ITS Enclosure
Transmission Control Processor	ITS Enclosure
Upper Center Windshield	ITS Enclosure, 1-1/2" ID

TS 86.7 Provisions, Automated Vehicle Announcement (AVA) System

Structural provisions and necessary cables shall be provided in the ceiling to install two AVA signs constructed to withstand the heavy-duty environmental and service conditions found in transit operations. The front sign shall be located near the standee line. The rear double-sided sign shall be positioned adjacent to the exit door and forward of the interior steps.

Both the front and rear double-sided signs shall be installed by Contractor.

TS 86.8 ITS Provisions, Wireless Local Area Network (WLAN)

WLAN antenna, including five leads; two Cellular, two Wi-Fi and one GPS and an additional Wi-Fi antenna inside the bus for passenger. Sierra Wireless, InMotion MG90 or an approved equal wireless router/switch and feedline shall be installed, subject to LACMTA approval in Pre-Production meetings. (Refer to Section TS 88.1 Approved Equals). Router shall include gateway activation and client license fees as well as preferred AS, AMM with 3-year and group 2 per gateway. Power for wireless router/switch shall be independently timed by the router to allow automatic turn-off one hour or more after bus is parked as a configurable feature of the router.

TS 86.9 ITS Provisions, Radio Antennas

Provide two Antenna Specialists (508 MHz and 900 MHz) radio antennas for voice and data radios. The antennas should have a feedline of RG-142 signal loss and physical quality specifications or better. The antennas shall be attached to the roof with antenna leads routed through 3/4-inch inside diameter conduits to the ITS enclosure. Antenna leads shall be type RG142 coaxial cable connected at the antenna by a soldered type N connector and 90-degree type N adapter with a minimum four-inch service loop. A type N soldered connector and a RG142 reducer shall be supplied for the radio connections in the ITS enclosure. The antenna mounting and lead termination shall be accessible from the Bus interior, subject to LACMTA approval in Pre-Production meetings. Antennas shall not be painted. (Refer to Section TS 88.1 Approved Equals).

TS 86.10 ITS Provisions, Global Positioning System (GPS)

A Global Positioning Satellite (GPS) Antenna and feedline shall be provided. The GPS Antenna shall be mounted on the centerline of the roof of the bus near the front, with a quick connector, within two feet from the antenna, for future replacement, subject to LACMTA approval in Pre-Production meetings. Refer to Section TS 88.1 Approved Equals.

TS 86.11 ITS Provisions, Incident Based Surveillance System (IBSS)

Complete mounting provisions, modules and necessary cables for the most current LACMTA IBSS, (SmartDrive), shall be provided running from the center windshield area to the ITS enclosure, permitting installation of EDR and completion of system by the bus manufacturer. All modules including SmartDrive SR3 for EDR shall be supplied by Contractor through existing SmartDrive Contract for installation by Bus manufacturer. Battery and ignition power and a separate J1939 communication connection shall be supplied in the ITS enclosure, subject to LACMTA approval in Pre-Production meetings.

TS 87. Event Data Recorder (EDR)

EDR shall be installed on the bus. The unit shall be installed as low as possible. The EDR shall be able to communicate over the J1939 CAN line and shall be equipped with three-axis accelerometer. The system shall be capable of recording available fault codes including DM1 messages. Settings are to be finalized with the LACMTA during Pre-Production. The EDR shall broadcast via the J1939 data communication link severe impact events to the vehicle monitoring system and also trigger an event in the camera system. The EDR shall also tag an event from a signal received over the J1939 CAN line from the silent alarm switch signal and the camera event button and in turn broadcast these events to the vehicle monitoring system. The EDR shall also record the following operational data:

- Head lights on or off.
- Turn signals and hazard lights on or off.
- Ignition on or off.
- Low air pressure warning.
- Whether moving in forward or reverse or idling.
- Parking brake is on or off.
- Retarder switch on or off

TS 88. Appendix

TS 88.1 Approved Equals

The following table lists products which have been approved for the bus procurement. The list only contains products which are of interest to the LACMTA and is not intended to be a comprehensive listing of every product which is required for the manufacture of the subject buses. Product categories not listed are left to the discretion of the Contractor so long as the product complies with the specifications. Product specification information is for reference only and may not reflect the latest or future improvements by manufacturers. Any change, revision, or substitution of specified products requires approval of the LACMTA. To add to or revise this list, Contractor must submit a written request per the Specification by the due date found in the RFP for approved equals.

TABLE 15
Approved Products

PRODUCT	MANUFACTURER	PRODUCT SPECIFICATION
Air Coupling	AMFLO	CP1, CP2, C1, C2
Air Coupling	Tru Flate	12-124, 13-124, 12-134, 13-134
Air Coupling	Parker	2C, 3C, B12, B13
Amplifier, PA	Motorola Solutions Inc.	120039-2
Antenna, Data Radio	Antenna Specialty Co.	ASPRC-572MOT, 508 MHz
Antenna, GPS	ACS Transport	120076-4
Antenna, Voice Radio	Antenna Specialty Co.	ASPG931MOT, 900 MHz
Antenna, WLAN	Mobile Mark	RM3-2400
Drain Plug, Dry Brake	FEMCO	As needed
Farebox – Reference only	GFI Odyssey	C24003-0501FB
Farebox Baseplate	GFI Odyssey	D22581-0003
Fluid, Rear Axle		Full Synthetic
Fluid, Transmission		Full Synthetic
Fuel Receptacle, fast fill	OPW	CL50

PRODUCT	MANUFACTURER	PRODUCT SPECIFICATION
Fuel Receptacle, slow fill	OPW	LB36
Jumper Receptacle-24 Volt	Whitaker	3298
Microphone	REI	
Radio Handset	Motorola	P/N12004-8
Registration Holder	Truck-Lite	97960
Seat Insert Fabric	Holdsworth	Sunrise/Sunset
Seat Insert Fabric	LaFranch King's Plus Fabric	Sunrise/Sunset
Seat Insert Fabric		Blue
Silent Alarm Switch	Microswitch	Part No. 4TL 1-3 with spring loaded black
Take-One Box	Beemak Plastic	BP-750-CT
Minimum Take-Twelve Box	Transit Information Products	407160
Trip Recorder (Replaces Hubodometer)	FleetWatch	JX55
Wireless Router (Wi-Fi System)	Sierra Wireless	InMotion, MG90
Wireless Router AMM	Sierra Wireless	9010230
Wireless Router Gateway activation	Sierra Wireless	IMTSER524
Wireless Router Client License	Sierra Wireless	9010208

TS 88.2 Maintainability Requirements

Mean Time to Fix

Maintenance requirements stated in mean time to fix (MTTF) are established below in Table 16. Unless otherwise indicated, these figures represent the total elapsed labor time (hours/minutes) required to complete the maintenance task by one mechanic. The figures do not include time required to prepare the bus such as bringing the bus to the hoist, raising it, etc.

The Contractor shall be required to demonstrate these maintenance tasks using the information as contained in the Service and Parts manuals. The demonstrations shall be conducted on the Pilot Bus and may occur at LACMTA facilities. Should a failure of a demonstration occur, the Manufacturer may be required to modify its bus design or service manual information as necessary and re-demonstrate the procedure on the Pilot Bus. The purpose of these demonstrations is to validate the maintenance manual, special tool requirements, and MTTF.

TABLE 16
MTTF

SERVICE TASK	MTTF (hrs./min.)
INSPECTION:	
6,000 Mile Inspection	7.5 hr.
Daily Inspections	10 min.
Brake Inspection	15 min.
REMOVE AND REPLACE:	
A/C Blower Motor	1 hr.
A/C Condenser Motor	1 hr.

SERVICE TASK	MTTF (hrs./min.)
Alternator	2 hr.
Access for Door Motor Adjustment	< 2 min.
Air Compressor	2 hr.
Air Dryer Desiccant	15 min.
Batteries Set	45 min.
Brake Application Valve	1 hr.
Engine/Transmission PPA (2 mechanics)	6 hr.
Engine ECM	2 hr.
Exterior Mirror Glass	< 5 min.
Headlining Panels, Interior individual (less handrails)	< 30 min.
Power Steering Gear Box Assembly	2 hr.
PPA mounts, complete set	2 hr.
Radiator (2 mechanics)	3 hr.
Seat Insert	< 1 min.
Shocks, Each	45 min.
Starter	1.5 hr
Transmission unit	8 hr.
Wheel Change, Front	45 min.
Wheel Change, Rear Dual	60 min.
Window glazing, Passenger	60 min.
Window guard, Passenger and Door	6 min.
Wiper Motor	20 min.
Operators Seat	30 min.
Electronic Unit (Regulator, PLC Module, Relay, Fuse, etc.)	15 min.
Lamps, Passenger Lights	15 min.

Mean Miles Between Failures

Table 17 lists minimum design goals for mean miles between failures (MMBF) on critical areas of bus.

TABLE 17
MMBF Goals

Type	Description	Design Goal
Class 1:	Physical Safety	Mean distance greater than 1,000,000 miles
Class 2:	Road Call	Mean distance greater than 10,000 miles
Class 2:	Stalling	Mean distance greater than 50,000 miles
	Interlock, F/R Doors	
	No Start	
	SEL/CEL	
	Diagnostic Light	

	Electrical failure	
	Stalling	
	Low Air	
	Suspension	
	HVAC	
	Charging System	
	Pneumatic System	
Class 2:	ADA- Ramp, Securement	Mean distance greater than 75,000 miles

TS 88.3 Technical Contract Deliverables

Contractor shall provide a table of contract deliverables, documentation and/or demonstrations as scheduled in the Contract documents during the proposal period. See Table 20 attachment for reference on technical submittal items.

Test Procedures

Contractor shall submit an overall test procedure for each design qualification and conformance/acceptance testing for approval to LACMTA at least 30 days prior to the scheduled date of the test. The Contractor shall provide all equipment and instrumentation required to conduct the tests. Along with the title referencing the specification requirement, the test procedure shall include at a minimum the following:

- Test objective
- Description of the type of report to be submitted
- Success/failure criteria
- Sequence of testing
- Equipment/instrumentation list with calibration dates
- Description of test setup including necessary diagrams
- Test methodology
- Procedure for data evaluation

The report shall be submitted within 30 days after completion of testing and shall follow industry standard format for submittal of technical papers. The reports shall include analysis along with necessary; photographs, charts and measured/accumulated data to support conclusions. Reports shall include a statement certifying compliance to specification requirements along with a list of any deficiencies.

TS 88.4 Decals/Signs

TABLE 18a
Exterior – Metro Local (Poppy)

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
A	3	Vehicle ID_4.5" White	CS0130	N/A
B	1	CNG Large_7.75"	CS0140	1-11/16" x 7-3/4"
C	1	SHUT OFF VALVE_1"(H)	CS0144	N/A
D	2	Battery Disconnect	CS55486	6-1/2" x 6-1/2"
E	4	Jack Points_3.75"(H)	CS5489	2" x 3-3/4"
F	2	Metro Local_7"(H)	CS0204	N/A

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
G	2	Nation's Largest Clean-Air Fleet_ 3.5" (H)	CS0131	N/A
H	2	Metro_17. 5"(H)	CS0185	N/A
I	2	Local_16.25"(H)	CS0196	N/A
J	2	CA LICENSE ID_1.5"(H)	CS0129	N/A
K	2	Metro Local_5.5" (H)	CS0202	N/A
L	1	Circle M_7.5"(H)	CS0133	N/A
M	1	Welcome Aboard_1",3/4"(H) Bienvenidos Exact Fare Please Tenga Pasaje Exacto Per Favor	CS0127	N/A
N	3	323.GO.METRO_7/8"(H) metro.net_11/16"(H)	CS0148	N/A
O	1	American Flag_Boarding	CS0125	6-3/4" x 3-1/2"
P	1	ISA Wheelchair	CS1000	6" x 6"
Q	1	ADA Kneeling Bus	CS0143	5-1/2" x 7"
R	2	Local_12"(H)	CS0198	N/A
S	1	Metro Local_1.5"(H)	CS0135	N/A
T	2	Circle M_4.5"(H)	CS0132	4-1/2" Dia.
U	1	Vehicle ID_2.625"(H)_White	CS0351	N/A
V	1	American Flag_Driver	CS0126	6-3/4" x 3-1/2"
W	1	Circle M_10"(H)	CS0134	10" Dia.
X	1	Danger-Do Not Turn In Front Of Bus_8.5"(H)	CS0146	N/A
Y	1	CNG Small_4"(H)	CS0141	6-1/2" x 4"

TABLE 18b
Exterior - Metro Rapid (Red)

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
A	3	Vehicle ID_4.5" White	CS0130	N/A
B	1	CNG Large_7.75"	CS0140	1-11/16" x 7-3/4"
C	1	SHUT OFF VALVE_1"(H)	CS0144	N/A
D	1	Battery Disconnect	CS55486	6-1/2" x 6-1/2"
E	4	Jack Points_3.75"(H)	CS5489	2" x 3-3/4"
F	2	Metro Rapid_7"(H)	CS0210	N/A
G	2	Nation's Largest Clean-Air Fleet_ 3.5" (H)	CS0131	N/A
H	2	Metro_17.5"(H)	CS0185	N/A
I	2	Rapid_16.25"(H)	CS0197	N/A
J	2	CA LICENSE ID_1.5"(H)	CS0129	N/A
K	2	Metro Rapid_5.5" (H)	CS0208	N/A











DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
L	1	Circle M_7.5"(H)	CS0133	N/A
M	1	Welcome Aboard_1",3/4"(H) Bienvenidos Exact Fare Please Tenga Pasaje Exacto Per Favor	CS0127	N/A
N	3	323.GO.METRO_7/8"(H) metro.net_11/16"(H)	CS0148	N/A
O	1	American Flag Boarding	CS0125	6-3/4" x 3-1/2"
P	1	ISA Wheelchair	CS1000	6" x 6"
Q	1	ADA Kneeling Bus	CS0143	5-1/2" x 7"
R	2	Rapid_12"(H)	CS0199	N/A
S	1	Metro Rapid_1.5"(H)	CS0157	N/A
T	2	Circle M_4.5"(H)	CS0132	4-1/2" Dia.
U	1	Vehicle ID_2.625"(H)_White	CS0351	N/A
V	1	American Flag Driver	CS0126	6-3/4" x 3-1/2"
W	1	Circle M_10"(H)	CS0134	10" Dia.
X	1	Danger-Do Not Turn In Front Of Bus_8.5"(H)	CS0146	N/A
Y	1	CNG Small_4"(H)	CS0141	6-1/2" x 4"



TABLE 19a
Interior – Metro All

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
A	4	Security Camera in Operation	CS5382	1'-0"x3-1/4"
B	2	Reserved for Seniors	CS5382	1'-7"x4"
C	3	Reserved for Mobility Devices	CS5401	1'-7"x4"
D	2	Please Remain in Securement	CS0230	10"x5-1/4"
E	3	Watch Your Step	CS5421	1'-4-1/4"x3"
F	1	Bus Maximum Height	CS0234	4-1/4"x2-1/8"
G	1	Bus Drivers Carry No Cash	CS5508	1'-1/4"x4-1/4"
H	1	PC640	CS5814	1'-4-3/4"x4-1/4"
I	1	Unnecessary Conversation	CS0155	4-1/4"x4-1/4"
J	1	Financial Responsibility	CS0162	3-3/4"x3-3/4"
K	1	Welcome to Metro	CS0152	5/8"x3-1/2"
L	1	Exit Rear Door	CS5505	11"x3-1/4"
M	1	Reserved for Mobility Devices	CS5505	11"x3-1/4"
N	2	Caution Door Opens Automatically	CS5511	3-3/8"x7"

TABLE 19b
High Voltage – Metro ZE Bus

Note: Table 19b applies to zero emission bus decals. Location and quantity of these decals will vary depending on the individual bus configuration. Final layout will be determined during Pre-Production meetings.

Area	Description	Size - Inches	Location	Qty	Total
1. Lock Out Compartment		4 x 6	Inside the compartment - Next to the switch	1	AR
		4 x 6	Inside the compartment - Next to the switch	1	AR
2. Battery Compartment(s)		6 x 4	Inside the compartment - On the battery box	1	AR
		4 x 6	Inside the compartment - On the battery box	1	AR
	XXX VOLTS	1 x 4	Inside the compartment - On the battery box	1	AR
		2 x 3	On the battery enclosure door, visible from outside	1	AR
3. Automatic Start Equipment		2 x 4	On the equipment	1	AR
		2 x 4	On the compressor	1	AR
	XXX VOLTS AC 3 PHASE	1 x 6	On the equipment and control boxes	1	AR
	XXX VOLTS	1 x 4	On the equipment and control boxes	1	AR
4. Auxiliary Motor Controller(s)	XXX VOLTS AC 3 PHASE	1 x 6	On the control box(es) and motor(s)	1	AR
5. PPU and Hazardous Voltage Area(s)		2 x 3	On the enclosure door, visible from outside	1	AR
		6 x 4	On the enclosure door, visible from inside	1	AR
	XXX VOLTS	1 x 4	Inside the compartment	1	AR
		4 x 6	On the enclosure door, visible from inside	1	AR

Area	Description	Size - Inches	Location	Qty	Total
6. Charging Connector (Bus Side)		2 x 3	On the enclosure door, visible from inside	1	AR
7. Charging Connector (Station Side)		2 x 3	Next to each charging connector	1	AR

TS 88.5 References

SAE #	Title	Date Published
J10	Air Brake Reservoir Performance and Identification Requirements.	Dec 04, 2013
J211	Instrumentation for Impact Test—Part 2: Photographic Instrumentation	June 16, 2014
J287	Driver Hand Control Reach	March 11, 2016
J366	Exterior Sound Level for Heavy Trucks and Buses	Sept 12, 2011
J381	Windshield Defrosting Systems Test Procedure and Performance Requirements - Trucks, Buses, and Multipurpose Vehicles.	Jan 27, 2009
J534	Lubrication Fittings	Aug 11, 2015
J537	Storage Batteries	May 23, 2011
J541	Voltage Drop for Starting Motor Circuits	July 16, 2013
J587	License Plate Illumination Devices (Rear Registration Plate Illumination Devices)	Aug 21, 2012
J593	Backup Lamps (Reversing Lamps)	Aug 26, 2010
J673	Automotive Safety Glasses	July 6, 2015
J680	Location and Operation of Instruments and Controls in Motor Truck Cabs, Recommended Practice	Sep 1, 1988
J686	Motor Vehicle License Plates	Aug 7, 2012
J689	Curbstone Clearance, Approach, Departure, and Ramp Break over Angles—Passenger Car and Light Truck	Aug 26, 2009
J726	Air Cleaner Test Code	June 27, 2002
J833	Human Physical Dimensions	May 29, 2003
J844	Nonmetallic Air Brake System Tubing	Dec 19, 2012
J941	Motor Vehicle Drivers' Eye Locations	Mar 3, 2010
J994	Alarm—Backup—Electric Laboratory Performance Testing	Sept 17, 2014
J1050	Describing and Measuring the Driver's Field of View	Feb 13, 2009
J1113	Electromagnetic Compatibility Component Test Procedure Part 42, Conducted Transient Emissions	Dec 8, 2010
J1127	Low Voltage Battery Cable	Dec 3, 2015
J1128	Low Voltage Primary Cable	Dec 3, 2015
J1149	Metallic Air Brake System Tubing and Pipe	Oct 21, 2015
J1211	Handbook for Robustness Validation of Automotive Electronic Modules	Nov 19, 2012
J1292	Automobile and Motor Bus Wiring	Jan 1, 2008
J1308	Fan Guard for Off-Road Machines	Dec 17, 2013
J1455	Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications	Aug 24, 2012
J1587	Electronic Data Interchange Between Microcomputer Systems in Heavy-Duty Vehicle Applications, Recommended Practice	Jan 4, 2013
J1708	Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications	Dec 12, 2010
J1908	Electrical Grounding Practice	Jan 1, 1996
J1986	Balance Weight and Rim Flange Design Specifications, Test Procedures, and Performance Recommendations	March 18, 2016

J1939	Data Link Layer	March 3, 2016
J1995	Engine Power Test Code - Spark Ignition and Compression Ignition - Gross Power Rating, Standard;	Jan 10, 2014
J2249	Wheelchair Tiedown and Occupant Restraint Systems for Use in Motor Vehicles	Jan 29, 1999
J2402	Road Vehicles—Symbols for Controls, Indicators, and Tell-tales	Jan 7, 2010
J2711	Recommended Practice for Measuring Fuel Economy and Emissions of Hybrid-Electric and Conventional Heavy-Duty Vehicles	Sept 20, 2002
J2805	Measurement of Noise Emitted by Accelerating Road Vehicle	Nov 10, 2015
J2808	Lane Departure Warning Systems Minimum Performance Requirements	March 9, 2015

TS 88.6 Holders

FIGURE 9

Bad Order (B.O.) Card Holder

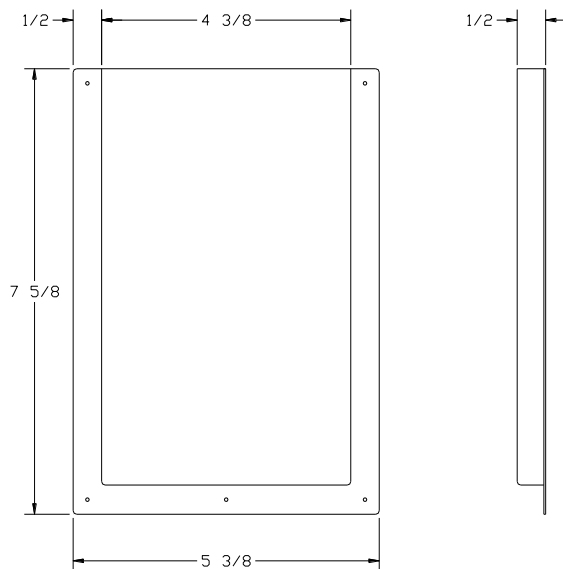
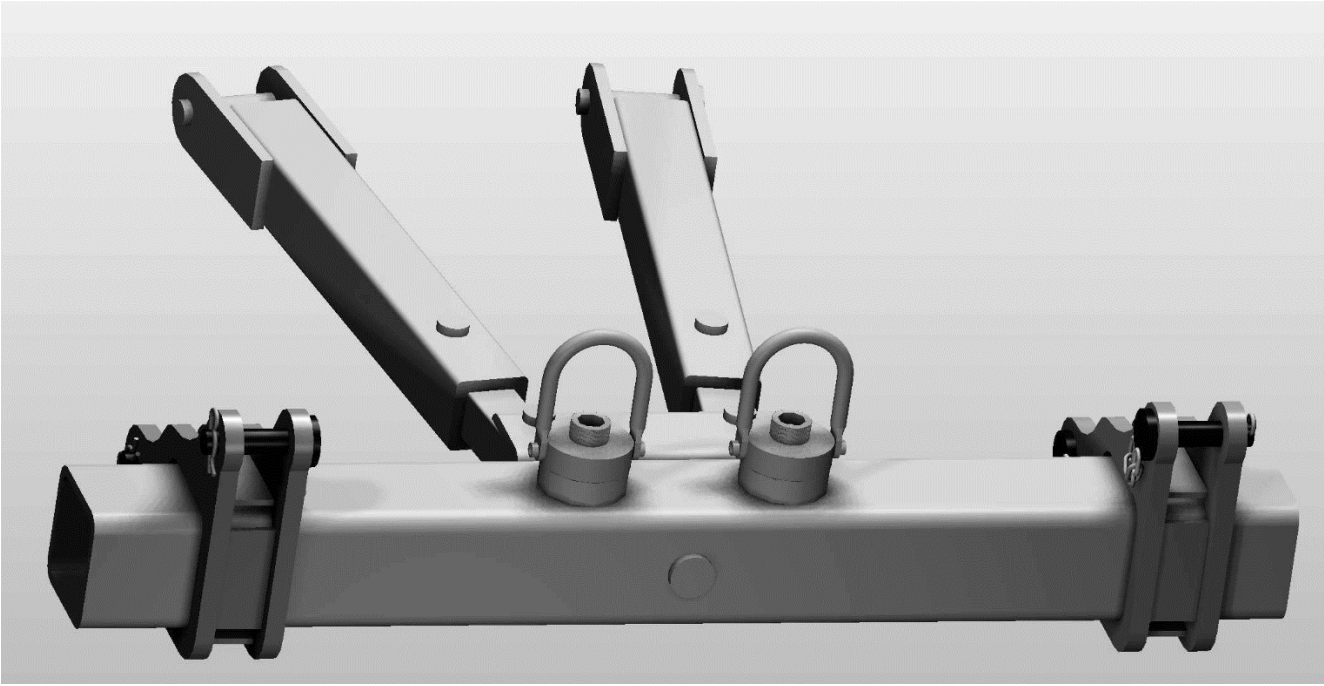


FIGURE 10

Typical Trash Bag Hooks



FIGURE 11
Metro Tow Device



Technical Contract Deliverables

Contractor shall provide a table of contract deliverables, documentation, samples and/or demonstrations as scheduled in the Contract documents. Table 20, provided as reference for Technical submittal items, is representative and not intended to be all inclusive.

TABLE 20
Contract Deliverable Items

Item	Section	Title	Deliverable	Schedule	Requirement
1	TS 4	Legal Requirements	Certification	Pre-production Meetings	The Contractor shall comply with all applicable federal, state and local regulations. These shall include but not be limited to ADA, as well as state and local accessibility, safety and security requirements. Local regulations are defined as those below the state level.
2	TS 5	Overall Requirements	Documentation	With Pilot Bus and First Article Bus	Contractor and LACMTA shall identify subcomponent vendors that shall submit installation/application approval documents , (including necessary documents and/or diagrams to verify configuration), with the completion of a Pilot Bus and First Article Bus.
3	TS 5.4	Maintenance and Inspection	Documents	Proposal Period	Contractor shall provide a list of all special tools and pricing required for maintaining this equipment. Said list shall be submitted as a supplement to Form PF-3 Schedule B of Prices Special Tools.
4	TS 5.6	Training	Documents	Proposal Period	The Contractor shall provide pricing for up to 1,000 Instructor class-room hours with the Bus order. For each Option order, Contractor shall also be required to provide Instructor training. The quantity of training hours shall be determined by the quantity of Option Buses ordered and shall be equal to five hours of training per Option bus up to a maximum of 500 instructor class-room hours for each Option order.
5	TS 5.6	Training, Base Order Buses	Documentation	30 days after pilot bus delivery	The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor at the time of pilot bus review.
6	TS 5.6	Training, Option Order Buses	Documentation	30 days prior to delivery of Option pilot bus	The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor.
7	TS 5.6.1	Training Curriculum	Documents	30 days prior to delivery of pilot bus	The Contractor shall develop and submit a training curriculum using the most current version Microsoft Office Word and/or Power Point, subject to LACMTA approval.

Item	Section	Title	Deliverable	Schedule	Requirement
8	TS 5.6.2	Teaching Materials	Documents, materials	30 days prior to training	The Contractor shall provide to the LACMTA Maintenance Instruction Department visual and other teaching materials as needed during classroom instruction.
9	TS 5.6.3	Optional Training Aids	Documents	Proposal Period	The Contractor shall supply pricing for items a – k, special training aids, as listed below for use by LACMTA training staff. Pricing for these aids is to be provided to the LACMTA on Form PF-5-Schedule D of Prices Training Aids.
10	TS 5.6.3	Optional Training Aids, E-Learning/Interactive Training Media	Documents	Proposal Period	The Contractor shall provide pricing for 25 hours of CNG/Electric Bus interactive learning seat time on Form PF-5-Schedule D of Prices Training Aids. The media shall provide a high level of student interactivity, including but not limited to: questions review, component identification, tool use, circuit building, component testing. All content shall be navigated through an industry standard e-learning programs graphical user interface (GUI) subject to LACMTA approval.
11	TS 5.6.4	Manuals, Manual Review and Approval	Documents	After NTP	The Contractor will be required to participate in Manual Review and Approval process and attend one service manual review meeting held at the LACMTA shortly following LACMTA Notice to Proceed.
12	TS 5.6.4	Manuals, Draft Manuals, Manual Review and Approval	Documents	With pilot bus	The Contractor shall provide the LACMTA with: Ten draft hardcopies each of the Service, Parts and Operator's manuals plus a list of all proposed OEM Component Repair manuals, simultaneously to the shipping of the first Pilot Bus.
13	TS 5.6.4	Manuals, Draft Manuals, Parts Index	Hardcopy, Spreadsheet	60 days prior to production 60	A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production Bus.
14	TS 5.6.4	Manuals, Final Manuals	Documents	90 days after start of production	Ten final hardcopy sets of Service and Parts manuals, shall be provided for each 100 Buses and twelve 12 total sets of Subsystem OEM manuals.
15	TS 5.6.4	Manuals, Final Manuals	Documents	90 days after start of production	Contractor shall supply a listing of diagnostic codes with final service manuals delivered that covers trouble shooting fault trees/codes related to the PPU.
16	TS 5.6.4	Manuals, Final Manuals	Documents	90 days after start of production	Final DVD editions of Service, Parts and Operator's manuals must be delivered within 90 days after the start date for production Buses.

Item	Section	Title	Deliverable	Schedule	Requirement
17	TS 5.6.4	Manuals, Component Repair/Service Section	Documents	90 days after start of production	Fourteen sets of Repair Manuals necessary to rebuild all Contractor supplied Units including: PPU, transmission/electric drive, HVAC system, starter, alternator, air compressor, etc., shall be provided.
18	TS 5.6.4	Manuals, Component Repair/Service Section	Hardware	90 days after start of production	Each set shall be organized and mounted onto a suitable table top holding rack subject to LACMTA approval
19	TS 5.6.4	Manuals, Price List	Hardcopy, Spreadsheet	90 days after start of production and updated annually	Ten copies of the current price list shall be provided separately as a supplement to the final parts manuals. Price lists shall be updated at least annually and provided for the life of the Bus as they are updated.
20	5.6.5	Special Equipment, Option, Special Service Equipment	Documents	Proposal Period	The LACMTA is aware that diagnostic equipment and/or software has been developed or is being developed by many of the OEMs to assist in the maintenance of the Buses. Proposer is required to submit a list of recommended special equipment, software and/or diagnostic tools deemed necessary to provide state-of-the-art service for the bus systems. Depending on the type of available equipment and/or software, the LACMTA may wish to obtain complete sets of such Special Service Equipment and/or software, plus any additional tools identified by the OEM manufacturer required to diagnose, calibrate, or remove-and-replace, all equipment provided with this Bus order.
21	TS 5.6.6	Diagnostic Laptop PC Specifications	Laptops	Delivery of first production bus	Because of the time delay between the procurement process and receipt of computer equipment, the final laptop computer configuration shall be subject to approval by the LACMTA at delivery...
22	TS 5.6.8	In-Process and As-Built Drawings	Scale Drawings	30 days prior to production	The Contractor shall, no later than 30 days prior to commencing production, supply the LACMTA with two sets of hardcopy scale drawings suitable for conducting repairs on every area of the vehicle, including all major systems and sub-system installations. Electrical and air schematics shall also be provided. In addition, the Contractor shall provide a description of the electronic configuration, layout and functionality of the Bus including communication paths and power distribution.
23	TS 5.6.8	In-Process and As-Built Drawings	Scale Drawings	60 days after final bus delivery	Five sets of Conforming drawings shall be delivered to the LACMTA within 60 days after final Bus delivery.

Item	Section	Title	Deliverable	Schedule	Requirement
24	TS 5.7	Operating Environment	Test Documentation	Pre-Production Meetings	The bus shall achieve normal operation in ambient temperature ranges of 0° F to 120° F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3,000 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 0 °F, above 120° F or at altitudes above 3,000 feet.
25	TS 5.8	Noise	Demonstration	Pilot Vehicle at Factory	The Contractor shall be required to demonstrate that vehicle-generated sound levels do not exceed the maximum interior and exterior values.
26	TS 5.8.1	Interior Noise	Test Documentation	Pilot Vehicle Prior to Production	The Contractor shall provide test documentation that vehicle has sufficient sound insulation to achieve 65 dBA or lower at any point inside the bus with an 80 dBA sound source at outside skin of the bus.
27	TS 5.9	Fire Safety	Certification	Pre-Production Meetings	Contractor must provide required certificates of compliance prior to manufacture of the Pilot Bus.
28	TS 5.10	Fire Suppression	Documentation	Proposal Period	The AFSS system shall meet or exceed the environmental requirements of SAE J1211.
29	TS 5.10	Fire Suppression	Documents	Proposal Period	At a minimum, the engine compartment, HVAC compartment, exhaust area and high current electrical areas (except the battery compartment) at rear of bus shall be equipped with an automatic fire sensing and suppression (AFSS) system product, subject to LACMTA approval during proposal period.
30	TS 5.10	Fire Suppression, AFSS Monitor Panel	Documenst	Pre-Production Meetings	The system shall have a supervision monitoring panel located above the operators' side console subject to LACMTA approval...
31	TS 5.10	Fire Suppression System, AFSS Agent	Documentation	Pre-Production Meetings	The agent shall be approved by Underwriters Laboratory or Factory Mutual Research Corporation and have no ozone depleting property and no global warming potential per USA EPA guidelines.
32	TS 5.10	Fire Suppression System (AFSS Cylinders)	Documentation	Pre-Production Meetings	The AFSS agent cylinders shall use DOT shippable linear actuators or electric solenoid valves (squibs are prohibited) attached to DOT certified bottles which do not require hydrostatic retest for a minimum of twelve (12) years. Cylinder(s) shall be compatible with suppression agents. Each cylinder shall have a pressure gauge with easy to read "Go-NoGo" type indicator which is visible when the cylinder(s) is installed on the Bus.

Item	Section	Title	Deliverable	Schedule	Requirement
33	TS 5.11	Gas Detection System (GDS)	Documents	Proposal Period	GDS system shall be provided to monitor the engine compartment and each separate fuel storage area(s) and shall automatically activate...
34	TS 5.11	Gas Detection System (GDS), GDS Monitor Panel	Documents	Pre-production Meetings	The system shall have a supervision monitoring panel located above the operators' side console area subject to LACMTA approval
35	TS 5.13	Water Leak Testing	Test	All buses	The roof, windows, windshields, and all doors of all Vehicles shall be water tested for a minimum of 30 continuous minutes in order that leaks may be detected and corrected. The HVAC shall be turned on only for the first 15 minutes of the test.
36	TS 5.14	Fasteners and Securements	Documentation, Samples	Proposal Period	Supports for all electrical cables, harnesses and bundles will be subject to LACMTA approval and shall be of premium quality.
37	TS 6	Physical Size	Test Documentation	Pilot Vehicle at Factory	Vehicles furnished under these specifications shall comply with physical size.
38	TS 7.	Vehicle Performance, Power Requirements	Documentation	Proposal Period	The propulsion system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed, and gradability requirements, and operate all propulsion-driven accessories using actual road test or dynamometer results and computerized vehicle performance data.
39	TS 7	Vehicle Performance	Demonstration	Pilot Vehicle at Factory	The Contractor shall be required to demonstrate acceleration, top speed, and gradeability requirements.
40	TS 7.4.3	Operating Range, CNG	Documentation	Proposal Period	The Contractor shall provide sufficient fuel capacity to give the bus a 400 mile range before the low fuel warning light comes on. The Contractor shall provide the LACMTA with a technical analysis which supports the proposed CNG fuel system design compliance to the LACMTA's range of operation requirement including the proposed fuel capacity.
41	TS 7.4.4	Operation Range, Electric (Zero Emission)	Documenation	Proposal Period	The Contractor shall provide sufficient energy storage and charger charging systems to give the bus a cumulative 300 mile daily operating range before the low energy warning light comes on. The Contractor shall provide the LACMTA with a technical analysis which supports the proposed energy storage and charger systems design compliance to the MTA's range of operation requirement including the proposed energy storage system capacity.

Item	Section	Title	Deliverable	Schedule	Requirement
42	TS 9.	Engine	Meeting and Documentation	Pre-production Meetings	Prior to manufacturing the Pilot bus, the Contractor shall coordinate a technical review with the LACMTA and engine and transmission suppliers covering integration and installation design. As part of the technical review, the Contractor shall advise the LACMTA concerning engine and transmission features and control system options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality.
43	TS 9	Engine	Certificate	Prior to start of production	Prior to start of production, the Contractor shall provide documentation from the Subsuppliers, which supports their approval, that the engine and transmission installation, support system design, and components used specifically for the LACMTA's contract meet the OEM requirements and recommendations.
44	TS 9.1	Engine (CNG	Documentation	Pre-production Meetings	Oil filtration systems shall be approved by the engine and transmission OEM and be designed with by-pass circuits, as needed, in the event that a filter becomes plugged.
45	TS 9.1.1	Engine, Compartment Control Panel Gauges and Indicators	Documents	Proposal Period	The following mechanical, electrical dial gauges, or digital display, subject to LACMTA approval during proposal period, shall be mounted on, or adjacent to, the engine compartment control panel: <ul style="list-style-type: none"> • Oil Pressure Gauge, • Temperature Gauge, • Air Filter Restriction Gauge, • Voltage Gauge(s).
46	TS 9.2.2	Propulsion System Service	Documents, Drawings	Proposal Period	The propulsion system shall be arranged so that accessibility for all routine maintenance is ensured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems.
47	TS 9.2.4	Energy Storage, Controller and Charging Systems	Documents, Drawings	Proposal Period	Energy storage shall be of a commercial design capable of operating in the LACMTA transit environment.
48	TS 9.2.5	Electric System Controller (ESC), Primary Power Unit (PPU)	Documents, Drawings	Proposal Period	The PPU shall have on-board diagnostic capabilities, able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in operator's area and inside PPU compartment.

Item	Section	Title	Deliverable	Schedule	Requirement
49	TS 10.	Cooling Systems	Test or Certification	Pre-Production Meetings	The cooling systems shall be of sufficient size and designed to maintain fluids and engine intake air at safe, continuous operating temperatures during the most severe operations possible with the bus loaded to GVWR and with conditions as listed in Section TS 5.7 with a 10 percent minimum reserve capacity in accordance with engine and transmission manufacturer's cooling system requirements. The cooling system fan controls should sense the temperatures of the operating fluids and the intake air, and if either is above safe operating conditions the cooling fan should be engaged. The fan control system shall be designed with a fail-safe mode of "fan on." The cooling system shall provide functional service while operating in the design operating profile environment.
50	TS 10	Cooling Systems	Demonstration	Pilot Vehicle Delivery in LA	The cooling system shall be self purging requiring no special procedures to remove air from the system when coolant is installed or added.
51	TS 10.1	Engine Cooling	Documents	Pre-Production Meetings	Surge tank filler cap shall have a safety lock. A 1/4 inch NPT port shall be provided in a convenient location in the surge tank for the LACMTA's pressure testing equipment, subject to LACMTA approval..
52	TS 12	Retarder (Transit Bus), Retarder Disable Switch	Documents, Drawings	Pre-Production Meetings	The retarder disable switch shall be located behind the destination sign door, subject to LACMTA approval
53	TS 14.1	Service	Documents, Drawings	Proposal Period	No special tools, other than dollies and hoists, shall be required to remove the PPA/PPU Two LACMTA mechanics shall be able to remove, replace, and prepare the complete PPA/PPU assembly for service within a MTTF of 12-man hours.
54	TS 14.1	Service	Approval	Within 60 days after final bus delivery	The Contractor shall provide two suitable PPA/PPU dollies for each spare PPA/PPU purchased under this Contract.
55	TS 14.1	Service	Documents. Drawings	Pre-production Meetings	The PPA/PPU dollies shall be designed, subject to LACMTA approval in pre-production meetings...
56	TS 14.1	Service	Drawings	Last Vehicle Delivery	The Contractor shall provide the LACMTA with sufficient fabrication drawings needed to manufacture additional dollies.
57	TS 14.1	Service	Documents, Drawings	Pre-production Meetings	Belt drives that require manual tensioning shall be designed to facilitate easy service/maintenance, subject to LACMTA approval

Item	Section	Title	Deliverable	Schedule	Requirement
58	TS 14.1	Service	Certificate	Pre-production Meetings	Accessory drive belts shall be guarded in accordance with CAL OSHA article 45, Belt and Pulley Drives, Section 4070 "Guarding".
59	TS 14.1	Service, Engine Air Cleaner	Drawings	Proposal Period	The air filter shall be positioned for easy access and service, subject to LACMTA approval...
60	TS 15	Hydraulic Systems	Demonstration	Pilot Vehicle at Factory	Any hydraulically driven system shall be subject to LACMTA approval at the Pilot Bus.
61	TS 15	Hydraulic Systems	Demonstration	Pilot Vehicle at Factory	The hydraulic system (steering) shall be located to accommodate easy service. The hydraulic system filter shall be located in the return, low pressure, circuit to the oil reservoir, or internal to the oil reservoir, subject to LACMTA approval at the Pilot Bus.
62	TS 15.1	Fluid Lines	Documents, Drawings	Pre-production Meetings	Rigid and flexible lines shall be individually supported and readily accessible for inspection and service, including interior lines inside the bus,...
63	TS 18.1.2	Fuel Lines, CNG	Documentation	Pre-production Meetings	Fuel lines shall comply with NFPA-52. All tubing shall be a minimum of seamless Type 304 stainless steel (ASTM A269 or equivalent). Fuel lines shall be identifiable as fuel lines only. Fuel lines shall be bent using computer numeric machines (CNC) to assure consistency, no hand bending will be permitted. The bus manufacturer shall have a documented procedure for testing the high pressure line assembly
64	TS 18.1.2	Fuel Lines, CNG	Documentation	Pre-production Meetings	Hose support in-between the bus frame and the engine that exceed 12 inches is subject to LACMTA approval...
65	TS 18.2.2	Design and Construction, CNG, Fuel Containers/Cylinders	Documentation	Pre-production Meetings	Fuel cylinder construction shall be in accordance with DOT Standard 304, ANSI NGV2, latest revision, design and test criteria. Cylinder shall be designed for the lightest weight possible which does not require a hydrostatic re-qualification. Cylinders shall be certified for refueling pressures to 125 percent of working pressure during temperature compensated fueling.
66	TS 18.2.2	Design and Construction, CNG, Pressure Relief Devices (PRDs)	Documents, Drawings	Proposal Period	PRDs shall be vented to the roof area of the Bus with minimum protrusion above the roof line and shall be protected with a suitable cap which shall withstand daily bus wash activity, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
67	TS 18.2.2	Design and Construction, CNG, Valves	Documents, Drawings	Proposal Period	An additional minimum 1/2 inch valve shall be provided for draining the high pressure manifold and any fuel cylinder(s) through a service port. Type and location of the service port shall be subject to LACMTA approval...
68	TS 18.2.2	Design and Construction, CNG, Gauges	Documentation	Pre-production Meetings	Glycerin filled gauges which meet NFPA 52 requirements shall be located in the high and low pressure manifolds which shall indicate fuel system pressure.
69	TS 18.2.2	Design and Construction, CNG, Fuel Filler	Documents, Drawings	Proposal Period	The fuel filler shall be located 30 to 38 feet measure behind the centerline of the front door, subject to LACMTA approval...
70	TS 18.2.2	Design and Construction, CNG, Defueling System	Documents, Drawings	Proposal Period	The CNG defueling port shall be an NGV-3.1/CGA-12.3 certified receptacle subject to LACMTA approval...
71	TS 21	Altoona Testing	Documentation	Proposal or First Article Bus	A report clearly describing and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the LACMTA.
72	TS 23.2	Crashworthiness, (Transit Bus)	Certification	Pre-Award Audit	Contractor shall be required to provide FEA software analysis or other evidence of compliance with this section during the Pre-Award Audit.
73	TS 24.	Corrosion	Certification	Pre-production Meetings	Representative samples of all materials and connections shall withstand a two-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces and no weight loss of over 1 percent.
74	TS 24.	Corrosion	Documentation	Pre-production Meetings	The Contractor shall provide a copy of its proposed undercoating system program...
75	TS 25.	Towing	Demonstration	Pilot Vehicle Delivery in LA	Contractor shall provide fifteen (15) sets of any special towing equipment adapters, if required, so that the LACMTA is able to flat tow the Bus.
76	TS 25	Towing	Demonstration	Pilot Vehicle Delivery in LA	Contractor shall demonstrate compliance with these provisions using the Pilot Vehicle.
77	TS 25	Towing	Documents, Samples	Pre-production Meetings	All male fittings shall have an additional quarter turn manual shut off valve provided near the front bumper for use only during towing, subject to LACMTA approval
78	TS 25.	Towing	Demonstration	Pilot Vehicle Delivery in LA	Two rear recovery devices/tie downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus.
79	TS 26.	Jacking	Demonstration	Pilot Vehicle Delivery in LA	Jacking and changing any one tire/wheel assembly shall be completed by one LACMTA mechanic.

Item	Section	Title	Deliverable	Schedule	Requirement
80	TS 27.	Hoisting	Demonstration	Pilot Vehicle Delivery in LA	The Contractor may be required to demonstrate compatibility with LACMTA hoists as part of the towing demonstration...
81	TS 27	Hoisting	Samples	Pre-production Meetings	A model or sample jacking plate shall be provided during Pre-Production meetings for approval by LACMTA.
82	TS 28.1	Floor, Design (Transit Bus)	Documents, Drawings	Proposal Period	Floor installation, repair, and replacement method shall be subject to LACMTA approval...
83	TS 28.5	Floor, Construction	Documentation	Proposal Period	The floor shall be constructed using composite flooring material approved by the LACMTA during proposal period.
84	TS 29.3	Farebox, Stanchions	Documents, Drawings	Proposal Period	Stanchions shall be located around the farebox in accordance with ADA requirements and subject to LACMTA approval...
85	TS 30.1	Wheel Housing, Design & Construction	Certification Documentation	Pre-production Meetings	<p>Wheel housings shall be constructed of corrosion-resistant and fire-resistant material. Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to prevent overheating when the bus is operated in revenue service.</p> <p>Wheel housings, as installed and trimmed, shall withstand impacts of a two- inch steel ball with at least 200 foot-pounds of energy without penetration.</p>
86	TS 31.3.3	Suspension, Lubrication, Standard Grease Fittings	Demonstration	Pilot Vehicle at Factory	All elements of steering, suspension and drive systems requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534 (Zerk Fitting).
87	TS 31.3.4	Suspension, Springs and Shock Absorbers, Kneeling	Demonstration	Pilot Vehicle at Factory	<p>A kneeling system shall lower the entrance(s) of the bus a minimum of 2.75 in. during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s) by the driver.</p> <p>The bus shall kneel at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully kneeled position within 4.5 seconds. After kneeling, the bus shall rise within 3 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum vertical acceleration shall not exceed 0.2g, and the jerk shall not exceed 0.3g/second.</p>

Item	Section	Title	Deliverable	Schedule	Requirement
88	TS 31.3.4	Suspension, Springs and Shock Absorbers, Raising	Demonstration	Pilot Vehicle at Factory	The Bus shall incorporate a system controlled by the operator that permits the Bus to raise (to account for high curbs) 2.75 inches, measured from normal ride height at the center of the bottom front step regardless of passenger load up to GVWR. The Bus shall raise at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully raised position within 4.5 seconds. After rising the Bus shall recover (lower) within 3.5 seconds to a ride height permitting the Bus to resume service and shall fully recover to the correct operating ride height within 10 seconds. During the lowering operation, the maximum acceleration shall not exceed 0.2g and the jerk shall not exceed 0.3g/sec. measured on the front door step tread.
89	TS 32.2	Tires	Documentation	With Each Vehicle	Contractor shall provide the LACMTA with a record listing tires installed for each Bus delivered. The information shall include the LACMTA brand serial number and mounting location on the Bus. Contractor shall conform to tire manufacturer specifications for maximum road speed and duty cycle during Bus delivery.
90	TS 33.	Steering	Test Documentation, or Demonstration	Pilot Vehicle at Factory	Electrically driven hydraulic assisted, or electrically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated. Steering torque applied by the operator shall not exceed 10 foot-pounds with the front wheels straight ahead. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops. Steering effort shall be measured with the Bus at Seated Load Weight (SLW), stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement with the tires inflated to recommended pressure. Power steering failure shall not result in loss of steering control. While the Bus is in operation, the steering effort shall not exceed 55 pounds at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

Item	Section	Title	Deliverable	Schedule	Requirement
91	TS 33.3.3	Steering Wheel, Steering Column Tilt	Demonstration	Pilot Vehicle at Factory	Steering column shall be a tilt and telescopic model. The steering column shall have full tilt capability with an adjustment range of no less than 35 degrees and be easily adjustable by the driver. The mechanism for adjustments shall be designed for ease of use, durability, utilize detents to position and lock the steering column and not require tightening by hand to apply a clamping force.
92	TS 33.3.4	Steering Wheel Telescopic Adjustment	Demonstration	Pilot Vehicle at Factory	The steering wheel shall have full telescoping capability and have a minimum telescopic range of 2 inches but no more than 5 inches and a minimum low-end adjustment of 32 in., measured from the top of the steering wheel rim in the horizontal position, (zero degrees' slope), to the cab floor at the heel point.
93	TS 37.1	Service Brake	Certification, Test Documentation	Pre-Production Meetings	The entire service brake system, including ABS controls, friction material, shall meet applicable FMVSS standards. The entire brake system, including friction material, shall have overhaul or replacement life goal of at least 45,000 miles when operated under LACMTA service. Brakes shall be self-adjusting. Mechanical brake wear indicators, (visible brake sensors), shall utilize stainless steel exposed push rods.
94	TS 37.6	Parking/Emergency Brake, Air Brakes	Documents, Drawings	Pre-Production Meetings	The parking brake shall be actuated by a valve mounted convenient to the operator, subject to LACMTA approval...
95	TS 39.1	Pneumatic System, General	Documents, Samples	Pre-Production Meetings	A quarter turn manual shut-off valve with quick disconnect fitting shall be easily accessible and located in the engine compartment and shall supply air prior to the air dryer, subject to LACMTA approval...
96	TS 39.2	Pneumatic System, Air Compressor	Demonstration	Pilot Vehicle at Factory	The electrically-driven air compressor shall be sized (designed) to charge the entire air system on new buses from 0 psi to 120 psi in less than five minutes for a single unit and bus not exceeding the fast idle speed (~1000 rpm) setting of the engine.

Item	Section	Title	Deliverable	Schedule	Requirement
97	TS 39.2	Pneumatic System, Air Compressor	Documentation	Pilot Vehicle Prior To Production	The electrically-driven air compressor shall be designed to supply air operating under the Air System Design Operating Profile while remaining within the manufacturer's air compressor specifications. The discharge temperature (measured at the compressor outlet using a probe thermocouple) shall not exceed 360°F, excluding temperature spikes of durations less than two seconds and two percent of compressor charge time. Air compressor duty-cycle shall not exceed 30 percent in any 10 minute period under the Manhattan Operating Profile.
98	TS 39.4	Pneumatic System, Air Reservoirs	Documentation	Pre-production Meetings & Pilot Vehicle at Factory	All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with drain plugs and guarded or flush type drain valves below floor level. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have drain valves mounted below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line. All air tanks shall have check valves at the inlet side for isolation.
99	TS 40	Electrical, Electronic and Data Communications, Overview	Approval	Prior to Pilot Bus completion	The Contractor shall coordinate a technical review with the LACMTA covering control system integration, installation, and design. As part of the technical review, the Contractor shall advise the LACMTA concerning control system features, options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality. The Contractor shall provide documentation including a description of control system operation and system schematics.
100	TS 40	Electrical, Electronic and Data Communications, Overview	Deliverable	Pilot Vehicle at Factory	A listing of the software part number and revision number and procedure for obtaining new releases shall be identified for each component which is software controlled.
101	TS 40.1	Electrical, Electronic and Data Communications, Modular Design	Demonstration	Pilot Vehicle at Factory	Replacement of the engine/propulsion compartment wiring harness(es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.
102	TS 41	Environmental and Mounting Requirements	Test Documentation	Pilot Vehicle Prior To Production	The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed, as recommended in SAE J1455.

Item	Section	Title	Deliverable	Schedule	Requirement
103	TS 41	Environmental and Mounting Requirements	Certification	Pilot Vehicle Prior To Production	No vehicle component shall generate, or be affected by, electromagnetic interference or radio frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54 (R 10).
104	TS 42.1.1	General Electrical Requirements, Low Voltage Batteries (24V)	Documents	Proposal Period	Batteries shall be a minimum of four absorbed glass mat thin plate pure lead technology group 31 series, heavy-duty, lead-acid, sealed top battery units for: a) engine starting (including fuel controls, electronic control units and ignition system), and b) other bus loads as needed, subject to LACMTA approval...
105	TS 42.1.1	General Electrical Requirements, Low-Voltage Batteries	Demonstration Test	Pilot Vehicle Prior To Production	Starting with a full charge, starting batteries shall have sufficient energy to provide adequate power after a minimum of five continuous days (Master Run switch "Off", Master Battery switch "On", all lights off, LACMTA installed ITS equipment operating) without charging or engine operation to then properly start the bus.
106	TS 42.1.3	General Electrical Requirements, Jump Start	Documents, Samples	Pre-Production Meetings	Female receptacles equipped with approximately one-foot 2/0 pigtail cables shall be provided. The receptacle(s) shall be located on the curbside rear corner of the Bus for convenient jumper cable connection, subject to LACMTA approval...
107	TS 42.1.7	General Electrical Requirements, Low-Voltage Generation and Distribution	Documentation	Pre-Production Meetings	The Contractor shall estimate the parasitic loads during the initial stage of the bus design and shall submit a draft report to LACMTA at the Pre-Production meetings.
108	TS 42.1.7	General Electrical Requirements, Low-Voltage Generation and Distribution	Documentation	Pilot Vehicle Prior To Production	The Contractor shall estimate the parasitic loads during the initial stage of the bus design and shall submit a draft report to LACMTA at the Pre-Production meetings. A final report shall be submitted during the Pilot Bus configuration audit.
109	TS 42.4	General Electrical Requirements, Electrical Components	Certification	Pre-Production Meetings	Location of electronic modules shall be reviewed for environmental suitability such as heat, water, vibrations, contamination from dust and debris, and other electrical equipment. The system including modules, external wire, connectors, and data Bus wiring shall be designed to operate under LACMTA's Design Operating Profile. All electrical components including relays and circuit breakers must remain unaffected while bus is operated in up to 15 inches of standing water.

Item	Section	Title	Deliverable	Schedule	Requirement
110	TS 43.1.3	General Electronic Requirements, Communications	Documents, Drawings	Proposal Period	Mounting and electrical provisions shall be provided to allow LACMTA installation of existing Fleetwatch JX-55 Vehicle Interface Module in the Operator's area, subject to LACMTA approval...
111	TS 45.2.1	Data Communications, Diagnostics, Fault Detection and Data Access	Documents, Drawings	Pre-Production Meetings	The communication port(s) shall be located in the Operator's area, Engine Compartment Control Panel, and ITS Enclosure area, subject to LACMTA approval...
112	TS 45.3.1	Multiplex Level, Data Access	Documents, Drawings	Pre-Production Meetings	Diagnostic and status information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible inside or adjacent to the ITS Enclosure subject to LACMTA approval...
113	TS 46.1	Driver's Area Controls, General	Documentation	Pre-Production Meetings	Switches and controls shall be divided into basic groups and assigned to specific areas, (Refer to Table 9) in conformance with SAE Recommended Practice J680, Revised 1988, "Location and Operation of Instruments and Controls in Motor Truck Cabs," and be essentially within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach.
114	TS 46.2	Driver's Area Controls, Glare	Inspection	Pilot Vehicle at Factory	The driver's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.
115	TS 46.8	Driver Foot Switches, Solid state Foot Switch Control	Documents, Drawings	Pre-Production Meetings	The inclined mounting surface shall be skid-resistant. All other controls, including high beam shall be in a location approved...
116	TS 47.1	Driver's Amenities, Coat Hanger	Documents, Samples	Pre-Production Meetings	A stainless steel, aluminum, or approved equal, coat hook shall be furnished and installed, subject to LACMTA approval.
117	TS 47.4	Repair Card Holder	Documents, Drawings	Pre-Production Meetings	A card holder shall be provided in the operators' area at a location accessible to mechanics standing in the front entry area with the passenger door open, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
118	TS 47.5	Safety Equipment	Documents, Drawings	Pre-Production Meetings	The following items shall be provided and installed within seven feet of the Operator's seat in a location that is easy reach, subject to LACMTA approval... a) DOT approved heavy-duty emergency reflector kit stored in a storage box. b) 5-pound (5 lb.) multipurpose fire extinguisher mounted with universal bracket.
119	TS 47.6	Bus Registration Holders	Documents, Drawings	Pre-Production Meetings	A Bus registration holder shall be installed above the operator near the ceiling, subject to LACMTA approval...
120	TS 47.7	Trash Hooks	Demonstration	Pilot Vehicle at Factory	Placement and selection of the hooks shall be reviewed on the Pilot Bus and are subject to LACMTA approval.
121	TS 49.1	Driver's Seat, Dimensions	Certification	Pre-pProduction Meetings	The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus. The heavy-duty Operator's seat shall support Operators' in the orthopedically correct seating position.
122	TS 49.8.1	Exterior Mirrors	Documents, Drawings	Proposal Period	Mirrors shall be made of tempered plate glass or have safety backing to prevent shattering subject to approval...
123	TS 49.8.1	Exterior Mirrors	Documents, Drawings	Proposal Period	Adjustment of the mirrors shall be provided by two nubbin switches located to the left of the Operator, subject to LACMTA approval...
124	TS 49.8.1	Exterior Mirrors, Street Side Mirrors	Documents, Drawings	Proposal Period	Street side mirror shall be overhead mounted in a position to minimize potential contact with vehicles or cyclists, subject to LACMTA approval...
125	TS 49.8.2	Interior Mirrors	Documents, Drawings	Pre-Production Meetings	Mirrors shall be provided to permit the operator to observe passengers throughout the Bus, including entrances and exits, and directly in front of the bus during bicycle loading and unloading activities without leaving his seat and without shoulder movement, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
126	TS 51.	Windshield	Certification	Pre-Production Meetings	The windshield shall permit an operator's field of view as referenced in SAE Recommended Practice J1050. The vertically upward view shall be a minimum of 15 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3.5 feet high no more than two) feet in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90-degree requirement, provided that the divider does not exceed a three-degree angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration.
127	TS 51.	Windshield	Inspection	Prior to Pilot Vehicle Acceptance	The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus. Windshield shall be two-piece design
128	TS 52.	Driver's Side Window	Certification	Pre-production Meetings	The driver's side window glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673. Light transmittance shall be maximum 75 percent on the glass area below 53 in. from the operator platform floor. On the top fixed over bottom slider configuration, the top fixed area above 53 inches may have a maximum one percent light transmittance.
129	TS 53.3	Side Windows, Configuration	Documents, Drawings	Proposal Period	Rearmost windows which are lower than shoulder height for seated passengers shall not be opened or equipped with emergency escape provisions, subject to LACMTA approval...
130	TS 53.4	Side Windows, Materials, Safety Glass Glazing Panels	Certification	Pre-production Meetings	Side windows glazing material shall have a minimum of 3/16 in. nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673. Windows on the bus sides and in the rear door shall be grey tint (13-50 percent) luminous transmittance as measured by ASTM D-1003), complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 37 percent, as measured by ASTM E-424.

Item	Section	Title	Deliverable	Schedule	Requirement
131	TS 53.4	Side Windows, Materials, Anti-Vandalism Sacrificial Film	Certification	Proposal Period	All glazing material that is aft of the front standee line, and in front of the exit door, shall be equipped with an interior single layer 6 mil minimum laminated film. All glazing material that is aft of, and including, the exit door shall be equipped with an interior four layer laminated film. Both types of window film installations are subject to LACMTA approval...
132	TS 54	HVAC, Capacity and Performance	Test Documentation	Prior to Pilot Vehicle Acceptance	<p>The HVAC climate control system shall be modular design and capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs.</p> <p>With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall control the average passenger compartment temperature within a range between 65 ° and 80°F, while maintaining the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10 ° to 95 °F and at any ambient relative humidity levels between 5 and 50 percent.</p> <p>System capacity testing, including pull-down/warm-up, stabilization and profile, shall be conducted in accordance to the APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System."</p>
133	TS 56.2	HVAC, Driver's Area	Test Documentation	Prior to Pilot Vehicle Acceptance	The windshield defroster unit shall meet the requirements of SAE Recommended Practice J381, "Windshield Defrosting Systems Performance Requirements," and shall have the capability of diverting heated air to the driver's feet and legs. The defroster or interior climate control system shall maintain visibility through the driver's side window.
134	TS 56.3	HVAC, Controls for the Climate Control System	Documents, Drawings	Proposal Period	Heater water control valves shall be "positive" type, when closed. The method of operating remote valves shall be subject to LACMTA approval...
135	TS 57	HVAC, Air Filtration	Certification	Pre-production Meetings	Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.2 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service.

Item	Section	Title	Deliverable	Schedule	Requirement
136	TS 62.3	Design, Curb Feelers	Sample	Upon Request	Curb feeler sample shall be provided to Contractor upon request.
137	TS 62.3	Design, Curb Feelers	Demonstration	Pilot Vehicle at Factory	Installation of curb feeler shall be subject to LACMTA approval...
138	TS 66	License Plate Provisions	Documents, Drawings	Pre-production Meetings	These provisions shall direct-mount or recess the license plates so that they can be cleaned by automatic bus-washing equipment without being caught by the brushes, subject to LACMTA approval...
139	TS 69.1	Service Compartments & Access Doors, Access Doors	Documents, Drawings	Pre-production Meetings	The fuel fill/charge port door shall be hinged at the top and shall open fully up against the side of the Bus subject to LACMTA approval...
140	TS 70.2	Bumpers, Front Bumper	Certification	Pre-production Meetings	No part of the bus, including the bumper, shall be damaged as a result of a five (5) mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's longitudinal centerline. The bumper shall return to its pre-impact shape within ten minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 310 loaded to 4,000 lbs parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30-degree angle to the longitudinal centerline of the bus.
141	TS 70.3	Bumpers, Rear Bumper	Certification	Pre-Production Meetings	No part of the bus, including the bumper, shall be damaged as a result of a two mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within ten minutes of the impact. When using a yard tug with a smooth, flat plate bumper two feet wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to five mph, over pavement discontinuities up to one inch high, and at accelerations up to two mph/sec. The rear bumper shall protect the bus, when impacted anywhere along its width by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lbs, at four mph parallel to or up to a 30-degree angle to, the longitudinal centerline of the bus.
142	TS 70.5	Bicycle Rack	Documents, Drawings	Pre-Production Meetings	The installed bicycle rack shall not interfere with towing the Bus. California Code Title 13 requires that bike racks be installed with a way for the Operator to determine whenever the bike rack is deployed.

Item	Section	Title	Deliverable	Schedule	Requirement
143	TS 71.1	Finish and Color, Appearance	Documentation	Pre-production Meetings/Pilot Vehicle	Contractor shall utilize the LACMTA's existing local color scheme in its exterior paint design, (see Technical Specification Attachment 1-Metro Local Exterior and Interior Fleet Standards for reference). Exterior colors shall be applied over a white base color. The manufacturer shall submit for MTA's approval, a drawing showing painting layout including striping bends and breaks, during Pre-Production meetings. The Pilot Bus shall be painted according to this color scheme for approval by the LACMTA prior to application to the remainder of the buses..
144	TS 71.1	Finish and Color, Appearance	Documentation	With Each Vehicle	Exterior painted surfaces shall have a minimum of 0.5-mil thick primer coat and a minimum 2.5-mil thick finish coat. Mil thickness shall conform to paint manufacturer's specifications.
145	TS 72.1	Decals, Numbering and Signing, Passenger Information	Documents, Drawings	Pre-production Meetings	"Take One" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the minimum "Take Twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval...
146	TS 73.2	Exterior Lighting, Doorway Lighting	Test Documentation	Pilot Vehicle Prior to Production	Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than one foot-candle for a distance of threefeet outward from the outboard edge of the door threshold with a passenger standing in the threshold. The lights must be positioned overhead and shall be shielded to protect passengers' eyes from glare.
147	TS 73.4	Exterior, Lighting, Headlights	Documents, Drawings	Proposal Period	Lenses shall be resistant to hazing and yellowing, and have proper hardness to resist surface scratches and stone chips, subject to LACMTA approval...
148	TS 74	Interior Panels & Finishes, General Requirements	Documents, Drawings	Proposal Period	Additional anti-graffiti/vandalism treatments shall be applied to interior surfaces, subject to LACMTA approval...
149	TS 75.	Interior Panels	Certification	Preproduction Meetings	Interior panel required to meet FMVSS 302. Materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision.
150	TS 75	Interior Panels	Documents, Drawings	Proposal Period	Panels in other areas of the bus shall be stainless or other material as determined to best match appearance with the rear section of the bus subject to LACMTA approval...
151	TS 75.2	Interior Panels, Modesty Panel	Certification	Pilot Vehicle Prior To Production	The modesty panel and its mounting shall withstand a static force of 250 lbs applied to a four inch x four inch area in the center of the panel without permanent visible deformation.

Item	Section	Title	Deliverable	Schedule	Requirement
152	TS 75.2	Interior Panels, Modesty Panel	Inspection	Pilot Vehicle at Factory	At the rear door area a clear non-glass panel from above the modesty panel to the top of the daylight opening and attached to the stanchion.
153	TS 75.4	Interior Panels, Rear Bulkhead	Documents, Drawings	Proposal Period	Ceiling and enclosures adjacent to ceiling shall be made of durable, corrosion resistant, easily cleanable material subject to LACMTA approval...
154	TS 75.8	Interior Panels, Floor Covering	Certification	Preproduction Meetings & Pilot Vehicle at Factory	All interior floor areas shall be covered with a combination of gray color smooth and ribbed slip resistant rubber or equivalent floor covering that remains effective in all weather conditions with 12-year unconditional warranty, subject to LACMTA approval.
155	TS 75.8	Interior Panels, Floor Covering	Documents, Drawings	Proposal Period	The edge of any interior steps shall have minimal overhang. Special coating for the step tread section may be acceptable subject to LACMTA approval...
156	TS 75.9	Interior Panels, Interior Lighting	Documents, Drawings	Proposal Period	The lighting system shall meet FCC Part 18; Class A regulation for EMI conducted and radiated emissions. The interior lighting design shall be subject to LACMTA approval.
157	TS 75.12	Interior Panels, Seating Area(s) (Transit Bus)	Test Documentation	Pilot Vehicle Prior to Production	The interior lighting system shall provide a minimum 15 foot-candle illumination on a one square- foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be seven foot-candles.
158	TS 75.14	Interior Panels, Vestibules/Doors (Transit Bus)	Test Documentation	Pilot Vehicle Prior to Production	Floor surface in the aisles shall be a minimum of 10 foot-candles, and the vestibule area a minimum of four foot-candles with the front doors open and a minimum of two foot-candles with the front doors closed. The front entrance area and curb lights (if needed) shall illuminate when the front door is open and master run switch is in the "lights" positions. Rear exit area and curb lights shall illuminate when the rear door is unlocked
159	TS 75.16	Interior Panels, Step Lighting	Test Documentation	Pilot Vehicle Prior to Production	Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of four foot-candles and shall illuminate in all engine run positions.

Item	Section	Title	Deliverable	Schedule	Requirement
160	TS 75.17	Interior Panels, Ramp Lighting (Transit Bus)	Test Documentation	Pilot Vehicle Prior to Production	Exterior and interior ramp lighting shall comply with CFR Part 49, Section 38.31. Lights shall be provided at the doorway equipped with the wheelchair access system to floodlight the loading area. The light shall be wired through the ramp master toggle switch on the driver's dash and shall automatically illuminate when this switch is in the "On" position. During ramp operation, the street surface shall be illuminated to a minimum of six candlepower a distance of three (3) feet beyond the external dimensions of the ramp platform once deployed.
161	TS 75.19.1	Farebox Lighting, Transit Bus	Test Documentation	Pilot Vehicle Prior to Production	A light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. The light shall illuminate the top of the fare box and the surrounding floor area to a minimum of 15 foot-candles.
162	TS 76	Fare Collection	Documents, Drawings	Pre-Production Meetings	The Contractor shall provide and install GFI Genfare Odyssey Validation farebox base plate, power leads and ITS interface cable, subject to LACMTA approval...
163	TS 76	Fare Collection	Documents, Drawings	Pre-Production Meetings	A one-inch inside diameter waterproof conduit shall be provided from the ITS enclosure to the farebox base plate mounting location, through the Bus floor, to protect the power leads and ITS interface cable, subject to LACMTA approval...
164	TS 77	Interior Access Panels and Doors (Transit Bus)	Documents, Drawings	Pre-Production Meetings	Removal of fixtures or equipment unrelated to the repair task to gain access shall be precluded or used only subject to LACMTA approval...
165	TS 77	Interior Access Panels and Doors (Transit Bus)	Documents, Drawings	Pre-Production Meetings	Access doors shall be hinged with gas props or nover-center springs, where practical, to hold the doors out of the mechanic's way subject to LACMTA approval during pre-production meetings. All overhead doors shall be hinged at the top and shall be prevented from coming loose or opening during transit service or in bus cleaning operations. Panel fasteners shall be standardized so that only one tool is required to service all special fasteners within the Bus subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
166	TS 78.13	Passenger Seating, Structure and Design	Test Documentation	Pre-Production Meetings	Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 lbs applied anywhere along their length with less than ¼-inch permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 lbs with less than ¼-inch permanent deformation and without visible deterioration.
167	TS 78.15	Passenger Seating, Construction and Materials	Documents, Drawings	Pre-Production Meetings	Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners and is subject to LACMTA approval...
168	TS 79.	Passenger Assists, (Transit Bus)	Demonstration	Pilot Vehicle at Factory	Passenger assists shall be convenient in location, shape, and size for both the 95th-percentile male and the 5th-percentile female standee.
169	TS 79.1	Assists (Transit Bus)	Certification & Test Documentation	Pre-Production Meetings	Passenger assists shall be capable of passing the NHTSA Drawstring Test. A crash resulting in a one- foot intrusion shall not produce sharp edges, loose rails, or other potentially dangerous conditions associated with a lack of structural integrity of the assists.
170	TS 79.1	Assists, (Transit Bus)	Test Documentation	Pre-Production Meetings	Assists shall withstand a force of 300 lbs applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation.
171	TS 79.1	Assists, (Transit Bus)	Inspection	Pilot Vehicle at Factory	All passenger assists shall permit a full hand grip with no less than 1½ inches of knuckle clearance around the assist.
172	TS 79.3	Vestibule (Transit Bus)	Demonstration	Pilot Vehicle at Factory	The front assist should not impede wheelchair boarding and provide adequate clearance and access to the farebox during vaulting and maintenance.
173	TS 79.6	Longitudinal Seat Assists (Transit Bus)	Documents, Drawings	Pre-Production Meetings	A vertical assist or grabrail shall be provided convenient to the outer rear settee seats if they are immediately behind an aisle facing seat subject to LACMTA approval...
174	TS 80.1	Passenger Doors, Transit Bus	Documents, Drawings	Proposal Period	All passenger door components, except door panels and glazing, must come from one single manufacture, subject to LACMTA approval...
175	TS 81.1	Accessibility Provisions, Loading Systems	Documents, Drawings	Proposal Period	Bus shall utilize a low-floor fully electrically operated, preferably self-leveling wheelchair ramp system subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
176	TS 81.3	Accessibility Provisions, Lift	Test Documentation	Pre-Production & Pilot Vehicle Prior To Production	<p>The loading platform shall be covered with a replaceable or renewable nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading.</p> <p>Deployment or storage of the ramp shall require no more than 15 seconds.</p> <p>Each operation shall require continuous manual pressure to the momentary switch by the operator and shall not allow unintentional improper access system operation. The device shall function without failure or adjustment for 500 cycles or 5,000 miles in all-weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 35 lbs of force.</p>
177	TS 81.5	Wheelchair Accommodations	Documents, Drawings	Proposal Period	Forward facing wheelchair securement and occupant restraint systems shall be the QPod or approved equal, subject to LACMTA approval...
178	TS 81.5.2	Wheelchair Accommodations, Rear Facing	Documents, Drawings	Pre-Production Meetings	Fabric covering on the padded barrier shall be blue, subject to LACMTA approval.
179	TS 83	Signage and Communication, Destination Signs	Documents, Drawings	Pre-Production Meetings	<p>The destination sign compartments shall meet the following minimum requirements.</p> <p>Compartments shall be designed to prevent condensation and entry of moisture and dirt.</p> <p>Compartments shall be designed to prevent fogging of both compartment window and glazing on unit itself.</p> <p>Access shall be provided to allow cleaning of inside compartment window and unit glazing, subject to LACMTA approval in Pre-Production meetings.</p> <p>Front window exterior display area shall be sized to allow full visibility of the front destination sign.</p>
180	TS 83.	Destination Signs, (Programming)	Deliverable	Pilot Vehicle Delivery in L.A.	Software shall be furnished for programming the sign system via an IBM compatible lap-top computer.

Item	Section	Title	Deliverable	Schedule	Requirement
181	TS 84.1	Passenger Information, Interior Displays	Documents, Drawings	Pre-Production Meetings	"Take one" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the minimum "take twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval...
182	TS 85.1	Passenger Stop Request/Exit Signal	Documents, Drawings	Pre-Production Meetings	A minimum of twelve stop request signal buttons utilizing a yellow housing shall be evenly distributed in the passenger cabin to be functionally accessible to all seated passengers subject to LACMTA approval...
183	TS 85.1	Passenger Stop Request/Exit Signal	Documents, Drawings	Proposal Period	Pricing for the installation of a wireless pushbutton switch system shall be provided on PF-1 Form, Schedule of Optional Vehicle Configuration.
184	TS 86	Communications	Documents, Drawings	Pre-Production Meetings	Service light(s) with suitable switch shall be provided within the enclosure, subject to LACMTA approval.
185	TS 86.1	Camera Surveillance System	Demonstration	Pilot Vehicle at Factory	A day-to-night demonstration shall be required to establish camera performance and final placement for optimum views and clarity. The LACMTA shall witness the demonstration and approve the final placement of the cameras. This demonstration must be successfully completed prior to approval of the pilot bus(s).
186	TS 86.1	Camera Surveillance System, Interior Cameras	Documents, Drawings	Pre-Production Meetings	Front interior camera(s) at front door passenger boarding area shall record audio subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
187	TS 86.1	Camera Surveillance System, Interior Cameras, Exterior Cameras	Documentation	Pilot Vehicle at Factory	<p>Cameras shall be placed for best recording of the following five (5) areas:</p> <ul style="list-style-type: none"> a) Forward 1/3 of passenger area, view of front vestibule, farebox transactions and field of view to include operator and image of bus number located on operator's barrier b) Front door, passenger boarding c) Rear door, passenger exiting d) Middle 1/3 passenger area e) Rear 1/3 passenger seating area starting from behind rear door with a primary emphasis on the rearmost seats. <p>Cameras shall be placed for best recording of the following four (4) areas:</p> <ul style="list-style-type: none"> a) Forward looking through windshield (Accident Surveillance) b) The curb side area of the Bus, (including exit door), and street from ten feet beyond front bumper to ten feet beyond rear bumper c) Street side area of the Bus and street from ten feet beyond the front bumper to ten feet beyond the rear bumper d) Rear camera shall view the ground behind the Bus from the bumper to approximately 25 feet back
188	TS 86.1	Exterior Cameras	Demonstration	Pilot Vehicle at Factory	Camera positions and adjustment are subject to LACMTA approval...
189	TS 86.1	Camera Monitor	Documentation	Pre-Production Meetings	Final monitor configuration is subject to LACMTA approval during pre-production meetings.
190	TS 86.1	Camera Surveillance System, Central Processor	Inspection	Pilot Vehicle at Factory	The video security system central processor shall be packaged in a suitable ventilated shock mounted and splash resistant enclosure keyed to LACMTA standards, located within the ITS enclosure, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
191	TS 86.1	System Management Tool	Documentation	Pre-Production Meetings	shall incorporate a system management tool for; wireless download of video files in a timely manner, software upgrades, camera checks, configuration changes and health reports as required. Final configuration is subject to LACMTA approval.
192	TS 86.1	System Management Tool	Documentation	Proposal Period	Pricing of the system management tool for use at up to 13 LACMTA operating divisions shall be provided to the LACMTA on Price Form PF-4, Schedule C of Prices of Diagnostic Test Equipment.
193	TS 86.1	Enhanced Video Recording System Option	Documentation	Proposal Period	Pricing for optional features to enhance the video recording system shall be provided on Price Form PF-1, Schedule of Optional Vehicle Configuration. Ability of video system to analyze and discern events such as wheelchair passengers and generate report information with summary data such as wheelchair passenger count and boarding/alighting locations. The ability to utilize the dash mounted display for diagnostic work or configuration changes on the DVR. Incorporation of a 360 degree camera(s) for better surveillance of bus interior.
194	TS 86.2	Public Address System	Documentation	Pre-Production Meetings	The location of the gooseneck microphone is subject to LACMTA approval in pre-production meetings.
195	TS 86.3	Automatic Passenger Counter (APC)	Documentation	Pre-Production Meetings	Provisions and necessary cables for installation of door sensors and analyzer(s) for IRMA-3 infrared APC system shall be provided subject to LACMTA approval.
196	TS 86.3	Automatic Passenger Counter (APC)	Documentation	Proposal Period	As an option, LACMTA may consider incorporating an installation of IRMA-Matrix infrared APC System. Pricing to include; installation, cabling, door sensors, analyzer(s), software, integration testing, first article acceptance and any other items necessary for proper operation shall be submitted on form PF-1, Schedule of Optional Vehicle Configuration.
197	TS 86.4.4	Emergency Alarm	Documentation	Pre-Production Meetings	SAS switch location and lead wire routing is subject to LACMTA approval...
198	TS 86.8	ITS Provisions, WLAN	Documentation	Pre Production Meetings	Sierra Wireless InMotion MG90 or an approved equal wireless router/switch and feedline shall be installed, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
199	TS 86.9	ITS Provisions, Radio Antennas	Documentation	Pre-Production Meetings	The antenna mounting and lead termination shall be accessible from the Bus interior, subject to LACMTA approval...
200	TS 86.10	ITS Provisions, Global Positioning System (GPS)	Documentation	Pre-Production Meetings	The GPS Antenna shall be mounted on the centerline of the roof of the bus near the front, with a quick disconnect, within two feet from the antenna, for future replacement subject to LACMTA approval... See TS 88.1 Approved Equals.
201	TS 86.11	ITS Provisions, IBSS	Documentation	Pre-Production Meetings	Battery and ignition power and a separate J1939 communication connection shall be supplied in the ITS enclosure, subject to LACMTA approval...
202	TS 88.2	Maintainability Requirements	Demonstration	Pilot Vehicle at Factory and in LA	The Contractor shall be required to demonstrate these maintenance tasks using the information contained in the service and parts manuals.



Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

MAEL-019

Response Required: No

Date: March 19, 2018

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 5
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES

Reference: MAEL-014, 017; ELMA-028; 032; 034

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan
Phil Rabottini

CDRL NO.: n/a

MAEL-019

DATE: March 19, 2018

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 5

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 5 to Contract No.: OP28367-000 is made effective on the 12th day of February 2018 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017 and Contract Modification No. 4 dated January 19, 2018 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Change in the rear axle model from Meritor 71000 to Meritor 79000, and retrofit of two pilot buses with upgraded rear axle model for an aggregate increase of \$355,714 in the total Contract Price from \$198,691,975 to \$199,047,689. Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of ~~\$198,691,975~~ **\$199,047,689** inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.


2. Revised Pricing Forms: PF 1 and PF-1A as attached to this modification no. 5.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 5 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

TOUY WAYNE
Type or Print Name

8/12/18
Date

By: Elizabeth Hernandez
Elizabeth Hernandez
Principal Contract Administrator

3/19/18
Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 Contract Modification No. 5

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

		Taxable				
No.	Qty.	Description of Item	Unit Price	Unit Price	Total Price	
1	295	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A*:	\$595,257.25	\$614,997	\$181,424,188.75	
1a	Lot	Manuals (Base Buy) (TS 5.6.4)	\$2,281.50	Lump Sum	\$23,400.00	
1b	295	Vehicle Delivery Charge for Base Buy		\$275.00	\$81,125.00	
1c		Tax (Base Buy)	9.75%	\$58,037.58	\$17,123,368	
2	2	Pilot Buses Retrofit with Rear Axle Upgrade		\$8,600	\$17,201	
2a		Tax	9.75%	\$838.55	\$1,677	
3	Lot	Reserved				
4	Lot	Reserved				
5	Lot	Reserved				
6	Lot	Reserved				
7	Lot	Performance Bond (Base Buy)		Lump Sum	\$119,336.00	
8	1,000	Total Training Hours for Base Buy***		\$175,000.00		
8a	900	Contractor (Proposer/Prime) Base Buy		\$175.00	\$157,500.00	
8b	100	Subcontractor/Supplier Base Buy		\$175.00	\$17,500.00	
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1		\$74,930.00	\$74,930.00	
10a	15	Special Towing Equipment (TS 25)		\$386.00	\$5,790.00	
10b		Tax	9.75%	\$37.64	\$564.53	
11a	2	Rear Recovery Devices/Tie Downs (TS 25)		\$505.00	\$1,010.00	
11b		Tax	9.75%	\$49.24	\$98.48	
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation						
In U.S. Dollars Using Words:					ONE HUNDRED NINETY-NINE MILLION FORTY SEVEN THOUSAND SIX HUNDRED SIXTY TWO DOLLARS	
In U.S. Dollars Using Figures:					\$199,047,689	

LACMTA
 CONTRACT NO. OP28367-000
 GA12-93

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 5

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 5

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles*	\$595,257.38	\$187,574,161.25
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$2,281.50	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy	\$0.00	\$0.00
10c		Tax (Option Buy)	9.75%	\$17,703,747.84
11		Reserved	\$	\$
12	Lot	Performance Bond for Option Buy***	\$	\$
13	500	Total Training Hours for Option Buy****	\$87,500.00	\$87,500.00
13a	450	Contractor (Proposer/Prime) Option Buy	\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy	\$175.00	\$8,750.00
14		Reserved	\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation				
In U.S. Dollars Using Words:			TWO-HUNDRED FIVE MILLION TWO HUNDRED FORTY SEVEN THOUSAND EIGHT HUNDRED NINETY ONE DOLLARS	
In U.S. Dollars Using Figures:			\$205,596,105	

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only. Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 Contract Modification No. 5

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION

No.	Qty.	Description of Item	Unit Price	Total Price
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)		\$6,370.00
15a		Direct Materials/Equipment	\$5,750.00	
15b		Labor Installation Costs	\$620.00	
15c		Non Recurring Cost	\$0.00	
15d		Other Costs (Identify)	\$0.00	
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)		\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00	
16b		Labor Installation Costs	\$1,020.00	
16c		Non Recurring Cost	\$0.00	
16d		Other Costs (Identify)	\$0.00	
17	600	Reserved****		
17a	295	Reserved		
17b	305	Reserved		
18	600	25-Year Certified CNG Tanks		\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$870.00	
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$870.00	
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)		\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00	
19b	295	Labor Installation Costs for Base Buy APC	\$460.00	

LACMTA
 CONTRACT NO. OP28367-000
 GA12-93

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 5

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

19c	295	Non Recurring Cost for Base Buy APC	\$	
19d	295	Other Costs (Identify) for Base Buy APC	\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles	\$4,136.00	
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles	\$460.00	
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles	\$	
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles	\$	
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)		\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System	\$869.00	
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System	\$86.00	
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System	\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System	\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$869.00	
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$96.00	
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00
21	600	USB Ports for Passenger Charging Only		\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00

LACMTA
CONTRACT NO. OP28367-000
GA12-93

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 Contract Modification No. 5

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

22	600	Optional Wireless Stop Request Switches (Bus set)		\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00
22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00
23	600	Optional Full Color Destination Sign Sets (TS 86.3)		\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00
24	Lot	Spare Parts (From Schedule A, Form PF-2)		\$2,203,445.65
25	Lot	Special Tools (Schedule B Form PF-3)		\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)		\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)		\$958,460.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.				
TEN-MILLION FORTY EIGHT THOUSAND SEVEN HUNDRED SIXTY FIVE DOLLARS & SIXTY-FIVE CENTS				
In U.S. Dollars Using Words:			In U.S. Dollars Using Figures: \$10,048,765.65	

**** Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:

ISL G engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx)	Particulate Matter (PM) grams per brake horsepower hour
Grams per brake horsepower-hour	0.01
0.02	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No. 5

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

No.	Qty.	Description of Item	Total Price
1.0		Total Price for CONTRACT for 295 Base Buy Buses to be the BASIS for Price Proposal evaluation	\$199,047,689
2.0		Total Price for CONTRACT for 150 Up to 305 Option Buy Buses to be the BASIS for Price Proposal evaluation	\$205,596,105
3.0		Total Price for OPTIONAL VEHICLE CONFIGURATION for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation	\$10,048,766
4.0		Total Price for CONTRACT for 295 Base Buy Buses, for 150 up to 305 Option Buy Buses, and Optional Vehicle Configuration for Optional Equipment combined to be the overall BASIS for Price Proposal evaluation	
In U.S. Dollars Using Words:			
FOUR-HUNDRED THIRTEEN MILLION NINE HUNDRED EIGHTY EIGHT THOUSAND SIX HUNDRED THIRTY ONE DOLLARS			
In U.S. Dollars Using Figures:			\$414,692,560

[Signature] (Signature of Person Executing Proposal) 3/12/12 Date

TONY WAYNE VICE PRESIDENT & GENERAL MANAGER
Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES

FORM PF-1A (CNG - 40')

SUBSYSTEM EQUIPMENT

CONTRACT MODIFICATION NO. 5

Contractor: **ELDORADO NATIONAL (CALIFORNIA), INC**

Contract No.: **OP28367-000**

BASE BUY		
NO.	DESCRIPTION OF ITEM	
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **	
1.1	TS 9. Propulsion Power Assembly (PPA)***	\$18,372
1.2	TS 9. Engine	\$60,324
1.3	TS 10. Cooling System	\$12,650
1.4	TS 18. Fuel System	\$68,300
1.5	TS 31. Suspension	\$19,950
1.6	TS 33. Steering System	\$4,950
1.7	TS 37. Brakes	\$3,260
1.8	TS 39. Pneumatic System	\$6,850
1.9	TS 42. Charging System	\$36,800
1.10	TS 44. Multiplex Control System	\$24,200
1.11	TS 54. HVAC Climate Control System	\$29,450
1.12	TS 78. Passenger Seats	\$28,955
1.13	TS 80. Doors	\$14,830
1.14	TS 81. Accessibility Provisions	\$19,740
1.15	TS 86. Communications	\$3,244
1.16	TS 11. Transmission	\$14,261
1.17	TS 78.1 USB Passenger Charging Port	\$480
1.18	TS 85.1 Wireless Stop Request Button	\$485
1.19	TS 86.3 Matrix APC	\$4,596
1.99	TS 34. Meritor Rear Axle Upgrade	\$1,040
	All other bus subsystem equipment not included above	\$242,260
TOTAL CNG BUS PRICE		\$614,997.25
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 1 - Base Buy		

- Notes:** 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
2. Price for line item Nos. 1a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40')
SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO. 5


OPTION BUY	
NO.	DESCRIPTION OF ITEM
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **
2.1 TS 9.	Propulsion Power Assembly (PPA)***
2.2 TS 9.	Engine
2.3 TS 10.	Cooling System
2.4 TS 18.	Fuel System
2.5 TS 31.	Suspension
2.6 TS 33.	Steering System
2.7 TS 37.	Brakes
2.8 TS 39.	Pneumatic System
2.9 TS 42.	Charging System
2.10 TS 44.	Multiplex Control System
2.11 TS 54.	HVAC Climate Control System
2.12 TS 78.	Passenger Seats
2.13 TS 80.	Doors
2.14 TS 81.	Accessibility Provisions
2.15 TS 86.	Communications
2.16 TS 11	Transmission
2.17 TS 78.1	USB Passenger Charging Port
2.18 TS 85.1	Wireless Stop Request Button
2.19 TS 86.3	Matrix APC
1.99 TS 34	Meritor Rear Axle Upgrade
	All other bus subsystem equipment not included above
TOTAL CNG BUS PRICE OPTION QUANTITY	
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, -line item 10 - Option Buy)	

\$614,997

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY(Form PF-1) shall not be included in computing price of any of the line items above.

3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99

 3/24/12 Date
 (Signature of Person Executing Proposal)
TONY WAYNE /VICE PRESIDENT & GENERAL MANAGER
 Type Name, Title



Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

MAEL-024

Response Required: No

Date: May 3, 2018

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 5
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES**

Reference: MAEL-022, 023, ELMA-026

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan
Phil Rabottini

CDRL NO.: n/a

MAEL-024

DATE: May 3, 2018

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 6

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 6 to Contract No.: OP28367-000 is made effective on the 23rd day of April 2018 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, and Contract Modification No. 5 dated February 12, 2018 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Revise SP-05 as follows:

SP-05 APPROVED SUBCONTRACTORS

Subcontractor	Services Performed	DBE/ MBE/ WBE
Amerex- Kidde Technologies, Inc.	Methane Gas Detection System	

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 6 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By: _____

Signature

Tony Warner

Type or Print Name

4/30/18
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: _____

Elizabeth Hernandez

Principal Contract Administrator

5/3/18
Date



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-030

Response Required: No

Date: October 12, 2018

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 7
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES**

Reference: MAEL-029, 023, ELMA-044; 046

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at
hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan

CDRL NO.: n/a

MAEL-030

DATE: October 12, 2018

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 7

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 7 to Contract No.: OP28367-000 is made effective on the 3RD day of October 2018 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018 and Contract Modification No. 6 dated April 23, 2018 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Change bike rack from Sportworks Apex 3 to Byk Rak 3 position for an aggregate decrease of \$102,361, inclusive of applicable taxes, in the total Contract Price from \$199,047,689 to \$198,945,328. Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of ~~\$199,047,689~~ **\$198,945,328** inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. Revised Pricing Forms: PF 1, PF-1A and PF 2 as attached to this modification no. 7.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 7 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By: _____



**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington

Signature

Tony Wayne

Type or Print Name

10/10/18

Date

Chief Executive Officer

By: Elizabeth Hernandez

Elizabeth Hernandez
Principal Contract Administrator

10/12/18

Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 7

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

1.0 CONTRACT FOR 295 BUSES (BASE BUY)				Taxable		
No.	Qty.	Description of Item	Unit Price	Unit Price	Total Price	
1	295	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A**	\$594,941.09	\$614,681	\$181,330,921.55	
1a	Lot	Manuals (Base Buy) (TS 5.6.4)	\$2,281.50	Lump Sum	\$23,400.00	
1b	295	Vehicle Delivery Charge for Base Buy Value of all taxable delivery charges per bus**		\$275.00	\$81,125.00	
1c		Tax (Base Buy)	9.75%	\$58,006.76	\$17,114,275	
2	2	Pilot Buses Retrofit with Rear Axle Upgrade		\$8,600	\$17,201	
2a		Tax	9.75%	\$838.55	\$1,677	
3	Lot	Reserved				
4	Lot	Reserved				
5	Lot	Reserved				
6	Lot	Reserved				
7	Lot	Performance Bond (Base Buy)		Lump Sum	\$119,336.00	
8	1,000	Total Training Hours for Base Buy***		\$175,000.00		
8a	900	Contractor (Proposer/Prime) Base Buy		\$175.00	\$157,500.00	
8b	100	Subcontractor/Supplier Base Buy		\$175.00	\$17,500.00	
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1		\$74,930.00	\$74,930.00	
10a	15	Special Towing Equipment (TS 25)		\$386.00	\$5,790.00	
10b		Tax	9.75%	\$37.64	\$564.53	
11a	2	Rear Recovery Devices/Tie Downs (TS 25)		\$505.00	\$1,010.00	
11b		Tax	9.75%	\$49.24	\$98.48	
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of items "1" through "11b") to be the BASIS for Price Proposal evaluation						
In U.S. Dollars Using Words:						
ONE HUNDRED NINETY-EIGHT MILLION NINE HUNDRED FORTY FIVE THOUSAND THREE HUNDRED TWENTY EIGHT DOLLARS						
In U.S. Dollars Using Figures:					\$198,945,328	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 7

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 7

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles*	\$594,941.22	\$614,681
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$2,281.50	Lump Sum
10b	305	Vehicle Delivery Charge for Option Buy	\$0.00	\$275.00
10c		Tax (Option Buy)	9.75%	\$58,006.77
11		Reserved	\$	\$
12	Lot	Performance Bond for Option Buy***		Lump Sum
13	500	Total Training Hours for Option Buy****	\$87,500.00	\$87,500.00
13a	450	Contractor (Proposer/Prime) Option Buy	\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy	\$175.00	\$8,750.00
14		Reserved	\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation				
In U.S. Dollars Using Words:			TWO-HUNDRED FIVE MILLION FOUR HUNDRED NINETY THOUSAND TWO HUNDRED SEVENTY FOUR DOLLARS	
In U.S. Dollars Using Figures:			\$205,490,274	

NOTE * Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
 Contract Modification No.: 7

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION			Unit Price	Total Price
No.	Qty.	Description of Item		
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)		\$6,370.00
15a		Direct Materials/Equipment	\$5,750.00	
15b		Labor Installation Costs	\$620.00	
15c		Non Recurring Cost	\$0.00	
15d		Other Costs (Identify)	\$0.00	
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)		\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00	
16b		Labor Installation Costs	\$1,020.00	
16c		Non Recurring Cost	\$0.00	
16d		Other Costs (Identify)	\$0.00	
17	600	Reserved****		
17a	295	Reserved		
17b	305	Reserved		
18	600	25-Year Certified CNG Tanks		\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$870.00	
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$870.00	
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)		\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00	
19b	295	Labor Installation Costs for Base Buy APC	\$460.00	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 7

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

19c	295	Non Recurring Cost for Base Buy APC	\$	
19d	295	Other Costs (Identify) for Base Buy APC	\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles		\$4,136.00
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles		\$460.00
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles	\$	
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles	\$	
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)		\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System	\$869.00	
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System	\$96.00	
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System	\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System	\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$869.00	
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$96.00	
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00
21	600	USB Ports for Passenger Charging Only		\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00

LACMTA
CONTRACT NO. OP28367-000
GA12-93

**GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 7**

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

22	600	Optional Wireless Stop Request Switches (Bus set)		\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00
22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00
23	600	Optional Full Color Destination Sign Sets (TS 86.3)		\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00
24	Lot	Spare Parts (From Schedule A, Form PF-2)		\$2,203,445.65
25	Lot	Special Tools (Schedule B Form PF-3)		\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)		\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)		\$958,460.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.				
In U.S. Dollars Using Words:			TEN-MILLION FORTY EIGHT THOUSAND SEVEN HUNDRED SIXTY FIVE DOLLARS & SIXTY-FIVE CENTS	
In U.S. Dollars Using Figures:			\$10,048,765.65	

**** Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:
ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx)	Particulate Matter (PM) grams
Grams per brake horsepower-hour	per brake horsepower hour
0.02	0.01

Page 7 of 7

GROUP A - UP TO 600 40' CNG BUSES

FORM PF-1A (CNG - 40')

SUBSYSTEM EQUIPMENT

CONTRACT MODIFICATION NO. 7

Contractor: ELDORADO NATIONAL (CALIFORNIA), INC

Contract No.: OP28367-000

BASE BUY	
NO.	DESCRIPTION OF ITEM
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **
1.1 TS 9.	Propulsion Power Assembly (PPA)***
1.2 TS 9.	Engine
1.3 TS 10.	Cooling System
1.4 TS 18.	Fuel System
1.5 TS 31.	Suspension
1.6 TS 33.	Steering System
1.7 TS 37.	Brakes
1.8 TS 39.	Pneumatic System
1.9 TS 42.	Charging System
1.10 TS 44.	Multiplex Control System
1.11 TS 54.	HVAC Climate Control System
1.12 TS 78.	Passenger Seats
1.13 TS 80.	Doors
1.14 TS 81.	Accessibility Provisions
1.15 TS 86.	Communications
1.16 TS 11	Transmission
1.17 TS 78.1	USB Passenger Charging Port
1.18 TS 85.1	Wireless Stop Request Button
1.19 TS 86.3	Matrix APC
1.99 TS 34	Meritor Rear Axle Upgrade
	All other bus subsystem equipment not included above
TOTAL CNG BUS PRICE	
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line Item 1 - Base Buy	
	\$614,681

- Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
2. Price for line item Nos. 1a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40')
SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO. 7

OPTION BUY	
NO.	DESCRIPTION OF ITEM
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **
2.1	Propulsion Power Assembly (PPA)***
2.2	Engine
2.3	Cooling System
2.4	Fuel System
2.5	Suspension
2.6	Steering System
2.7	Brakes
2.8	Pneumatic System
2.9	Charging System
2.10	Multiplex Control System
2.11	HVAC Climate Control System
2.12	Passenger Seats
2.13	Doors
2.14	Accessibility Provisions
2.15	Communications
2.16	Transmission
2.17	USB Passenger Charging Port
2.18	Wireless Stop Request Button
2.19	Matrix APC
1.99	Meritor Rear Axle Upgrade
TS 34	All other bus subsystem equipment not included above
TOTAL CNG BUS PRICE OPTION QUANTITY	
*Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 10 - Option Buy)	
\$614,681	

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99



 (Signature of Person Executing Proposal)
TONY WAYNE MICE PRESIDENT & GENERAL MANAGER
 Type Name, Title

10/10/18
 Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 7

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
LOW NOX ENGINE					
1	Ea.	Propulsion Power Assembly (See Definition in SP-1)	3	\$86,270.00	\$258,810.00
2	Ea.	Air Compressor	5	\$6,760.00	\$33,800.00
3	Ea.	Turbo	3	\$1,982.00	\$5,946.00
4	Ea.	EGR Cooler	20	\$1,110.47	\$22,209.40
5	Ea.	EGR Valve	10	\$610.68	\$6,106.80
6	Ea.	Delta P Sensor	10	\$347.66	\$3,476.60
7	Ea.	Mass. Air Flow Sensor	10	\$1,067.56	\$10,675.60
8	Ea.	Oxygen Sensor	20	\$223.61	\$4,472.20
9	Ea.	Catalyst	5	\$3,574.95	\$17,874.75
10	Ea.	Cylinder Head	5	\$4,513.81	\$22,569.05
11	Ea.	Pistons Kits	60	\$325.00	\$19,500.00
12	Bus Set	Rod Bearings	10	\$64.00	\$640.00
13	Bus Set	Main Bearing	10	\$219.27	\$2,192.70
14	Ea.	Liners	60	\$191.87	\$11,512.20
15	Ea.	Head Gasket	5	\$428.75	\$2,143.75
16	Ea.	Upper Gasket Set	5	\$844.99	\$4,224.95
17	Ea.	Oil Pan Gasket	20	\$133.60	\$2,672.00
18	Ea.	Stiffener Plate Gasket	20	\$92.85	\$1,857.00
19	Ea.	Oil Pan	5	\$505.51	\$2,527.55
20	Ea.	Throttle Actuator	5	\$574.16	\$2,870.80
21	Ea.	Fuel Control Valve	10	\$1,429.19	\$14,291.90
22	Ea.	Ignition Control Module	10	\$1,648.45	\$16,484.50
23	Ea.	Ignition Coils	120	\$175.23	\$21,027.60
24	Ea.	Engine Harness	5	\$1,493.62	\$7,468.10
25	Ea.	Ignition Harness	10	\$167.53	\$1,675.30
26	Ea.	Oil Cooler	5	\$179.73	\$898.65
27	Ea.	Lube Pump	5	\$275.51	\$1,377.55
28	Ea.	Front Crank Seal	10	\$30.54	\$305.40
29	Ea.	Rear Seal	10	\$28.65	\$286.50
30	Ea.	Water Pump	10	\$175.03	\$1,750.30
31	Ea.	Vibration Damper	10	\$344.21	\$3,442.10
32	Ea.	Belt Tensioner (If applicable)	20	\$145.47	\$2,909.40
33	Ea.	Coolant/Temperature Sensor	20	\$11.21	\$224.20
34	Ea.	Oil Pressure Sensor	10	\$98.10	\$981.00
35	Ea.	Fuel Pressure Sensor	10	\$144.34	\$1,443.40
36	Ea.	Low Fuel Pressure Regulator	10	\$1,222.22	\$12,222.20
37	Ea.	Engine Cradle	5	\$1,420.00	\$7,100.00
38	Ea.	Belt Guard	5	\$358.80	\$1,794.00
39	Ea.	Complete Engine Package (See definition in TS-2)	4	\$66,430.00	\$265,720.00
40	Bus Set	Spark Plugs	15	\$42.02	\$630.30
41	Bus Set	Adaptation Kit (Eng to Trans)	3	\$1,066.00	\$3,198.00
42	Ea.	PPA Dollies	8	\$685.00	\$5,480.00
COOLING SYSTEM					
1	Ea.	Radiator Packages (See definition in TS-2)	5	\$7,715.00	\$38,575.00
2	Ea.	Thermal Management Controllers	5	\$598.32	\$2,991.60
3	Bus Set	Fan Resistors	20	\$48.60	\$972.00
4	Bus Set	CAN Interface Cables	5	\$101.25	\$506.25
5	Ea.	Fan Reversal LED Panel	5	\$593.39	\$2,966.95
6	Ea.	Fan Assembly	30	\$40.66	\$1,219.80
7	Ea.	Coolant Reservoir	10	\$556.20	\$5,562.00
8	Ea.	Transmission Cooler	10	\$648.00	\$6,480.00
9	Bus Set	Pressure Relief Valve	20	\$23.85	\$477.00
10	Ea.	Radiator Cap	30	\$5.27	\$158.10
11	Ea.	Coolant Overflow Tank	10	\$36.29	\$362.90

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 7

CONTRACTOR: **ELDORADO NATIONAL (CALIFORNIA), INC.**
Contract No.: **OP28367-000**
Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
CHARGING SYSTEM					
1	Ea.	Alternator	10	\$9,750.00	\$97,500.00
2	Ea.	Voltage Regulators	10	\$351.00	\$3,510.00
3	Ea.	Batteries	40	\$203.77	\$8,150.80
4	Ea.	Battery Equalizer	20	\$418.50	\$8,370.00
5	Ea.	Battery Disconnect	10	\$31.82	\$318.20
6	Ea.	Battery Separator	5	\$297.00	\$1,485.00
7	Ea.	Power Distribution Panel in Battery Compartment	5	\$267.30	\$1,336.50
8	Ea.	Low Voltage Disconnect	10	\$44.55	\$445.50
9	Ea.	Circuit Breaker 80A	20	\$31.59	\$631.80
10	Ea.	Circuit Breaker 100A	20	\$39.15	\$783.00
11	Ea.	Circuit Breaker 120A or 130A, whichever applies	20	\$49.95	\$999.00
12	Bus Set	Fuse and Circuit Breaker Panels	5	\$310.50	\$1,552.50
SUSPENSION					
1	Bus Set	Air Ride Beams	10	\$2,310.00	\$23,100.00
2	Bus Set	Air Bags	20	\$672.00	\$13,440.00
3	Ea.	Front Axle	10	\$4,879.85	\$48,798.50
4	Ea.	Rear Axle	10	\$3,946.07	\$39,460.70
5	Bus Set	Radius Rods	5	\$412.80	\$2,064.00
6	Bus Set	Shocks	10	\$383.68	\$3,836.80
7	Bus Set	Leveling Valve Front	10	\$191.81	\$1,918.10
8	Bus Set	Leveling Valve Rear	10	\$191.81	\$1,918.10
DRIVE TRAIN					
1	Ea.	Transmission	5	\$14,261.00	\$71,305.00
2	Ea.	TCM Programmed	5	\$611.00	\$3,055.00
3	Ea.	Adaptation Kit (Trans to Eng)	2	\$1,066.00	\$2,132.00
4	Ea.	Drive Shaft	10	\$544.00	\$5,440.00
5	Ea.	Differential	15	\$6,972.00	\$104,580.00
STEERING SYSTEM					
1	Bus Set	Steering Gear and Linkage	10	\$1,172.50	\$11,725.00
2	Ea.	Steering Column	10	\$596.77	\$5,967.70
3	Ea.	Steering Shaft	10	\$135.30	\$1,353.00
4	Ea.	Steering Box Assembly	10	\$277.78	\$2,777.80
5	Ea.	Power Steering Gear Assembly	10	\$893.97	\$8,939.70
PNEUMATIC SYSTEM					
1	Bus Set	Air Tanks (Complete Sets)	10	\$352.00	\$3,520.00
2	Ea.	Air Dryer	10	\$400.66	\$4,006.60
3	Ea.	Air Governor	10	\$68.80	\$688.00
4	Bus Set	Pressure Reducing Valves	10	\$28.80	\$288.00
5	Bus Set	Check Valves	10	\$57.60	\$576.00
6	Bus Set	Brake Control Valve	10	\$46.40	\$464.00
7	Bus Set	Brake Pedal Valve	10	\$134.54	\$1,345.40
8	Bus Set	Quick Release Valve	10	\$17.60	\$176.00
9	Bus Set	Parking Relay Valve	10	\$57.60	\$576.00
10	Bus Set	Parking Control Valve	10	\$46.40	\$464.00
11	Bus Set	Air Brake Tubing	10	\$134.54	\$1,345.40
12	Bus Set	Solenoid Valve Assembly	10	\$17.60	\$176.00
FUEL SYSTEM					
1	Bus Set	Fuel Cylinder Assembly	2	\$68,300.00	\$136,600.00
2	Ea.	Fill Manifold	2	\$592.00	\$1,184.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 7

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
3	Bus Set	Shut Off Valve Assembly	5	\$440.00	\$2,200.00
4	Bus Set	PRD'S	10	\$134.40	\$1,344.00
5	Ea.	High Fuel Pressure Regulator	20	\$600.00	\$12,000.00
6	Bus Set	Defueling Valves	5	\$1,560.00	\$7,800.00
7	Ea.	Low/High Pressure Filter Assembly	5	\$704.00	\$3,520.00
8	Bus Set	Fuel Pressure Gauges	10	\$88.00	\$880.00
9	Bus Set	Defueling Switches	5	\$41.60	\$208.00
10	Bus Set	Manifold Shut Off Valve Assembly	10	\$325.00	\$3,250.00
11	Bus Set	Solenoid Valve Assembly	10	\$376.00	\$3,760.00
12	Bus Set	Fuel Line Assembly	10	\$576.00	\$5,760.00
13	Ea.	Low Pressure Sensor	20	\$144.00	\$2,880.00
14	Ea.	Proximity Switch @ the Fuel Fill Door	20	\$7.94	\$158.80
15	Bus Set	Fuel Line Assembly	5	\$576.00	\$2,880.00
16	Bus Set	Vent Tubes	5	\$137.60	\$688.00
17	Ea.	Control Harness	5	\$240.00	\$1,200.00
18	Ea.	Proximity Switch @ the Fast Fill Recepticle	20	\$7.94	\$158.80

DOORS

1	Bus Set	Complete Base Plate and Operator Assembly	5	\$1,920.00	\$9,600.00
2	Bus Set	Front/Rear Turning Shaft Assembly	5	\$1,864.00	\$9,320.00
3	Bus Set	Door Panels	5	\$6,387.00	\$31,935.00
4	Bus Set	Door Glass	2	\$1,816.00	\$3,632.00

BODY INTERIOR

1	Bus Set	Interior AVA Sign Assembly	5	\$1,580.00	\$7,900.00
2	Ea.	Destination Sign Controller	2	\$512.00	\$1,024.00
3	Ea.	Next Stop Sign	5	\$256.00	\$1,280.00
4	Bus Set	Interior Speaker Assembly	10	\$192.00	\$1,920.00
5	Ea.	Microphone Hand Set	5	\$92.80	\$464.00
6	Ea.	Visor/Sun Shade(s) Front & Side	10	\$316.80	\$3,168.00
7	Bus Set	Access Panels	5	\$960.00	\$4,800.00
8	Bus Set	Light Covers	5	\$916.80	\$4,584.00
9	Bus Set	Modesty Panels	10	\$880.00	\$8,800.00
10	Bus Set	Ceiling Panels	10	\$1,472.00	\$14,720.00
11	Bus Set	Side Wall Trim Panel	10	\$480.00	\$4,800.00
12	Bus Set	Floor Covering	5	\$2,470.00	\$12,350.00
13	Bus Set	Wheelchair Securement Devices	5	\$1,248.00	\$6,240.00
14	Bus Set	Passenger Seat	4	\$34,087.00	\$136,348.00
15	Bus Set	Seat Track	2	\$388.00	\$776.00
16	Ea.	Operator Seat	5	\$2,680.00	\$13,400.00
17	Ea.	Farebox Grabrail	4	\$248.00	\$992.00
18	Bus Set	Manual Release Mechanism	6	\$47.00	\$282.00
19	Bus Set	Passenger Hand Strap	10	\$496.00	\$4,960.00
20	Ea.	HVAC Return Grill	5	\$390.00	\$1,950.00

BODY EXTERIOR

1	Bus Set	Passenger Windows	2	\$14,186.40	\$28,372.80
2	Bus Set	Replacement Pass Side Window Glass (if not bonded)	2	\$4,560.00	\$9,120.00
3	Bus Set	Side Window Film or Guards	5	\$1,847.00	\$9,235.00
4	Bus Set	Windshield	3	\$680.00	\$2,040.00
5	Bus Set	Operator Window	2	\$1,139.68	\$2,279.36
6	Bus Set	Access Door Set (excluding engine door and HVAC access door)	3	\$2,180.00	\$6,540.00
7	Ea.	Engine Door	2	\$623.00	\$1,246.00
8	Ea.	HVAC Rear Attic Door	2	\$428.80	\$857.60
9	Ea.	Bike Rack	2	\$1,148.00	\$2,296.00
10	Ea.	Emergency Roof Hatch	2	\$249.20	\$498.40
11	Bus Set	Windshield Wiper Assy.	3	\$766.96	\$2,300.88
12	Ea.	Windshield Washer Reservoir	2	\$52.80	\$105.60
13	Bus Set	Mirrors	4	\$971.28	\$3,885.12
14	Bus Set	Bumper	3	\$2,208.00	\$6,624.00
15	Bus Set	Mud Guards	3	\$104.00	\$312.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 7

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
16	Ea.	Head Lights	10	\$742.00	\$7,420.00
17	Bus Set	Front Turn Signal	10	\$54.40	\$544.00
18	Bus Set	Side Marker Lights	10	\$128.00	\$1,280.00
19	Bus Set	Rear Door Lights	10	\$64.00	\$640.00
20	Bus Set	Under Hood Hazard Lights	10	\$115.20	\$1,152.00
21	Ea.	License Plate Installation	5	\$20.80	\$104.00
22	Bus Set	CNG Tank Cover Installation	4	\$3,800.00	\$15,200.00
23	Bus Set	Exterior Trim (including fender skirts, exit door trim and trim pieces covering joints between body panels)	4	\$1,387.00	\$5,548.00

CLIMATE CONTROL SYSTEM

1	Ea.	Compressor	2	\$6,800.00	\$13,600.00
2	Ea.	Controller	2	\$300.00	\$600.00
3	Ea.	Evaporator	2	\$6,300.00	\$12,600.00
4	Ea.	Condensor	2	\$410.25	\$820.50
5	Ea.	Blower Assembly	4	\$555.00	\$2,220.00
6	Ea.	Thermostat	2	\$55.79	\$111.58
7	Ea.	Marine Pump	3	\$603.00	\$1,809.00

WHEELCHAIR

1	Bus Set	Ramp Assembly	3	\$7,995.00	\$23,985.00
2	Bus Set	Valve Assembly	2	\$87.00	\$174.00
3	Bus Set	Electrical Harness	2	\$348.40	\$696.80
4	Ea.	Ramp	2	\$7,995.00	\$15,990.00
5	Ea.	Controller	2	\$707.38	\$1,414.76
6	Ea.	Motor	3	\$819.00	\$2,457.00

BRAKES

1	Bus Set	Pressure Switches (include all for each Bus Set)	10	\$585.00	\$5,850.00
2	Bus Set	Protection Valve	10	\$84.00	\$840.00
3	Bus Set	Brake Air Chamber	10	\$269.70	\$2,697.00
4	Bus Set	Brake Wear Indicator	5	\$390.00	\$1,950.00
5	Ea.	ABS Electronic Control Unit	5	\$388.50	\$1,942.50
6	Ea.	ABS Harness	2	\$367.50	\$735.00
7	Bus Set	ABS Sensor	5	\$295.50	\$1,477.50

MULTIPLEX CONTROLS SYSTEM


1	Ea.	Event Data Recorder	2	\$2,200.00	\$4,400.00
2	Ea.	DVR	2	\$5,535.40	\$11,070.80
3	Bus Set	Complete Bus Wiring Harnesses	2	\$21,071.15	\$42,142.30
4	Bus Set	Communication Module (Gateway Module)	10	\$3,630.00	\$36,300.00
5	Bus Set	Multiplex Module	10	\$6,610.81	\$66,108.10
6	Bus Set	Wheels	5	\$2,860.00	\$14,300.00

Total Unit Price \$501,724.21

TOTAL PARTS BUY \$2,203,191.65

In U.S. Dollars Using Words:

TWO-MILLION TWO-HUNDRED THREE THOUSAND ONE HUNDRED NINETY ONE DOLLARS & SIXTY-FIVE CENTS

 _____ Authorized Signature TONY WAYNE Print Name	06/10/18 _____ Date
--	---------------------------



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-034

Response Required: No

Date: November 13, 2018

File Nos.:

Action Item(s):

CDRL:

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: EXECUTED CONTRACT MODIFICATION NO. 8
OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES**

Reference: MAEL-032; ELMA-045(R)

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

If you have any questions, I can be reached at 213.922.7334 or e-mail at hernandezel@metro.net.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

cc: Wayne Okubo
Kwesi Annan

CDRL NO.: n/a

DATE: November 13, 2018

MAEL-034

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 8

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 8 to Contract No.: OP28367-000 is made effective on the 26th day of October 2018 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, and Contract Modification No. 7 dated October 3, 2018, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Change bus floor covering from RCA to Altro, applicable only to production buses no. 66 to 295 of the Base Buy, for an aggregate increase of \$98,972, inclusive of applicable taxes, in the total Contract Price from \$198,945,328 to \$199,044,300, in accordance with the revised Pricing Forms as attached. Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of ~~\$198,945,328~~ **\$199,044,300** inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. Revised Pricing Forms: PF 1, PF-1A and PF 2 as attached to this modification no. 8.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 7 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By: _____

Signature

TOM WAYNE

Type or Print Name

11/5/18

Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: _____

Wayne Okubo
Director, Contract Administration

11/9/18

Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 8

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

		Taxable			
No.	Qty.	Description of Item	Unit Price	Unit Price	Total Price
1	229	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A:	\$595,335.02	\$615,075	\$140,852,150
	66	1 40' Low Floor CNG Buses (Base Buy) from PF-1A	\$594,941.09	\$614,681	\$40,568,948
1a	Lot	Manuals (Base Buy) (TS 5.6.4)	\$2,281.50	Lump Sum	\$23,400.00
1b	295	Vehicle Delivery Charge for Base Buy		\$275.00	\$81,125.00
1c	229	Tax (Base Buy Production Bus 67 - 295)	9.75%	\$58,045.16	\$13,294,624
1d	66	Tax (Base Buy Production Bus 1-66)	9.75%	\$58,006.76	\$3,828,446
2	2	Pilot Buses Retrofit with Rear Axle Upgrade		\$8,600	\$17,201
2a		Tax	9.75%	\$838.55	\$1,677
3	Lot	Reserved			
4	Lot	Reserved			
5	Lot	Reserved			
6	Lot	Reserved			
7	Lot	Performance Bond (Base Buy)		Lump Sum	\$119,336.00
8	1,000	Total Training Hours for Base Buy***		\$175,000.00	
8a	900	Contractor (Proposer/Prime) Base Buy		\$175.00	\$157,500.00
8b	100	Subcontractor/Supplier Base Buy		\$175.00	\$17,500.00
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1		\$74,930.00	\$74,930.00
10a	15	Special Towing Equipment (TS 25)		\$386.00	\$5,790.00
10b		Tax	9.75%	\$37.64	\$564.53
11a	2	Rear Recovery Devices/Tie Downs (TS 25)		\$505.00	\$1,010.00
11b		Tax	9.75%	\$49.24	\$98.48
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation					
In U.S. Dollars Using Words:				ONE HUNDRED NINETY NINE MILLION FORTY FOUR THOUSAND THREE HUNDRED DOLLARS	
In U.S. Dollars Using Figures:				\$199,044,300	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 8

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NOTE

Unit Prices from Mod. No. 7 for Production Buses 1 - 65

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 8

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

2.0 CONTRACT FOR 150 UP TO 305 BUSES (OPTION BUY)				
No.	Qty.	Description of Item	Taxable	
			Unit Price	Total Price
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles *	\$595,335.02 \$615,075	\$187,597,841.45
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$2,281.50 Lump Sum	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy	\$0.00	\$83,875.00
10c		Tax (Option Buy)	9.75% \$58,045.16	\$17,706,056.66
11		Reserved	\$	\$
12	Lot	Performance Bond for Option Buy****	Lump Sum	\$123,421.00
13	500	Total Training Hours for Option Buy****	\$87,500.00	
13a	450	Contractor (Proposer/Prime) Option Buy	\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy	\$175.00	\$8,750.00
14		Reserved	\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation				
In U.S. Dollars Using Words:			TWO-HUNDRED FIVE MILLION EIGHT HUNDRED TWO THOUSAND FIVE HUNDRED SEVENTY ONEDOLLARS	
			In U.S. Dollars Using Figures: \$205,622,094	

NOTE * Taxable Unit Price Is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 8

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

3.0 OPTIONAL VEHICLE CONFIGURATION				Unit Price		Total Price
No.	Qty.	Description of Item				
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)				\$6,370.00
15a		Direct Materials/Equipment		\$5,750.00		
15b		Labor Installation Costs		\$620.00		
15c		Non Recurring Cost		\$0.00		
15d		Other Costs (Identify)		\$0.00		
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)				\$10,170.00
16a		Direct Materials/Equipment		\$9,150.00		
16b		Labor Installation Costs		\$1,020.00		
16c		Non Recurring Cost		\$0.00		
16d		Other Costs (Identify)		\$0.00		
17	600	Reserved****				
17a	295	Reserved				
17b	305	Reserved				
18	600	25-Year Certified CNG Tanks				\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$256,650.00	\$870.00		
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$285,350.00	\$870.00		
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)				\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC		\$4,136.00		
19b	295	Labor Installation Costs for Base Buy APC		\$460.00		
19c	295	Non Recurring Cost for Base Buy APC		\$		

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 8

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

19d	295	Other Costs (Identify) for Base Buy APC	\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles		\$4,136.00
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles		\$460.00
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles	\$	
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles	\$	
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)		\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System	\$869.00	
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System	\$96.00	
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System	\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System	\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$869.00	
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$96.00	
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00
21	600	USB Ports for Passenger Charging Only		\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00
22	600	Optional Wireless Stop Request Switches (Bus set)		\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00

LACMTA
CONTRACT NO. OP28367-000
GA12-93

PRICING FORM
PF1 - CNG 40'
Contract Mod. No. 8

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 8

Proposer:

ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00	
23	600	Optional Full Color Destination Sign Sets (TS 86.3)			\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00	
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00	
24	Lot	Spare Parts (From Schedule A, Form PF-2)			\$2,261,788.13
25	Lot	Special Tools (Schedule B Form PF-3)			\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)			\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)			\$958,460.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.					
In U.S. Dollars Using Words:					TEN-MILLION ONE HUNDRED SEEN THOUSAND ONE HUNDRED EIGHT DOLLARS
In U.S. Dollars Using Figures:					\$10,107,108

Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:

ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx)	Particulate Matter (PM) grams per brake horsepower hour
Grams per brake horsepower-hour	0.01
0.02	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40')
SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO. 8

Contractor: **ELDORADO NATIONAL (CALIFORNIA), INC**
Contract No.: **QP28367-000**

BASE BUY	
NO.	DESCRIPTION OF ITEM
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **
1.1 TS 9.	Propulsion Power Assembly (PPA)***
1.2 TS 9.	Engine
1.3 TS 10.	Cooling System
1.4 TS 18.	Fuel System
1.5 TS 31.	Suspension
1.6 TS 33.	Steering System
1.7 TS 37.	Brakes
1.8 TS 39.	Pneumatic System
1.9 TS 42.	Charging System
1.10 TS 44.	Multiplex Control System
1.11 TS 54.	HVAC Climate Control System
1.12 TS 78.	Passenger Seats
1.13 TS 80.	Doors
1.14 TS 81.	Accessibility Provisions
1.15 TS 86.	Communications
1.16 TS 11	Transmission
1.17 TS 78.1	USB Passenger Charging Port
1.18 TS 85.1	Wireless Stop Request Button
1.19 TS 86.3	Matrix APC
1.99 TS 34	Meritor Rear Axle Upgrade
	All other bus subsystem equipment not included above
TOTAL CNG BUS PRICE	
	Production Bus 1 - 66 \$18,372
	Add Altro Flooring \$60,324
	Production Bus 67 - 295 \$12,650
	Production Bus 67 - 295 \$68,300
	Production Bus 67 - 295 \$19,950
	Production Bus 67 - 295 \$4,950
	Production Bus 67 - 295 \$3,260
	Production Bus 67 - 295 \$6,850
	Production Bus 67 - 295 \$36,800
	Production Bus 67 - 295 \$24,200
	Production Bus 67 - 295 \$29,450
	Production Bus 67 - 295 \$28,955
	Production Bus 67 - 295 \$14,830
	Production Bus 67 - 295 \$19,740
	Production Bus 67 - 295 \$3,244
	Production Bus 67 - 295 \$14,261
	Production Bus 67 - 295 \$480
	Production Bus 67 - 295 \$485
	Production Bus 67 - 295 \$4,596
	Production Bus 67 - 295 \$1,040
	Production Bus 67 - 295 \$241,944
	Production Bus 1 - 66 \$614,681
	Add Altro Flooring \$393.80
	Production Bus 67 - 295 \$615,075

* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 1 - Base Buy)

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line item Nos. 1a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.


3. *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40')
SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO. 8

OPTION BUY	
NO.	DESCRIPTION OF ITEM
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **
2.1 TS 9.	Propulsion Power Assembly (PPA)***
2.2 TS 9.	Engine
2.3 TS 10.	Cooling System
2.4 TS 18.	Fuel System
2.5 TS 31.	Suspension
2.6 TS 33.	Steering System
2.7 TS 37.	Brakes
2.8 TS 39.	Pneumatic System
2.9 TS 42.	Charging System
2.10 TS 44.	Multiplex Control System
2.11 TS 54.	HVAC Climate Control System
2.12 TS 78.	Passenger Seats
2.13 TS 80.	Doors
2.14 TS 81.	Accessibility Provisions
2.15 TS 86.	Communications
2.16 TS 11	Transmission
2.17 TS 78.1	USB Passenger Charging Port
2.18 TS 85.1	Wireless Stop Request Button
2.19 TS 86.3	Matrix APC
1.99 TS 34	Meritor Rear Axle Upgrade
TOTAL CNG BUS PRICE OPTION QUANTITY	
* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 10 - Option Buy)	

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99



 (Signature of Person Executing Proposal)

 TONY WAYNE VICE PRESIDENT & GENERAL MANAGER

 Type Name, Title

 11/5/18

 Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 8

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
LOW NOX ENGINE					
1	Ea.	Propulsion Power Assembly (See Definition in SP-1)	3	\$86,270.00	\$258,810.00
2	Ea.	Air Compressor	5	\$6,760.00	\$33,800.00
3	Ea.	Turbo	3	\$1,982.00	\$5,946.00
4	Ea.	EGR Cooler	20	\$1,110.47	\$22,209.40
5	Ea.	EGR Valve	10	\$610.68	\$6,106.80
6	Ea.	Delta P Sensor	10	\$347.66	\$3,476.60
7	Ea.	Mass. Air Flow Sensor	10	\$1,067.56	\$10,675.60
8	Ea.	Oxygen Sensor	20	\$223.61	\$4,472.20
9	Ea.	Catalyst	5	\$3,574.95	\$17,874.75
10	Ea.	Cylinder Head	5	\$4,513.81	\$22,569.05
11	Ea.	Pistons Kits	60	\$325.00	\$19,500.00
12	Bus Set	Rod Bearings	10	\$64.00	\$640.00
13	Bus Set	Main Bearing	10	\$219.27	\$2,192.70
14	Ea.	Liners	60	\$191.87	\$11,512.20
15	Ea.	Head Gasket	5	\$428.75	\$2,143.75
16	Ea.	Upper Gasket Set	5	\$844.99	\$4,224.95
17	Ea.	Oil Pan Gasket	20	\$133.60	\$2,672.00
18	Ea.	Stiffener Plate Gasket	20	\$92.85	\$1,857.00
19	Ea.	Oil Pan	5	\$505.51	\$2,527.55
20	Ea.	Throttle Actuator	5	\$574.16	\$2,870.80
21	Ea.	Fuel Control Valve	10	\$1,429.19	\$14,291.90
22	Ea.	Ignition Control Module	10	\$1,648.45	\$16,484.50
23	Ea.	Ignition Coils	120	\$175.23	\$21,027.60
24	Ea.	Engine Harness	5	\$1,493.62	\$7,468.10
25	Ea.	Ignition Harness	10	\$167.53	\$1,675.30
26	Ea.	Oil Cooler	5	\$179.73	\$898.65
27	Ea.	Lube Pump	5	\$275.51	\$1,377.55
28	Ea.	Front Crank Seal	10	\$30.54	\$305.40
29	Ea.	Rear Seal	10	\$28.65	\$286.50
30	Ea.	Water Pump	10	\$175.03	\$1,750.30
31	Ea.	Vibration Damper	10	\$344.21	\$3,442.10
32	Ea.	Belt Tensioner (If applicable)	20	\$145.47	\$2,909.40
33	Ea.	Coolant Temperature Sensor	20	\$11.21	\$224.20
34	Ea.	Oil Pressure Sensor	10	\$98.10	\$981.00
35	Ea.	Fuel Pressure Sensor	10	\$144.34	\$1,443.40
36	Ea.	Low Fuel Pressure Regulator	10	\$1,222.22	\$12,222.20
37	Ea.	Engine Cradle	5	\$1,420.00	\$7,100.00
38	Ea.	Belt Guard	5	\$358.80	\$1,794.00
39	Ea.	Complete Engine Package (See definition in TS-2)	4	\$66,430.00	\$265,720.00
40	Bus Set	Spark Plugs	15	\$42.02	\$630.30
41	Bus Set	Adaptation Kit (Eng to Trans)	3	\$1,066.00	\$3,198.00
42	Ea.	PPA Dollies	8	\$685.00	\$5,480.00
COOLING SYSTEM					
1	Ea.	Radiator Packages (See definition in TS-2)	5	\$7,715.00	\$38,575.00
2	Ea.	Thermal Management Controllers	5	\$598.32	\$2,991.60
3	Bus Set	Fan Resistors	20	\$48.60	\$972.00
4	Bus Set	CAN Interface Cables	5	\$101.25	\$506.25
5	Ea.	Fan Reversal LED Panel	5	\$593.39	\$2,966.95
6	Ea.	Fan Assembly	30	\$40.66	\$1,219.80
7	Ea.	Coolant Reservoir	10	\$556.20	\$5,562.00
8	Ea.	Transmission Cooler	10	\$648.00	\$6,480.00
9	Bus Set	Pressure Relief Valve	20	\$23.85	\$477.00
10	Ea.	Radiator Cap	30	\$5.27	\$158.10
11	Ea.	Coolant Overflow Tank	10	\$36.29	\$362.90

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 8

CONTRACTOR: **ELDORADO NATIONAL (CALIFORNIA), INC.**
Contract No.: **OP28367-000**
Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
CHARGING SYSTEM					
1	Ea.	Alternator	10	\$9,750.00	\$97,500.00
2	Ea.	Voltage Regulators	10	\$351.00	\$3,510.00
3	Ea.	Batteries	40	\$203.77	\$8,150.80
4	Ea.	Battery Equalizer	20	\$418.50	\$8,370.00
5	Ea.	Battery Disconnect	10	\$31.82	\$318.20
6	Ea.	Battery Separator	5	\$297.00	\$1,485.00
7	Ea.	Power Distribution Panel in Battery Compartment	5	\$267.30	\$1,336.50
8	Ea.	Low Voltage Disconnect	10	\$44.55	\$445.50
9	Ea.	Circuit Breaker 80A	20	\$31.59	\$631.80
10	Ea.	Circuit Breaker 100A	20	\$39.15	\$783.00
11	Ea.	Circuit Breaker 120A or 130A, whichever applies	20	\$49.95	\$999.00
12	Bus Set	Fuse and Circuit Breaker Panels	5	\$310.50	\$1,552.50
SUSPENSION					
1	Bus Set	Air Ride Beams	10	\$2,310.00	\$23,100.00
2	Bus Set	Air Bags	20	\$672.00	\$13,440.00
3	Ea.	Front Axle	10	\$4,879.85	\$48,798.50
4	Ea.	Rear Axle	10	\$9,721.86	\$97,218.60
5	Bus Set	Radius Rods	5	\$412.80	\$2,064.00
6	Bus Set	Shocks	10	\$383.68	\$3,836.80
7	Bus Set	Leveling Valve Front	10	\$191.81	\$1,918.10
8	Bus Set	Leveling Valve Rear	10	\$191.81	\$1,918.10
DRIVE TRAIN					
1	Ea.	Transmission	5	\$14,261.00	\$71,305.00
2	Ea.	TCM Programmed	5	\$611.00	\$3,055.00
3	Ea.	Adaptation Kit (Trans to Eng)	2	\$1,066.00	\$2,132.00
4	Ea.	Drive Shaft	10	\$544.00	\$5,440.00
5	Ea.	Differential	15	\$6,972.00	\$104,580.00
STEERING SYSTEM					
1	Bus Set	Steering Gear and Linkage	10	\$1,172.50	\$11,725.00
2	Ea.	Steering Column	10	\$596.77	\$5,967.70
3	Ea.	Steering Shaft	10	\$135.30	\$1,353.00
4	Ea.	Steering Box Assembly	10	\$277.78	\$2,777.80
5	Ea.	Power Steering Gear Assembly	10	\$893.97	\$8,939.70
PNEUMATIC SYSTEM					
1	Bus Set	Air Tanks (Complete Sets)	10	\$352.00	\$3,520.00
2	Ea.	Air Dryer	10	\$400.66	\$4,006.60
3	Ea.	Air Governor	10	\$68.80	\$688.00
4	Bus Set	Pressure Reducing Valves	10	\$28.80	\$288.00
5	Bus Set	Check Valves	10	\$57.60	\$576.00
6	Bus Set	Brake Control Valve	10	\$46.40	\$464.00
7	Bus Set	Brake Pedal Valve	10	\$134.54	\$1,345.40
8	Bus Set	Quick Release Valve	10	\$17.60	\$176.00
9	Bus Set	Parking Relay Valve	10	\$57.60	\$576.00
10	Bus Set	Parking Control Valve	10	\$46.40	\$464.00
11	Bus Set	Air Brake Tubing	10	\$134.54	\$1,345.40
12	Bus Set	Solenoid Valve Assembly	10	\$17.60	\$176.00
FUEL SYSTEM					
1	Bus Set	Fuel Cylinder Assembly	2	\$68,300.00	\$136,600.00
2	Ea.	Fill Manifold	2	\$592.00	\$1,184.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 8

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
3	Bus Set	Shut Off Valve Assembly	5	\$440.00	\$2,200.00
4	Bus Set	PRD'S	10	\$134.40	\$1,344.00
5	Ea.	High Fuel Pressure Regulator	20	\$600.00	\$12,000.00
6	Bus Set	Defueling Valves	5	\$1,560.00	\$7,800.00
7	Ea.	Low/High Pressure Filer Assembly	5	\$704.00	\$3,520.00
8	Bus Set	Fuel Pressure Gauges	10	\$88.00	\$880.00
9	Bus Set	Defueling Switches	5	\$41.60	\$208.00
10	Bus Set	Manifold Shut Off Valve Assembly	10	\$325.00	\$3,250.00
11	Bus Set	Solenoid Valve Assembly	10	\$376.00	\$3,760.00
12	Bus Set	Fuel Line Assembly	10	\$576.00	\$5,760.00
13	Ea.	Low Pressure Sensor	20	\$144.00	\$2,880.00
14	Ea.	Proximity Switch @ the Fuel Fill Door	20	\$7.94	\$158.80
15	Bus Set	Fuel Line Assembly	5	\$576.00	\$2,880.00
16	Bus Set	Vent Tubes	5	\$137.60	\$688.00
17	Ea.	Control Harness	5	\$240.00	\$1,200.00
18	Ea.	Proximity Switch @ the Fast Fill Recepticle	20	\$7.94	\$158.80

DOORS

1	Bus Set	Complete Base Plate and Operator Assembly	5	\$1,920.00	\$9,600.00
2	Bus Set	Front/Rear Turning Shaft Assembly	5	\$1,864.00	\$9,320.00
3	Bus Set	Door Panels	5	\$6,387.00	\$31,935.00
4	Bus Set	Door Glass	2	\$1,816.00	\$3,632.00

BODY INTERIOR

1	Bus Set	Interior AVA Sign Assembly	5	\$1,580.00	\$7,900.00
2	Ea.	Destination Sign Controller	2	\$512.00	\$1,024.00
3	Ea.	Next Stop Sign	5	\$256.00	\$1,280.00
4	Bus Set	Interior Speaker Assembly	10	\$192.00	\$1,920.00
5	Ea.	Microphone Hand Set	5	\$92.80	\$464.00
6	Ea.	Visor/Sun Shade(s) Front & Side	10	\$316.80	\$3,168.00
7	Bus Set	Access Panels	5	\$960.00	\$4,800.00
8	Bus Set	Light Covers	5	\$916.80	\$4,584.00
9	Bus Set	Modesty Panels	10	\$880.00	\$8,800.00
10	Bus Set	Ceiling Panels	10	\$1,472.00	\$14,720.00
11	Bus Set	Side Wall Trim Panel	10	\$480.00	\$4,800.00
12	Bus Set	Floor Covering	5	\$2,637.58	\$13,187.90
13	Bus Set	Wheelchair Securement Devices	5	\$1,248.00	\$6,240.00
14	Bus Set	Passenger Seat	4	\$34,087.00	\$136,348.00
15	Bus Set	Seat Track	2	\$388.00	\$776.00
16	Ea.	Operator Seat	5	\$2,680.00	\$13,400.00
17	Ea.	Farebox Grabrail	4	\$248.00	\$992.00
18	Bus Set	Manual Release Mechanism	6	\$47.00	\$282.00
19	Bus Set	Passenger Hand Strap	10	\$496.00	\$4,960.00
20	Ea.	HVAC Return Grill	5	\$390.00	\$1,950.00

BODY EXTERIOR

1	Bus Set	Passenger Windows	2	\$14,186.40	\$28,372.80
2	Bus Set	Replacement Pass Side Window Glass (if not bonded)	2	\$4,560.00	\$9,120.00
3	Bus Set	Side Window Film or Guards	5	\$1,847.00	\$9,235.00
4	Bus Set	Windshield	3	\$680.00	\$2,040.00
5	Bus Set	Operator Window	2	\$1,139.68	\$2,279.36
6	Bus Set	Access Door Set (excluding engine door and HVAC access door)	3	\$2,180.00	\$6,540.00
7	Ea.	Engine Door	2	\$623.00	\$1,246.00
8	Ea.	HVAC Rear Attic Door	2	\$428.80	\$857.60
9	Ea.	Bike Rack	2	\$1,148.34	\$2,296.68
10	Ea.	Emergency Roof Hatch	2	\$249.20	\$498.40
11	Bus Set	Windshield Wiper Assy.	3	\$766.96	\$2,300.88
12	Ea.	Windshield Washer Reservoir	2	\$52.80	\$105.60
13	Bus Set	Mirrors	4	\$971.28	\$3,885.12
14	Bus Set	Bumper	3	\$2,208.00	\$6,624.00
15	Bus Set	Mud Guards	3	\$104.00	\$312.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 8

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.
 Contract No.: OP28367-000
 Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NO.	UNIT	DESCRIPTION OF ITEM	QTY	UNIT PRICE	TOTAL PRICE
16	Ea.	Head Lights	10	\$742.00	\$7,420.00
17	Bus Set	Front Turn Signal	10	\$54.40	\$544.00
18	Bus Set	Side Marker Lights	10	\$128.00	\$1,280.00
19	Bus Set	Rear Door Lights	10	\$84.00	\$840.00
20	Bus Set	Under Hood Hazard Lights	10	\$115.20	\$1,152.00
21	Ea.	License Plate Installation	5	\$20.80	\$104.00
22	Bus Set	CNG Tank Cover Installation	4	\$3,800.00	\$15,200.00
23	Bus Set	Exterior Trim (Including fender skirts, exit door trim and trim pieces covering joints between body panels)	4	\$1,387.00	\$5,548.00

CLIMATE CONTROL SYSTEM

1	Ea.	Compressor	2	\$6,800.00	\$13,600.00
2	Ea.	Controller	2	\$300.00	\$600.00
3	Ea.	Evaporator	2	\$6,300.00	\$12,600.00
4	Ea.	Condensor	2	\$410.25	\$820.50
5	Ea.	Blower Assembly	4	\$555.00	\$2,220.00
6	Ea.	Thermostat	2	\$55.79	\$111.58
7	Ea.	Marine Pump	3	\$603.00	\$1,809.00

WHEELCHAIR

1	Bus Set	Ramp Assembly	3	\$7,995.00	\$23,985.00
2	Bus Set	Valve Assembly	2	\$87.00	\$174.00
3	Bus Set	Electrical Harness	2	\$348.40	\$696.80
4	Ea.	Ramp	2	\$7,995.00	\$15,990.00
5	Ea.	Controller	2	\$707.38	\$1,414.76
6	Ea.	Motor	3	\$819.00	\$2,457.00

BRAKES

1	Bus Set	Pressure Switches (include all for each Bus Set)	10	\$585.00	\$5,850.00
2	Bus Set	Protection Valve	10	\$84.00	\$840.00
3	Bus Set	Brake Air Chamber	10	\$269.70	\$2,697.00
4	Bus Set	Brake Wear Indicator	5	\$390.00	\$1,950.00
5	Ea.	ABS Electronic Control Unit	5	\$388.50	\$1,942.50
6	Ea.	ABS Harness	2	\$367.50	\$735.00
7	Bus Set	ABS Sensor	5	\$295.50	\$1,477.50

MULTIPLEX CONTROLS SYSTEM

1	Ea.	Event Data Recorder	2	\$2,200.00	\$4,400.00
2	Ea.	DVR	2	\$5,535.40	\$11,070.80
3	Bus Set	Complete Bus Wiring Harnesses	2	\$21,071.15	\$42,142.30
4	Bus Set	Communication Module (Gateway Module)	10	\$3,630.00	\$36,300.00
5	Bus Set	Multiplex Module	10	\$6,610.81	\$66,108.10
6	Bus Set	Wheels	5	\$2,860.00	\$14,300.00

Total Unit Price \$507,667.82
TOTAL PARTS BUY \$2,261,786

In U.S. Dollars Using Words:

TWO-MILLION TWO-HUNDRED THREE THOUSAND FOUR HUNDRED FORTY FIVE DOLLARS & SIXTY-FIVE CENTS

 Authorized Signature
 TONY WAYNE
 Print Name

6/5/18
 Date



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-037

Response Required: No

Date: December 7, 2018

File Nos.:

Action Item(s):

CDRL: n/a

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
CONTRACT MODIFICATION NO.: 9
TRAINING AIDS**

Reference: ELMA-045

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 9

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 9

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 9 to Contract No.: OP28367-000 is made effective on the 5th day of November 2018 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, and Contract Modification No. 8 dated October 26, 2018 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

MTA to procure items from the Pricing Form, line 27 Training Aids (Schedule D Form PF-5), for an aggregate amount of \$349,636, inclusive of applicable taxes.

Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of \$199,044,300, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. Training Aids - Additionally, in consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor for line items under Pricing Form PF-5 Training Aids in the amount of \$349,646 inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions, CP- 2 (H).
 - a. Ea. One complete running engine and transmission assembly, including cooling and fueling systems, mounted on a suitable roll around stand (TS 5.6.3.a)

- b. Ea. Anti-Lock Brake Board (TS 5.6.3.f)
- c. Ea. Electric Air Conditioning Training Simulator Module (TS 5.6. 3.g)
- d. Ea. Video Security System (TS 5.6.3.i)
- e. Ea. Multiplex Electrical Training Board (TS 5.6.3.k)
- f. Ea. Voith DIWA.6 transmission training cutaway (TS 5.6.3.b)

Revised Pricing Forms: PF-1 and PF -5 as attached to this modification no. 9.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 9 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By: _____

Signature

TONY WAYNE

Type or Print Name

11/6/18

Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: _____

Wayne Okubo

Director, Contract Administration

11/14/18

Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 9

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

		Taxable				
No.	Qty.	Description of item	Unit Price	Unit Price	Total Price	
1	229	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A*:	\$595,335.02	\$615,075	\$140,852,150	
	66	1 40' Low Floor CNG Buses (Base Buy) from PF-1A	\$594,941.09	\$614,681	\$40,568,948	
1a	Lot	Manuals (Base Buy) (TS 5.6.4)	\$2,281.50	Lump Sum	\$23,400.00	
1b	295	Vehicle Delivery Charge for Base Buy		\$275.00	\$81,125.00	
1c	229	Tax (Base Buy Production Bus 67 - 295)	9.75%	\$58,045.16	\$13,294,624	
1d	66	Tax (Base Buy Production Bus 1-66)	9.75%	\$58,006.76	\$3,828,446	
2	2	Pilot Buses Retrofit with Rear Axle Upgrade		\$8,600	\$17,201	
2a		Tax	9.75%	\$838.55	\$1,677	
3	Lot	Reserved				
4	Lot	Reserved				
5	Lot	Reserved				
6	Lot	Reserved				
7	Lot	Performance Bond (Base Buy)		Lump Sum	\$119,336.00	
8	1,000	Total Training Hours for Base Buy***		\$175,000.00		
8a	900	Contractor (Proposer/Prime) Base Buy		\$175.00	\$157,500.00	
8b	100	Subcontractor/Supplier Base Buy		\$175.00	\$17,500.00	
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1		\$74,930.00	\$74,930.00	
10a	15	Special Towing Equipment (TS 25)		\$386.00	\$5,790.00	
10b		Tax	9.75%	\$37.64	\$564.53	
11a	2	Rear Recovery Devices/Tie Downs (TS 25)		\$505.00	\$1,010.00	
11b		Tax	9.75%	\$49.24	\$98.48	
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation						
In U.S. Dollars Using Words:					ONE HUNDRED NINETY NINE MILLION FORTY FOUR THOUSAND THREE HUNDRED DOLLARS	
In U.S. Dollars Using Figures:					\$199,044,300	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 9

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

NOTE	Unit Prices from Mod. No. 7 for Production Buses 1 - 65
	* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A
	** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column
	*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 9

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles*	\$595,335.02	\$187,597,841.45
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$2,281.50	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy	\$0.00	\$83,875.00
10c		Tax (Option Buy)	9.75%	\$17,706,056.66
11		Reserved	\$	\$
12	Lot	Performance Bond for Option Buy***		\$123,421.00
13	500	Total Training Hours for Option Buy****	\$87,500.00	
13a	450	Contractor (Proposer/Prime) Option Buy	\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy	\$175.00	\$8,750.00
14		Reserved	\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation				
In U.S. Dollars Using Words:			TWO-HUNDRED FIVE MILLION EIGHT HUNDRED TWO THOUSAND FIVE HUNDRED SEVENTY ONEDOLLARS	
In U.S. Dollars Using Figures:			\$205,622,094	

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 9

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION

No.	Qty.	Description of Item	Unit Price	Total Price
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)		\$6,370.00
15a		Direct Materials/Equipment	\$5,750.00	
15b		Labor Installation Costs	\$620.00	
15c		Non Recurring Cost	\$0.00	
15d		Other Costs (Identify)	\$0.00	
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)		\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00	
16b		Labor Installation Costs	\$1,020.00	
16c		Non Recurring Cost	\$0.00	
16d		Other Costs (Identify)	\$0.00	
17	600	Reserved****		
17a	295	Reserved		
17b	305	Reserved		
18	600	25-Year Certified CNG Tanks		\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$870.00	
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$870.00	
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)		\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00	
19b	295	Labor Installation Costs for Base Buy APC	\$460.00	
19c	295	Non Recurring Cost for Base Buy APC	\$	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 9

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

19d	295	Other Costs (Identify) for Base Buy APC	\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles		\$4,136.00
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles		\$460.00
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles		\$
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles		\$
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)		\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System		\$869.00
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System		\$96.00
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System		\$
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System		\$
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$869.00
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$96.00
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00
21	600	USB Ports for Passenger Charging Only		\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00
22	600	Optional Wireless Stop Request Switches (Bus set)		\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 9

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**
Contract No.: **OP28367-000**
Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00
23	600	Optional Full Color Destination Sign Sets (TS 86.3)		\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00
24	Lot	Spare Parts (From Schedule A, Form PF-2)		\$2,261,788.13
25	Lot	Special Tools (Schedule B Form PF-3)		\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)		\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)		\$989,385.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.				
In U.S. Dollars Using Words:			TEN-MILLION ONE HUNDRED THIRD EIGHT THOUSAND ONE HUNDRED THIRTY THREE DOLLARS	
In U.S. Dollars Using Figures:			\$10,138,033	

**** Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:
ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx)	Particulate Matter (PM) grams per brake horsepower hour
Grams per brake horsepower-hour 0.02	0.01

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 9

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40") LOW FLOOR CNG BUS PROCUREMENT

4.0 CONTRACT FOR BASE BUY, OPTION BUY, AND OPTIONAL VEHICLE CONFIGURATION			
No.	Qty.	Description of Item	Total Price
1.0	Total Price for CONTRACT for 295 Base Buy Buses to be the BASIS for Price Proposal evaluation		\$199,044,300
2.0	Total Price for CONTRACT for 150 Up to 305 Option Buy Buses to be the BASIS for Price Proposal evaluation		\$205,622,094
3.0	Total Price for OPTIONAL VEHICLE CONFIGURATION for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation		\$10,138,033
4.0	Total Price for CONTRACT for 295 Base Buy Buses, for 150 up to 305 Option Buy Buses, and Optional Vehicle Configuration for Optional Equipment combined to be the overall BASIS for Price Proposal evaluation		
In U.S. Dollars Using Words:			FOUR-HUNDRED FOURTEEN MILLION EIGHT HUNDRED FOUR THOUSAND FOUR HUNDRED TWENTY SEVEN DOLLARS
In U.S. Dollars Using Figures:			\$414,804,427

 4/6/10
(Signature of Person Executing Proposal) Date

TONY WAYNE VICE PRESIDENT & GENERAL MANAGE
Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-5 (CNG - 40')- SCHEDULE D OF PRICES TRAINING AIDS (OPTIONAL)
CONTRACT MODIFICATION NO. 9

Contractor **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
1	Ea.	One complete running engine and transmission assembly, including cooling and fueling systems, mounted on a suitable roll around stand (TS 5.6.3 a.)	1	\$193,200.00	\$193,200.00
2	Ea.	Static Transmission Assembly Note: If the Contractor is offering an Allison B400 transmission, a visual transmission is not required Voith DIWA .6 transmission (TS 5.6.3 b.)	1	\$30,925.00	\$30,925.00
3	Ea.	Complete Static Front Axle Assembly TS 5.6.3.c.	1	\$16,400.00	\$16,400.00
4	Ea.	Complete Static Rear Axle Assembly TS 5.6.3.d.	1	\$18,500.00	\$18,500.00

ATECH ELECTRICAL TRAINING BOARDS - General Electrical Training (TS 5.6.3 e.)

1	Kit	GM Specialized Electronic Trainer	10	\$2,100.00	\$21,000.00
2	Kit	GM Electronic Instructor's Guide (Books Only - Stages 1, 2, & 3)	10	\$95.00	\$950.00
3	Kit	4 Resistors	10	\$35.00	\$350.00
4	Kit	Dual Filament Light	10	\$46.00	\$460.00
5	Kit	Horn	10	\$121.00	\$1,210.00
6	Kit	Blank Board	10	\$24.00	\$240.00

SYSTEM SIMULATION TRAINING BOARDS

1	Ea.	Anti-Lock Brake/Air Brake Board (TS 5.6.3.f.)	1	\$32,000.00	\$32,000.00
2	Ea.	Electric Air Conditioning Training Simulator Module (TS 5.6.3.g.)	1	\$29,700.00	\$29,700.00
3	Ea.	Fire Suppression (TS 5.6.3.h.)	1	\$7,200.00	\$7,200.00
4	Ea.	Video Security System (TS 5.6.3.i.)	1	\$9,250.00	\$9,250.00
5	Ea.	Destination Sign (TS 5.6.3.j.)	1	\$6,000.00	\$6,000.00
6	Ea.	Multiplex Electrical Training Board (TS 5.6.3.k.)	2	\$23,500.00	\$47,000.00

E-LARNING INTERACTIVE TRAINING MEDIA (TS 5.6.3)

1	Hr.	Module 1	6	\$23,000.00	\$138,000.00
2	Hr.	Module 2	3	\$23,000.00	\$69,000.00
3	Hr.	Module 3	3	\$23,000.00	\$69,000.00
4	Hr.	Module 4	2	\$23,000.00	\$46,000.00
5	Hr.	Module 5	4	\$23,000.00	\$92,000.00
6	Hr.	Module 6	2	\$23,000.00	\$46,000.00
7	Hr.	Module 7	2	\$23,000.00	\$46,000.00
8	Hr.	Module 8	1	\$23,000.00	\$23,000.00
9	Hr.	Module 9	1	\$23,000.00	\$23,000.00
10	Hr.	Module 10	1	\$23,000.00	\$23,000.00

TOTAL BUY \$989,385.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-5 (CNG - 40')- SCHEDULE D OF PRICES TRAINING AIDS (OPTIONAL)
CONTRACT MODIFICATION NO. 9

In U.S. Dollars Using Words:

NINE-HUNDRED EIGHTY NINE THOUSAND THREE HUNDRED EIGHTY FIVE DOLLARS


Authorized Signature


Date

TONY WAYNE
Print Name



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-043

Response Required: No

Date: January 18, 2019

File Nos.:

Action Item(s):

CDRL: n/a

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 10
DISADVANTAGED WORKER (SP-38)**

Reference: ELMA-053

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 10

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 10

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 10 to Contract No.: OP28367-000 is made effective on the 9th day of January 2019 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, and Contract Modification No. 9 dated November 5, 2018 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

Modify Special Provisions SP-38 to read:

SP-38 LOCAL EMPLOYMENT PROGRAM

A. OBLIGATIONS OF CONTRACTOR

The Contractor shall implement the Local Employment Plan and Local Facility Capital Investments as approved by LACMTA and set forth in Exhibit C of the Contract. The Contractor's Local Employment Plan Commitment Value for Local Workers' Wages and Benefits is \$2,506,164. The Contractor's Disadvantaged Worker Commitment Value for Disadvantaged Workers' wages and benefits is \$250,616. The Contractor's Local Employment Plan Commitment Value for Local Facility Capital Investments is \$3,470,000. The Contractor's Total Local Employment Plan Commitment Value is \$5,976,164.

B. STATE OF CALIFORNIA NEW FULL TIME EQUIVALENT (FTE) POSITIONS & LOCAL FACILITY CAPITAL INVESTMENTS

The State of California Resident FTE Positions included under the Contractor's Local Employment Plan shall:

1. Include only Contractor and Subcontractor/Supplier with State of California Resident employees who provide work hours directly allocable to the OP28367-000 program in the State of California. Local Employees that also work on other projects may only be counted to the extent they perform work allocable to the

OP28367-000 Contract. A Local Employee may be expressed as a percentage of one FTE. To be considered eligible for California resident status, workers must maintain a physical presence in California, show intent to make California his or her permanent home, and be a U.S. Citizen or be granted and maintain an allowable immigration status prior to the Contract award date.

Evidence of intent to make California one's permanent home prior to Contract award may include, but is not limited to:

- California voter registration and voting in California elections
 - California driver's license
 - California automobile registration
 - California State income tax obligation on total income
 - Ownership of residential property or continuous occupancy or renting of an apartment on a lease basis where your personal belongings are kept
 - Active savings and/or checking accounts in a California bank
 - Immigration status with legal capacity to establish California residency
 - Maintaining a permanent military address and home of record in California
 - Military leave and earning statements showing California as legal residence.
2. Not include 1) current employees; 2) former, furloughed, and/or laid off employees who are separated from employment with the Contractor or Subcontractor/Supplier (if applicable) on or after the date of LACMTA's Notice of Intent to Award Letter; 3) employees who will not be working on the project; 4) employees hired by the Contractor or Subcontractor to work on other projects to fill in or replace current employees reassigned to OP28367-000, 5) hours and costs that cannot be segregated and audited pursuant to internal Cost Accounting Systems of the Contractor or Subcontractors; 6) Work conducted outside of the State of California; 7) Work performed by Non-State of California residents.

The Local Facility Capital Investments included under the Contractor's Local Employment Plan shall:

1. Include only facility improvements, additions, upgrades, modifications, or major improvements (not ordinary repairs and maintenance) to existing facilities, leased facilities, or newly purchased facilities within the State of California. capital equipment investments may be included only if the equipment has an estimated useful life of at least two (2) years and is valued at \$5,000 or more for any individual item. Proposers may include lease costs in their local facility capital investments only if ownership is shifted from the lessor to the lessee by the end of the lease period.
2. Not include: lease costs without a lease to own agreement, utility costs, minor repair costs, capital equipment investments less than \$5,000 for any individual item, short term (less than 2 years) capital equipment investments or operating costs.

C. DISADVANTAGED WORKER COMMITMENT

The Disadvantaged Worker Commitment included under the Contractor's Local Employment Plan shall:

1. Include a commitment to hire new Disadvantaged Workers that equals a minimum of 10% of the total of new wages and benefits for all Local Workers. A Disadvantaged Worker is defined as (1) being homeless; (2) being a custodial single parent; (3) receiving public assistance; (4) lacking GED or high school diploma; (5) having a criminal record or other involvement in the criminal justice system; (6) suffering from chronic unemployment; (7) emancipated from the foster care system; or (8) being a veteran of the Iraq/Afghanistan war.

G.D. REPORTS

The Contractor shall submit quarterly progress reports to LACMTA detailing its adherence to the commitments made in the Local Employment Plan. The quarterly report shall summarize the major actions taken during the prior quarter in implementation of the Employment, and shall:

1. Specify the total number of Local Employee Full Time Equivalent (FTE) work performed in that quarter by type (trade or craft), duration, and location, and disadvantaged worker status, and the annual value of those jobs (expressed in direct OP28367-000 hours expended and people hired);
2. Describe the workforce development and training programs carried out during that quarter and the amount expended by the Contractor for such programs;
3. Describe the quarterly outreach and recruitments coordinated through workforce development and community groups that led to new local hires and;
4. Describe the extent to which the Local Employment Plans producing long-term employment in skilled or trade labor;
5. Describe the value of construction performed toward the Facility Investment Commitment; include copies of design and construction contracts.

If any such report indicates that the Contractor has failed to achieve the Total Local Employment Plan Commitment Value for local employee wages and benefits, Disadvantaged Worker wages and benefits or Facility Investments set forth in its Local Employment Plan for the time period involved, the report shall include a corrective action plan designed to achieve the Total Local Employment Plan Commitment Value, including a time frame within which such corrective actions will be achieved.

D.E. RELATION TO MILESTONE PAYMENTS

LACMTA reserves the right to review and audit the Contractor's records, books and financial ledgers and cost accounting system at any time during the Contract term for purposes of determining the Contractor's compliance with Total Local Employment Commitment Value. In the event LACMTA determines that there has been a material

failure of the Contractor or its Subcontractors/Suppliers to comply with any requirement of its Local Employment Plan, LACMTA shall notify the Contractor in writing and shall provide the Contractor with thirty (30) days to correct such non-compliance. If such non-compliance is not corrected to the satisfaction of LACMTA within such 30-day period (or such longer period as LACMTA may in its discretion allow), LACMTA may withhold a portion of the next Milestone Payment due to the Contractor under CP-02, in an amount that LACMTA determines in its discretion to be reasonable and appropriate based on the nature and extent of the Contractor's non-compliance. Any amounts withheld by LACMTA under this subsection shall be repaid to the Contractor, as part of the next Milestone Payment due, when the Contractor demonstrates to the satisfaction of LACMTA that it has corrected the non-compliance. Any withholding under this subsection shall not affect the right of LACMTA to exercise other remedies available under this Contract for the Contractor's non-compliance with its Local Employment Plan, including the right to terminate for default in the event of repeated instances of such non-compliance.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 10 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature


TODD WAYNE
Type or Print Name

1/15/19
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By:


Elizabeth Hernandez
Principal Contract Administrator

1/17/19
Date



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-045

Response Required: No

Date: January 28, 2019

File Nos.:

Action Item(s):

CDRL: n/a

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 11
METRO REQUESTED CHANGES TO BUS DESIGN/CONFIGURATION**

Reference: ELMA-054

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 11

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 11

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 11 to Contract No.: OP28367-000 is made effective on the 15th day of January 2019 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, and Contract Modification No. 10 dated January 9, 2019, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

MTA requested and approved changes to the bus design/configuration for an increase in the aggregate Contract amount of **\$279,870**, inclusive of applicable taxes:

- A. Heat shield between catalytic converter and HVAC unit
- B. Protective layer film for modesty panels
- C. Ethernet cable for fare box
- D. Ethernet cables for Automatic Passenger Control
- E. Redesign of Rear Cross Seat Access to Engine Compartment (Jefferson doors)

Article IV COMPENSATION shall read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of ~~\$199,044,300~~ **\$199,324,170**, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. Training Aids - Additionally, in consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor for line items under Pricing Form PF-5 Training Aids in the amount of \$349,646 inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions, CP- 2 (H).

- a. Ea. One complete running engine and transmission assembly, including cooling and fueling systems, mounted on a suitable roll around stand (TS 5.6.3.a)
- b. Ea. Anti-Lock Brake Board (TS 5.6.3.f)
- c. Ea. Electric Air Conditioning Training Simulator Module (TS 5.6. 3.g)
- d. Ea. Video Security System (TS 5.6.3.i)
- e. Ea. Multiplex Electrical Training Board (TS 5.6.3.k)
- f. Ea. Voith DIWA.6 transmission training cutaway (TS 5.6.3.b)

Revised Pricing Forms: PF-1 and PF-1A as attached to this modification no. 11.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 11 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By: _____

Signature

Tony Wayne
Type or Print Name

4/15/17
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: _____

Wayne Okubo
Director, Contract Administration

4/24/17
Date

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 11

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

1.0 CONTRACT FOR 295 BUSES (BASE BUY)			Taxable		
No.	Qty.	Description of Item	Unit Price	Unit Price	Total Price
1	229	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A*:	\$596,199.46	\$615,939.30	\$141,050,100
	66	¹ 40' Low Floor CNG Buses (Base Buy) from PF-1A	\$595,805.53	\$615,545.53	\$40,626,005
1a	Lot	Manuals (Base Buy) (TS 5.6.4)	\$2,281.50	Lump Sum	\$23,400.00
1b	295	Vehicle Delivery Charge for Base Buy Value of all taxable delivery charges per bus**:		\$275.00	\$81,125.00
1c	229	Tax (Base Buy Production Bus 67 - 295)	9.75%	\$58,129.45	\$13,313,925
1d	66	Tax (Base Buy Production Bus 1-66)	9.75%	\$58,091.04	\$3,834,009
2	2	Pilot Buses Retrofit with Rear Axle Upgrade		\$8,600	\$17,201
2a		Tax	9.75%	\$838.55	\$1,677
3	Lot	Reserved			
4	Lot	Reserved			
5	Lot	Reserved			
6	Lot	Reserved			
7	Lot	Performance Bond (Base Buy)		Lump Sum	\$119,336.00
8	1,000	Total Training Hours for Base Buy***		\$175,000.00	
8a	900	Contractor (Proposer/Prime) Base Buy		\$175.00	\$157,500.00
8b	100	Subcontractor/Supplier Base Buy		\$175.00	\$17,500.00
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1		\$74,930.00	\$74,930.00
10a	15	Special Towing Equipment (TS 25)		\$386.00	\$5,790.00
10b		Tax	9.75%	\$37.64	\$564.53
11a	2	Rear Recovery Devices/Tie Downs (TS 25)		\$505.00	\$1,010.00
11b		Tax	9.75%	\$49.24	\$98.48
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation					
In U.S. Dollars Using Words:			ONE HUNDRED NINETY NINE MILLION THREE HUNDRED TWENTY FOUR THOUSAND ONE HUNDRED SEVENTY DOLLARS		
In U.S. Dollars Using Figures:				\$199,324,170	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 11

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

NOTE ¹ Unit Prices from Mod. No. 7 for Production Buses 1 - 65

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

2.0 CONTRACT FOR 150 UP TO 305 BUSES (OPTION BUY)

<u>No.</u>	<u>Qty.</u>	<u>Description of Item</u>	<u>Taxable</u>		
			<u>Unit Price</u>	<u>Unit Price</u>	<u>Total Price</u>
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles*	\$596,199.46	\$615,939.30	\$187,861,486.50
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$2,281.50	Lump Sum	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy Value of all taxable delivery charges per bus**:	\$0.00	\$275.00	\$83,875.00
10c		Tax (Option Buy)	9.75%	\$58,129.45	\$17,731,762.94
11		Reserved		\$	\$
12	Lot	Performance Bond for Option Buy***		Lump Sum	\$123,421.00
13	500	Total Training Hours for Option Buy****		\$87,500.00	
13a	450	Contractor (Proposer/Prime) Option Buy		\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy		\$175.00	\$8,750.00
14		Reserved		\$	\$

2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation

In U.S. Dollars Using Words: **TWO-HUNDRED FIVE MILLION NINE HUNDRED ELEVEN THOUSAND FOUR HUNDRED FORTY FIVE DOLLARS**

In U.S. Dollars Using Figures: **\$205,911,445**

NOTE * Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 11

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION				
No.	Qty.	Description of Item	Unit Price	Total Price
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)		\$6,370.00
15a		Direct Materials/Equipment	\$5,750.00	
15b		Labor Installation Costs	\$620.00	
15c		Non Recurring Cost	\$0.00	
15d		Other Costs (Identify)	\$0.00	
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)		\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00	
16b		Labor Installation Costs	\$1,020.00	
16c		Non Recurring Cost	\$0.00	
16d		Other Costs (Identify)	\$0.00	
17	600	Reserved****		
17a	295	Reserved		
17b	305	Reserved		
18	600	25-Year Certified CNG Tanks		\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$256,650.00	
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$265,350.00	
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)		\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00	
19b	295	Labor Installation Costs for Base Buy APC	\$460.00	
19c	295	Non Recurring Cost for Base Buy APC	\$	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 11

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

19d	295	Other Costs (Identify) for Base Buy APC		\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00	
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles		\$4,136.00	
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles		\$460.00	
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles		\$	
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles		\$	
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00	
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)			\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System		\$869.00	
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System		\$96.00	
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System		\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System		\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00	
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$869.00	
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$96.00	
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00	
21	600	USB Ports for Passenger Charging Only			\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00	
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00	
22	600	Optional Wireless Stop Request Switches (Bus set)			\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 11

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00	
23	600	Optional Full Color Destination Sign Sets (TS 86.3)			\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00	
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00	
24	Lot	Spare Parts (From Schedule A, Form PF-2)			\$2,261,788.13
25	Lot	Special Tools (Schedule B Form PF-3)			\$7,710.00
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)			\$355,010.00
27	Lot	Training Aids (Schedule D, Form PF-5)			\$989,385.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.					
In U.S. Dollars Using Words:			TEN-MILLION ONE HUNDRED THIRD EIGHT THOUSAND ONE HUNDRED THIRTY THREE DOLLARS		
			In U.S. Dollars Using Figures:		\$10,138,033

**** Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:
 ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx) Grams per brake horsepower-hour	Particulate Matter (PM) grams per brake horsepower hour
0.02	0.01

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 11

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

4.0 CONTRACT FOR BASE BUY, OPTION BUY, AND OPTIONALVEHICLE CONFIGURATION			Total Price
No.	Qty.	Description of Item	
1.0		Total Price for CONTRACT for 295 Base Buy Buses to be the BASIS for Price Proposal evaluation	\$199,324,170
2.0		Total Price for CONTRACT for 150 Up to 305 Option Buy Buses to be the BASIS for Price Proposal evaluation	\$205,911,445
3.0		Total Price for OPTIONAL VEHICLE CONFIGURATION for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation	\$10,138,033
4.0		Total Price for CONTRACT for 295 Base Buy Buses, for 150 up to 305 Option Buy Buses, and Optional Vehicle Configuration for Optional Equipment combined to be the overall BASIS for Price Proposal evaluation	
In U.S. Dollars Using Words:			FOUR-HUNDRED FIFTEEN MILLION THREE HUNDRED SEVENTY THREE THOUSAND SIX HUNDRED FORTY NINE DOLLARS
			In U.S. Dollars Using Figures: \$415,373,649

(Signature of Person Executing Proposal)

Date

TONY WAYNE VICE PRESIDENT & GENERAL MANAGER

Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES**FORM PF-1A (CNG - 40')****SUBSYSTEM EQUIPMENT****CONTRACT MODIFICATION NO. 11****Contractor:** ELDORADO NATIONAL (CALIFORNIA), INC**Contract No.:** OP28367-000

		<u>BASE BUY</u>	
<u>NO.</u>	<u>DESCRIPTION OF ITEM</u>		
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **		
1.1	TS 9. Propulsion Power Assembly (PPA)***		\$18,372
1.2	TS 9. Engine		\$60,324
1.3	TS 10. Cooling System		\$12,650
1.4	TS 18. Fuel System		\$68,300
1.5	TS 19.2 Heat shield between catalytic converter and HVAC unit		\$332.55
1.6	TS 23.1 Hinge Rear Cross Seat Access to the bulkhead		\$65.66
1.7	TS 31. Suspension		\$19,950
1.8	TS 33. Steering System		\$4,950
1.9	TS 37. Brakes		\$3,260
1.10	TS 39. Pneumatic System		\$6,850
1.11	TS 42. Charging System		\$36,800
1.12	TS 44. Multiplex Control System		\$24,200
1.13	TS 54. HVAC Climate Control System		\$29,450
1.14	TS 75.2 Protective film on modesty panels		\$116.94
1.15	TS 76 Ethernet Cable to Farebox		\$38.38
1.16	TS 78. Passenger Seats		\$28,955
1.17	TS 80. Doors		\$14,830
1.18	TS 81. Accessibility Provisions		\$19,740
1.19	TS 86. Communications		\$3,244
1.20	TS 86.3 Ethernet Cables in ITS enclosure		\$310.91
1.21	TS 11 Transmission		\$14,261
1.22	TS 78.1 USB Passenger Charging Port		\$480
1.23	TS85.1 Wirelesss Stop Request Button		\$485
1.24	TS 86.3 Matrix APC		\$4,596
1.99	TS 34 Meritor Rear Axle Upgrade		\$1,040
	All other bus subsystem equipment not included above		\$241,944

TOTAL CNG BUS PRICE**Production Bus 1 - 66 * \$615,545.53****Add Altro Flooring (Bus 67 - 295) \$393.80****Production Bus 67 - 295 \$615,939.30*** Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line Item 1 - **Base Buy**)

- Notes:**
- ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
 - Price for line Item Nos. 1a-27 in the CONTRACT PRICE SUMMARY(Form PF-1) shall not be included in computing price of any of the line items above.
 - *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99

GROUP A - UP TO 600 40' CNG BUSES**FORM PF-1A (CNG - 40')****SUBSYSTEM EQUIPMENT****CONTRACT MODIFICATION NO. 11**

		OPTION BUY	
NO.	DESCRIPTION	OF ITEM	
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **		
2.1	TS 9.	Propulsion Power Assembly (PPA)***	\$18,372
2.2	TS 9.	Engine	\$60,324
2.3	TS 10.	Cooling System	\$12,650
2.4	TS 18.	Fuel System	\$68,300
2.5	TS 19.2	Heat shield between catalytic converter and HVAC unit	\$332.55
2.6	TS 23.1	Hinge Rear Cross Seat Access to the bulkhead	\$65.66
2.7	TS 31.	Suspension	\$19,950
2.8	TS 33.	Steering System	\$4,950
2.9	TS 37.	Brakes	\$3,260
2.10	TS 39.	Pneumatic System	\$6,850
2.11	TS 42.	Charging System	\$36,800
2.12	TS 44.	Multiplex Control System	\$24,200
2.13	TS 54.	HVAC Climate Control System	\$29,450
2.14	TS 75.2	Protective film on modesty panels	\$116.94
2.15	TS 76	Ethernet Cable to Farebox	\$38.38
2.16	TS 78.	Passenger Seats	\$28,955
2.17	TS 80.	Doors	\$14,830
2.18	TS 81.	Accessibility Provisions	\$19,740
2.19	TS 86.	Communications	\$3,244
2.20	TS 86.3	Ethernet Cables in ITS enclosure	\$310.91
2.21	TS 11	Transmission	\$14,261
2.22	TS 78.1	USB Passenger Charging Port	\$480
2.23	TS 85.1	Wireless Stop Request Button	\$485
2.24	TS 86.3	Matrix APC	\$4,596
2.99	TS 34	Meritor Rear Axle Upgrade	\$1,040
		All other bus subsystem equipment not included above including flooring	\$242,338
TOTAL CNG BUS PRICE OPTION QUANTITY			*\$615,939.30

* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line item 10 - Option Buy)

- Notes:** 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
2. Price for line Item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99

(Signature of Person Executing Proposal)	Date
TONY WAYNE /VICE PRESIDENT & GENERAL MANAGER	
Type Name, Title	



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-044

Response Required: No

Date: January 24, 2019

File Nos.:

Action Item(s):

CDRL: n/a

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 12
MATRIX OF TECHNICAL SPECIFICATIONS CHANGES; CONFORMED
TECHNICAL SPECIFICATIONS (VOLUME II OF II)**

Reference: ELMA-055

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 12

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 12

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 12 to Contract No.: OP28367-000 is made effective on the 17th day of January 2019 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, and Contract Modification No. 11 dated January 15, 2019 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

Changes/revisions to Contract OP28367-000, Technical Specifications - Volume II of II as outlined in Attachment I. A conformed copy of the updated Technical Specifications, dated January 14, 2019, is enclosed with this modification.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 12 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature

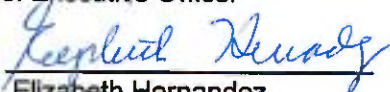
Tony Wayne
Type or Print Name

1/21/19
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By:


Elizabeth Hernandez
Principal Contract Administrator

1/23/19
Date

CONTRACT NO.: OP28367-000

Modification No. 12, Attachment I

Volume II Technical Specification Changes

Ref #	Reference #	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue						
1	RFP - Amendment No. 4	<p>TS 1. Scope</p> <p>These technical specifications contain the LACMTA's requirements for wheelchair accessible low floor transit buses, which accommodate the widest spectrum of passengers including children, adults, the elderly, and the physically disabled, conforming to all applicable ADA regulations. These buses shall provide maximum passenger appeal in appearance, comfort, and safety; combined with excellence in operating characteristics, standardization with existing LACMTA fleet, economy of operation, maximum efficiency, optimum seating, and conformity with federal, state and local regulations and emission standards. Buses shall include interior and exterior styling features in common with existing Metro BRT type buses such as streamlined appearance. These buses shall incorporate a high level of subsystem integration coordinated with central diagnostic functions and single point Operator interface. Buses shall have a minimum expected life of 12 years or 500,000 miles, whichever comes first. Refer to Table 17 for design life goals.</p> <p>Metro will consider and evaluate proposals of Zero Emission (ZE) buses that meet legal, dimensional, maintainability and performance requirements outlined in this document. Vendors proposing electric buses for consideration should also include a list of any specialty equipment used for fueling and/or recharging vehicle, any specialty support and/or diagnostic equipment, and any other unique equipment that will be necessary to support daily operation of the vehicle. Any specialty equipment required to support the ZEB project should be itemized and listed along with estimated installation costs as part of each Contractor's proposal. Any ZE buses proposed in response to this solicitation shall meet CARB's definition for zero emission buses.</p> <p>These technical specifications have been prepared with emphasis on in-service reliability. The basic structure of the bus including major suspension components shall be designed to last the life of the bus without major overhaul or replacement. Wherever brand, manufacturer or product names are indicated in the Technical Specification, they are included for the purpose of establishing identification and a general description of the Goods, Equipment, Components or parts. Wherever such names appear, the term "OR APPROVED EQUAL" is deemed to follow. The decision whether a proposed Item is an approved equal will be rendered by LACMTA as defined by Contract GC-02-H SP-34 Non-Restrictive Clauses.</p>						
2	RFP - Amendment No. 4	<p>TS 5.6.6 Diagnostic Laptop PC Specifications</p> <p>RequiredOptional diagnostic laptop shall be Dell Latitude E6540 and at a minimum contain the following:</p> <p style="text-align: center;">TABLE 2 Laptop Specifications</p> <table><tr><th>Category</th><th>Description</th></tr><tr><td>Processor</td><td>Intel Core i5-6300U (Dual Core, 2.4GHz, 3M cache)</td></tr><tr><td>Operating System</td><td>Windows 7 Professional English, French, Spanish 64-bit (Includes Windows 10 Pro License)</td></tr></table>	Category	Description	Processor	Intel Core i5-6300U (Dual Core, 2.4GHz, 3M cache)	Operating System	Windows 7 Professional English, French, Spanish 64-bit (Includes Windows 10 Pro License)
Category	Description							
Processor	Intel Core i5-6300U (Dual Core, 2.4GHz, 3M cache)							
Operating System	Windows 7 Professional English, French, Spanish 64-bit (Includes Windows 10 Pro License)							

CONTRACT NO.: OP28367-000
Modification No. 12, Attachment I
Volume II Technical Specification Changes

Ref #	Reference #	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue																									
		<table><tr><td>Memory</td><td>8GB (2x4GB) 2133MHz DDR4 Memory</td></tr><tr><td>Hard Drive</td><td>500GB 7200rpm 7.2krpm HD</td></tr><tr><td>Video Card</td><td>AMD Radeon RT M360, for I5-6300U (Vpro Capable)</td></tr><tr><td>Optical Drive</td><td>Dell External USB Slim DVD+/-RW Optical Drive</td></tr><tr><td>Battery</td><td>Primary 4-cell 62W/HR Battery</td></tr><tr><td>Adapter</td><td>65 Watt AC Adaptor</td></tr><tr><td>Power Cord</td><td>US Power Cord</td></tr><tr><td>LCD</td><td>15.6-inch HD (1366x768) Anti-Glare LCD</td></tr><tr><td>Wireless</td><td>Intel Dual-Band Wireless-AC 8260 Wi-Fi + BTW8260AC 4.1 Wireless Driver (2x2)</td></tr><tr><td>Keyboard</td><td>Internal Dual Pointing Keyboard, English</td></tr><tr><td>Security Hardware</td><td>Absolute Computrace Complete 5 Year - Education</td></tr><tr><td>System Management</td><td>No Out-of-Band System Management</td></tr></table> <p>System shall be compatible with all diagnostic software. Contractor shall provide a complete listing of all proposed software and hardware to the LACMTA Project Manager prior to purchasing.</p> <p>Because of the time delay between the procurement process and receipt of required computer equipment, the final laptop computer configuration shall be subject to approval by the LACMTA at delivery to ensure it has all of the appropriate and necessary software and is compatible with LACMTA's other existing laptop computers. All laptop PCs shall include a suitable protective carrying "soft" case and a Microsoft mouse.</p>	Memory	8GB (2x4GB) 2133MHz DDR4 Memory	Hard Drive	500GB 7200rpm 7.2krpm HD	Video Card	AMD Radeon RT M360, for I5-6300U (Vpro Capable)	Optical Drive	Dell External USB Slim DVD+/-RW Optical Drive	Battery	Primary 4-cell 62W/HR Battery	Adapter	65 Watt AC Adaptor	Power Cord	US Power Cord	LCD	15.6-inch HD (1366x768) Anti-Glare LCD	Wireless	Intel Dual-Band Wireless-AC 8260 Wi-Fi + BTW8260AC 4.1 Wireless Driver (2x2)	Keyboard	Internal Dual Pointing Keyboard, English	Security Hardware	Absolute Computrace Complete 5 Year - Education	System Management	No Out-of-Band System Management	
Memory	8GB (2x4GB) 2133MHz DDR4 Memory																										
Hard Drive	500GB 7200rpm 7.2krpm HD																										
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Keyboard	Internal Dual Pointing Keyboard, English																										
Security Hardware	Absolute Computrace Complete 5 Year - Education																										
System Management	No Out-of-Band System Management																										
3	RFP - Amendment No. 4	TS 9.2.2 Propulsion System Service <p>The propulsion system shall be arranged so that accessibility for all routine maintenance is ensured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems. However, LACMTA shall recognize that properly rated equipment and safety electrical work practices are essential when servicing high-voltage electric components. The air compressor, radiator, all propulsion accessories, and any other component requiring service or replacement shall be easily re moveable. The Contractor shall provide all specialty tools and diagnostic equipment required for maintaining the propulsion system in accordance with the Special Tools List.</p> <p>All compartments and areas that include components using hazardous or higher voltages, shall incorporate safety warning labels to provide appropriate warning for service personnel. A secondary label shall be included to list the voltages in use within the compartment or area. Labels shall be visible when approaching the area. Labels shall include pictograph symbols for easy recognition.</p>																									
4	RFP - Amendment No. 4	TS 10.1 Engine Cooling <p>A heavy-duty stainless steel radiator surge tank shall provide sufficient draw down capacity as required by the engine manufacturer. A heavy-duty single glass tube, (non-plastic), shall be provided to determine satisfactory engine coolant level</p>																									

CONTRACT NO.: OP28367-000

Modification No. 12, Attachment I

Volume II Technical Specification Changes

Ref #	Reference #	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue
		<p>accessible by opening the surge tank access door. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system with both it and the water filler no more than 65 inches above the ground. Both shall be accessible through the same access door. Surge tank filler cap shall have a safety lock. A ¼-inch NPT port shall be provided in a convenient location in the surge tank for the LACMTA's pressure testing equipment, refer to CDRL Table 20. The system shall be designed to allow coolant to be added while the cooling system is at full operating temperature incorporating an un-pressurized coolant overflow reservoir.</p> <p>The radiator shall be of durable corrosion-resistant construction with bolt-on, removable, metal header tanks. No heat producing components, such as intake charge-air-coolers, or climate control system components shall be mounted between the engine cooling air intake aperture and the radiator. Sensor port fittings (1/8-inch NPTF) shall be provided in the upper and lower sections of the radiator to allow the use of thermocouple for diagnostics. Louvered fins are not acceptable.</p> <p>Self-Cleaning</p> <p>Radiator and charge air cooler fan(s) shall be electrically driven and capable of reverse operations for periodic self-cleaning of the radiator and charge air cooler. For multiple fans, system shall be designed to prevent air recirculation in the event of individual fan failure.</p> <p>A cooling system pressure gauge with an operating range of 0-30 psi, easily readable through the surge tank access door, shall be installed to monitor static and operating pressures.</p>
5	RFP - Amendment No. 4	<p>TS 42.1.4 Battery Compartment</p> <p>The battery compartment shall prevent accumulation of water and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. Battery enclosure, including access door or cover, shall be constructed of fiberglass, suitable plastic material, or stainless steel.</p> <p>The battery quick disconnect access door shall be identified with a decal. The decal size shall not be less than 3.5 × 5 inches (8.89 × 12.7 cm).</p> <p>The battery hold-down bracket shall be constructed of a non-metallic material (plastic or fiberglass).</p>
6	RFP - Amendment No. 4	<p>TS 43.1 Wiring and Terminals</p> <p>Kinking, grounding at multiple points, stretching and reducing the bend radius below the manufacturer's recommended minimum shall not be permitted. The wires used between data Bus and devices shall consist of UL or CSA approved multi-strand wires. The load side shall have wire UL or CSA approved.</p> <p>Individual slip-on "spade" or "blade" type connectors are acceptable on a case-by-case basis during Pre-Production meeting review.</p>

CONTRACT NO.: OP28367-000

Modification No. 12, Attachment I

Volume II Technical Specification Changes

Ref #	Reference #	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue						
		<p>This access door shall not require any special locking devices to gain access to the switch. The door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.</p> <p>The batteries shall be securely mounted on a self-draining stainless steel or other non-corrosive material tray that can accommodate the size and weight of the batteries without deformation. The battery tray shall pull out easily and properly support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced and filled. A locking device shall retain the battery tray to the stowed position. A maximum of four batteries shall be securely mounted on each heavy-duty battery tray which shall accommodate the battery system. Tray(s) shall pull out on heavy-duty rollers or swing out easily from outside the bus for service, inspection, and replacement.</p> <p>If not located in the engine compartment, the same fire-resistant properties must apply to the battery compartment. Sparking devices shall not be located within the battery box.</p>						
7	RFP - Amendment No. 4	<p>TS 86.8 ITS Provisions, Wireless Local Area Network (WLAN)</p> <p>WLAN antenna, including five) leads; two) Cellular, two Wi-Fi and one GPS and an additional Wi-Fi antenna inside the bus for passenger Wi-Fi. Sierra Wireless, InMotion, oMG 2032 or an approved equal wireless router/switch and feedline shall be installed, subject to LACMTA approval in Pre-Production meetings. (Refer to Section TS 88.1 Approved Equals). Power for wireless router/switch shall be independently timed by the router to allow automatic turn-off one hour or more after bus is parked as a configurable feature of the router.</p>						
8	RFP - Amendment No. 4	<p style="text-align: center;">TABLE 15 Approved Products</p> <table border="1"> <thead> <tr> <th>PRODUCT</th><th>MANUFACTURER</th><th>PRODUCT SPECIFICATION</th></tr> </thead> <tbody> <tr> <td>Wireless Router (Wi-Fi System)</td><td>InMotion Sierra Wireless</td><td>InMotion, oMG 2032</td></tr> </tbody> </table>	PRODUCT	MANUFACTURER	PRODUCT SPECIFICATION	Wireless Router (Wi-Fi System)	InMotion Sierra Wireless	InMotion , oMG 2032
PRODUCT	MANUFACTURER	PRODUCT SPECIFICATION						
Wireless Router (Wi-Fi System)	InMotion Sierra Wireless	InMotion , oMG 2032						
9	RFP - Amendment No. 4	<p>TS 88.5 References</p> <table border="1"> <thead> <tr> <th>SAE #</th><th>Title</th><th>Date Published</th></tr> </thead> <tbody> <tr> <td>J1908</td><td>Electrical Grounding Practice</td><td>Jan 1, 1996</td></tr> </tbody> </table>	SAE #	Title	Date Published	J1908	Electrical Grounding Practice	Jan 1, 1996
SAE #	Title	Date Published						
J1908	Electrical Grounding Practice	Jan 1, 1996						
10	RFP – Amendment No. 5	<p>TS 5.6.5 Special Equipment</p> <p>Option, Special Service Equipment</p> <p>The items in this section are discretionary and may be purchased through this contract, subject to LACMTA approval.</p> <p>The Contractor shall supply pricing for 30 sets of Special Service Equipment listed below for use by LACMTA training staff. Pricing for this special service equipment is to be provided to the LACMTA on Form PF-4-Schedule C of Prices Special Service Equipment.</p> <p>The LACMTA is aware that diagnostic equipment and/or software has been</p>						

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		<p>developed or is being developed by many of the OEMs to assist in the maintenance of the Buses. Proposer is required to submit a list of recommended special equipment, software and/or diagnostic tools deemed necessary to provide state-of-the-art service for the bus systems. Depending on the type of available equipment and/or software, the LACMTA may wish to obtain complete sets of such Special Service Equipment and/or software, plus any additional tools identified by the OEM manufacturer required to diagnose, calibrate, or remove-and-replace, all equipment provided with this bus order. The purchase of any such Special Equipment and/or software is at the sole option of the LACMTA. Because of technological changes which may occur prior to and during the actual production of the buses, the LACMTA reserves the right to issue Change Orders for updated diagnostic equipment, tools and software, and other Special Service Equipment at any time prior to Contract closeout.</p> <p>For the Base order or any Option order that is exercised the Contractor shall provide pricing for Diagnostic Tools and Equipment listed below. The quantities listed below are for 300 Base Vehicles. Quantities for Diagnostic Tools and Equipment of Option Vehicles will be determined at the time the Option is exercised. At a minimum, Proposers shall provide a complete listing of such currently available equipment and/or software and the proposed pricing in the Price Forms.</p> <p>Engine/Propulsion and Electric Drive/Transmission:</p> <ul style="list-style-type: none"> • Engine/Propulsion Diagnostic software, including necessary cables and connectors with one year software registration. • Transmission/Electric Drive diagnostic software, including necessary cables and connectors. • PPU diagnostic software, including necessary cables and adapters. • Nexiq Technologies USB Link PC to Vehicle Interface. • ABS/Regenerative Braking diagnostic software, including necessary cables and connectors. • Engine/Propulsion cooling system diagnostic or programming software. • Power Management diagnostic tools and software. • Battery Management diagnostic tools and software. <p>Electrical/Vehicle Control System:</p> <ul style="list-style-type: none"> • Multiplex/Vehicle Control software and connection kit to include applicable cables, connectors and translator boxes, no registration or upgrade fees attached.

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		<ul style="list-style-type: none"> Diagnostic laptop (to be defined) to include: applicable cables, connectors and translator boxes. Multiplex Module programmers, (if applicable). <p>Energy Storage and BMS</p> <ul style="list-style-type: none"> Power management diagnostic software and connection kit to include applicable cables and adapters, including registration fees. <p>Doors</p> <ul style="list-style-type: none"> Door System diagnostic or programming software. <p>Chassis—Undercarriage:</p> <ul style="list-style-type: none"> Towing Equipment—To tow bus from front or rear hookup. <p>Interior:</p> <ul style="list-style-type: none"> Video Security Diagnostic Kits including test fixture(s) and associated software application(s) that allows for installing components of each group, (Video Security, IBSS and Destination Sign) so that all the components of each group are easily accessible for programming, replacement, adjustment and troubleshooting including but not limited to all cables, DVR docking station, cameras, etc. Training aid should be integrated with the training program to allow off-the-bus training and familiarization of the systems. Destination Sign Diagnostic Equipment (J1708 Protocol Boxes/software). <p>Heating Ventilation Air Conditioning (HVAC):</p> <ul style="list-style-type: none"> A/C interface software and cable. <p>Diagnostic PC:</p> <ul style="list-style-type: none"> Diagnostic laptops with necessary interface cables, power adapters.
11	RFP - Amendment No. 5	<p>TS 25.Towing</p> <p>Towing attachment points shall be provided on the front of the bus. Each towing device, when used with a load equalizing sling, shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 degrees of the longitudinal axis of the bus. If applicable, the rear towing device(s) shall not provide a toehold for unauthorized riders. The method of attaching the LACMTA's towing bar shall require the specific approval of the LACMTA in Pre-Production meetings and shall not require the removal, or disconnection, of front suspension or steering components. Removal of the bike rack is permitted for attachment of towing devices. Contractor shall provide 15 sets of any special towing equipment adapters, if required, so that the LACMTA is able to flat tow the bus. Contractor shall demonstrate compliance with these provisions using the Pilot Bus.</p> <p>Pricing for the towing equipment is to be provided to the LACMTA on Form</p>







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		<p>PF-3-Schedule A for CNG and Schedule C for ZE of Prices Special Tools.</p> <p>Provision of Connectors for Towing Shop air connectors shall be provided at the front and rear of the bus and shall be capable of supplying all pneumatic systems of the bus with externally sourced compressed air. The location of these shop air connectors shall facilitate towing operations. A second air supply should be provided to allow the rear service brakes to be applied using the tow truck brake signal air pressure to apply the rear primary service brakes.</p> <p>All male fittings shall have an additional quarter turn manual shut off valve provided near the front bumper for use only during towing (AMFLO CP1 and C2), subject to LACMTA approval in Pre-Production meetings. Fittings shall be protected against dirt and moisture when not in use. Air connectors shall be LACMTA standard air chucks conveniently located in the engine compartment. Air lines leading to the external air shall include hand shut-off valves.</p> <p>Lifted (Unsupported) Front Axle and Flat Towing Capability The front towing attachment points shall allow attachment of the LACMTA's standard tow bar. The front towing attachment points shall permit towing of the bus at curb weight by the towing device(s) and the LACMTA tow bar without damage to anybody panel or component. These devices shall permit common flat towing.</p> <p>Two rear recovery devices/tie downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus. The method of attaching the tow bar or adapter shall require the specific approval of the LACMTA in pre-production meetings. Any tow bar or adapter exceeding 50 pounds should have means to maneuver or allow for ease of use and application. Each towing device shall accommodate a crane hook with a one-inch throat.</p>
12	RFP - Amendment No. 5	<p>TS 76 Fare Collection</p> <p>Space and structural provisions shall be made for installation of 41-inch GFI Genfare Odyssey Validation farebox and shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver area, shall not restrict operation of driver controls and shall not — either by itself or in combination with stanchions, transfer mounting, cutting and punching equipment, or route destination signs — restrict the driver's field-of- view per SAE Recommended Practice J1050. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The farebox location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the farebox shall be readable on a daily basis. The floor under the farebox shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the farebox.</p> <p>Adjacent to the farebox area and within easy reach of the Operator, Contractor shall</p>

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		<p>provide a small clipboard approximately 4.5 inches by 5.5 inches to hold the operator schedule, (paddle).</p> <p>The Contractor shall provide and install GFI Genfare Odyssey Validation farebox base plate, power leads and ITS interface cable, subject to LACMTA approval in Pre-Production meetings.</p> <p>Note: Proposers are to contact GFI Genfare directly to determine correct part numbers, harness length requirements, etc. The under floor reinforcement shall be of adequate strength to anchor the farebox using GFI installation kit B22249-0001 D22581-0005 or equivalent. Reinforcement plate shall include permanently attached nuts to secure the farebox base plate to the floor.</p> <p>A circuit breaker protected, 20-amp, 24-Volt DC battery circuit, shall be provided and powered through the battery connect switches. This power circuit shall include a grounded lead. A one-inch inside diameter waterproof conduit shall be provided from the ITS enclosure to the farebox base plate mounting location, through the bus floor, to protect the power leads and ITS interface cable, subject to LACMTA approval in Pre-Production meetings. Farebox end of conduit shall protrude above the floor at a minimum 1/2 inch to prevent moisture from entering the conduit.</p>																	
13	RFP - Amendment No. 5	<p>TS 80.7 Door Height Above Pavement</p> <p>It shall be possible to open and close either passenger door when the bus loaded to gross vehicle weight rating is not knelt and parked with the tires touching an eight-inch high curb on a street sloping toward the curb so that the street side wheels are five inches higher than the right side wheels.</p> <p>When the bus is at operating level, opened doors shall be a minimum 15.5 14 to 16 inches above the ground.</p>																	
14	RFP - Amendment No. 5	<p>Note: Table 19b applies to zero emission bus decals. Location and quantity of these decals will vary depending on the individual bus configuration. Final layout will be determined during Pre-Production meetings.</p> <p style="text-align: center;">TABLE 19b High Voltage – Metro ZE Bus</p> <table><tr><th>Area</th><th>Description</th><th>Size - Inches</th><th>Location</th><th>Qty</th><th>Total</th></tr><tr><td rowspan="2">1. Lock Out Compartment</td><td></td><td>4 x 6</td><td>Inside the compartment - Next to the switch</td><td>1</td><td>AR</td></tr><tr><td></td><td>4 x 6</td><td>Inside the compartment - Next to the switch</td><td>1</td><td>AR</td></tr></table>	Area	Description	Size - Inches	Location	Qty	Total	1. Lock Out Compartment		4 x 6	Inside the compartment - Next to the switch	1	AR		4 x 6	Inside the compartment - Next to the switch	1	AR
Area	Description	Size - Inches	Location	Qty	Total														
1. Lock Out Compartment		4 x 6	Inside the compartment - Next to the switch	1	AR														
		4 x 6	Inside the compartment - Next to the switch	1	AR														




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		2. Battery Compartment(s)		6 x 4	Inside the compartment - On the battery box	1	AR
				4 x 6	Inside the compartment - On the battery box	1	AR
			XXX VOLTS	1 x 4	Inside the compartment - On the battery box	1	AR
				2 x 3	On the battery enclosure door, visible from outside	1	AR
		3. Automatic Start Equipment		2 x 4	On the equipment	1	AR
				2 x 4	On the compressor	1	AR
			XXX VOLTS AC	1 x 6	On the equipment and control boxes	1	AR
			3 PHASE				
			XXX VOLTS	1 x 4	On the equipment and control boxes	1	AR
		4. Auxiliary Motor Controller(s)	XXX VOLTS AC	1 x 6	On the control box(es) and motor(s)	1	AR
		5. PPU and Hazardous Voltage Area(s)		2 x 3	On the enclosure door, visible from outside	1	AR
				6 x 4	On the enclosure door, visible from inside	1	AR
			XXX VOLTS	1 x 4	Inside the compartment	1	AR

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				4 x 6	On the enclosure door, visible from inside	1	AR
		6. Charging Connector (Bus Side)		2 x 3	On the enclosure door, visible from inside	1	AR
		7. Charging Connector (Station Side)		2 x 3	Next to each charging connector	1	AR
15	RFP - Amendment No. 5	Metro 40ft Decal Guide Revision 8-26-16 Decal document updated with revision date of 8-26-16 to include two additional decals for zero emission buses on last page, CS5775 and CS6289. Location and quantity for these two decals to vary depending on particular bus configuration. Final layout will be determined during Pre-Production meetings.					
16	RFP - Amendment No. 7	TS 2 Definitions The following definitions are added to section TS 2. Engine Package: Complete engine assembly incorporating accessories necessary for operation as applicable. Package shall include at a minimum; turbocharger(s), supercharger(s), electronic control modules, manifolds, throttle body, starter, air compressor, hydraulic pump and engine mounted filters. Radiator Package: Complete system with accessories necessary for operation. Package shall include at a minimum; heat exchanger(s), cooling fan(s), electronic controller(s) with diagnostic communications and alternator if applicable.					
17	RFP - Amendment No. 7	TS 5.6.4 Manuals Manual Review and Approval The Contractor shall be solely responsible for the accuracy and completeness of the manuals and the conversion of the Parts manual into Electronic Parts Catalog (EPC). The LACMTA will assemble a technical review committee to define acceptance criteria of the manuals deliverables, quality standards, file formats, expected results and the testing methods to be used. The Contractor shall put together a team with the technical capabilities to successfully complete these deliverables to LACMTA's satisfaction. The Contractor will be required to participate in Manual Review and Approval process and attend one service manual review meeting held at the LACMTA shortly following LACMTA Notice to Proceed. Except for the Parts Index, the draft manuals shall be shipped simultaneously with the first Pilot Bus. The final meeting will be scheduled after receipt of draft manuals but prior to the ship date of the first Production Bus. Draft Manuals Except for the Parts Index, the Contractor shall provide the LACMTA with draft					

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		<p>manuals simultaneously with the Pilot Bus: Draft manuals shall include:</p> <ul style="list-style-type: none"> • Ten draft hardcopies each of the Service, Parts and Operator's manuals plus a list of all proposed OEM Component Repair manuals, simultaneously to the shipping of the first Pilot Bus. • Draft Parts manuals are further defined to include a minimum of 95 percent of all part numbers with an error rate of less than 5 percent. It will be the responsibility of the Contractor to ensure the accuracy of all part numbers. • Hard copy manuals shall be provided in suitable 3-post binders clearly identified with the Bus manufacturer and model number, LACMTA Bus series number, revision date, and table of contents. • A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production Bus. <p>Final Manuals</p> <p>Final DVD editions of Service, Parts and Operator's manuals must be delivered within 90 days after the start date for production Buses. Following the 90 day period after start of production the LACMTA may withhold \$10,000 per Bus delivered until all maintenance and parts manuals are received.</p> <ul style="list-style-type: none"> • Ten final hardcopy sets of Service and Parts manuals shall be provided for each 100 Buses and 12 total sets for Subsystem OEM manuals. • For any Option Buses, four hardcopy sets of Service manuals shall be provided for each 10 Option Buses. • Twenty final edition Service and Parts manuals excluding subsystem OEM component manuals shall be provided on DVD • The Contractor shall supply two final hardcopy Operator's manuals per every 10 buses and five total final electronic copies on DVD. • Contractor shall supply one diagnostic code card for each bus system a listing of diagnostic codes with final service manuals delivered that covers trouble shooting fault trees/codes related to the PPU engine, transmission, ABS system, etc. <p>If separate subsystem OEM component supplier manuals are provided for preventative maintenance, diagnostics, parts and repair, then the number of manuals provided shall correspond with the quantities described above.</p> <p>Manuals on DVD</p>

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		<p>Final edition Service and Parts manuals shall include an index and search function to locate items by subject, part name, or system. Updates shall be delivered to the Maintenance Instruction Department as they occur. Updates must be identified with effected system and with update revision dates.</p> <p>The DVD versions shall be provided with licenses which permit the MTA to load the manuals on an unlimited number of MTA computers and/or server units. Neither generic nor poor quality reproductions shall be acceptable. Manuals must be in English. The DVD version may consist of multiple DVDs.</p> <p>The Contractor must be able to work with the 3rd party EPC provider (Digabit, Inc., 850 Englewood Pkwy. #200, Englewood, CO 80110 (Phone # 303 957-2822)) directly to convert their Parts manual into an EPC format suitable for use with LACMTA's current ERP/EAM systems. EPC integration shall include the ability of the contractor to provide information in the current format for initial EPC publishing needs and continue working with the EPC publishing provider using current data formatting standards over the life cycle of the bus.</p> <p>Manual - Updates</p> <p>Updates to the manuals covering revisions, corrections or additions shall be grouped and released to the LACMTA as discovered or disclosed by LACMTA at a minimum of once per year but not to exceed three times per year for 12 years. Updates shall be provided in electronic and hardcopy format and shall be delivered to the LACMTA Maintenance Instruction Department. Updates must be identified with defected system and with update revision dates.</p> <p>Service Manuals</p> <p>Service manuals shall be divided into separate sections as listed below:</p> <ul style="list-style-type: none"> a) Preventative Maintenance Procedures (PMP) by component or system - Specifically for use at LACMTA Operating Divisions. Procedures must identify what inspection criteria procedures are needed for each component or system at intervals by time or mileage. Daily inspection is not acceptable criteria for preventative maintenance. b) Diagnostic Procedures - Include troubleshooting guides for all air, fluid, mechanical and electrical systems. Include schematics for fuel, air, hydraulic, coolant, HVAC, multiplex, braking and electrical with wiring harness drawings. c) Component Repair/Service - The manuals must be organized to show every subsystem in the bus including all re-buildable components used. For example, the steering box, air compressor, power steering pump, differential, transmission/electric drive/electric drive and PPU must be included. Component Reference Diagrams must be specific and referenced by exact exploded view diagrams. <p>PMP Section</p> <p>PMP manuals shall be specific for the LACMTA's bus order and shall include the manufactures inspection and maintenance requirements for buses covered by this procurement and shall not contain any unrelated or unnecessary requirements. All</p>

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		<p>routine maintenance schedule requirements, including maintenance of major subsystems, shall be provided in one master PMP matrix. The master PMP matrix shall include; specific service task, service mileage, and PMP service manual section reference. The PMP manual shall also include remove-and replace instructions for all sub-system components including: PPA, engine, transmission, starter, alternator, A/C compressor, air compressor, etc.</p> <p>Diagnostic Section</p> <p>Diagnostic manuals which may be integrated with the maintenance manual shall include isometric, phantom, and schematic illustrations as necessary to completely describe each system including but not limited to location and routing of air, hydraulic, water, lines and electrical harnesses including all anchor and attachment points. Diagnostic manuals shall also include trouble shooting guides necessary to complete running repairs for all supplied Bus equipment.</p> <p>All wiring schematics and wiring harness drawings required in Service Manuals shall be provided in a separate publication in 11 X 17 inch uniform format. OEM schematics and those provided by all subsystem manufacturers shall be uniform diagrams with an emphasis on readability by mechanics performing diagnostic functions. Drawings shall provide functional grouping, continuity and interfacing at all connection points to eliminate unnecessary interfacing between multiple drawings and subsystem supplier drawings. Electrical schematic drawings shall include diagrams to clearly and accurately show locations of all electrical connectors splice and ground points for the Bus wiring harnesses.</p> <p>Component Repair/Service Section</p> <p>Fourteen sets of Repair Manuals necessary to rebuild all Contractor supplied Units including: PPU, transmission/electric drive, HVAC system, starter, alternator, air compressor, etc., shall be provided. Each copy shall be the latest hardcopy edition issued by the OEM component manufacturer. Repair manuals shall be comprehensive and shall cover all aspects of repair from tear-down through final test as recommended by the Bus OEM. Repair manuals shall be grouped in sets and with a table of contents. Each set shall be organized and mounted onto a suitable table top holding rack subject to LACMTA approval. The LACMTA requires fourteen sets of wall posters with the repair manuals showing subsystem, component and part assembly, parts numbers, torque values, installation notes, etc. A list of subsystem component repair manuals shall be submitted for LACMTA review at time of Pilot Bus delivery.</p> <p>Parts Manuals</p> <p>Must be specific and referenced by exact exploded-view diagrams and organized to coordinate with Service Manuals for ease of use. Parts manuals shall be specific to the LACMTA bus order including subsystem OEM PPU and transmission/electric drive parts listings. IPC and EPC manuals provided shall include illustrations with necessary exploded diagrams and data arranged so that part numbers can be readily found and identified in the illustration for each system and subsystem component, assembly, subassembly or piece part, from an orderly breakdown of the complete bus. An assembly or subassembly is an identifiable portion of a component of a system or subsystem.</p>

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		<p>Parts manuals shall contain a reference part number index, listed in numerical order with descriptions, and page numbers. The comprehensive number index shall include major subsystem parts numbers which includes the PPU, transmission/electric drive/, and air conditioning. A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production bus.</p> <p>The parts list index shall also be provided to the LACMTA in a PC spreadsheet file on a DVD compatible with Microsoft Excel and include subsystem supplier part numbers, part description, and price. OEM component supplier part numbers are required.</p> <p>Price List</p> <p>Ten copies of the current price list shall be provided separately as a supplement to the final parts manuals. Price lists shall be updated at least annually and provided for the life of the bus as they are updated.</p> <p>Operator's Manuals</p> <p>The Operator manuals shall be specific to the LACMTA bus configuration and designed for a LACMTA Bus Operator target audience, without extraneous material or information. Manuals shall clearly outline the features and controls, indicators necessary for safe and proper operation of the buses including ADA equipment.</p>
18	RFP - Amendment No. 7	<p>TS 83 Destination Signs</p> <p>An automatic electronic bright white LED destination sign system shall be furnished on the front, on the curbside near the front door, on the right-front windshield area and on the rear of the bus. The destination signs on the front and front curbside shall be bright white high definition. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. Sign system shall provide optimum visibility of the message display units for passengers and shall meet applicable ADA requirements.</p> <p>The destination sign compartments shall meet the following minimum requirements:</p> <ul style="list-style-type: none"> • Compartments shall be designed to prevent condensation and entry of moisture and dirt. • Compartments shall be designed to prevent fogging of both compartment window and glazing on unit itself. • Access shall be provided to allow cleaning of inside compartment window and unit glazing, subject to LACMTA approval in Pre-Production meetings. • Front window exterior display area shall be sized to allow full visibility of the front destination sign. <p>Destination signs shall be installed in such a manner as to facilitate easy access and replacement of the entire sign assembly, or components. Components such as electronic control modules shall be replaceable from inside the Bus. Where possible, parts shall be commercially available.</p> <p>All signs shall be controlled via a single human-machine interface (HMI). In the</p>

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		<p>absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver.</p> <p>Optional Full Color Destination Signs</p> <p>Pricing for optional full color signs in; Front, Side, Rear and Run Number locations, shall be submitted on Price Form PF-1, Schedule of Optional Vehicle Configuration. The signs shall be capable of utilizing the full color spectrum for displaying characters and background with adjustable resolution to provide optimum clarity for passengers reading the messages. The color signs shall meet all sections of TS 83 requirements for white signs where applicable.</p> <p>Front Destination Sign</p> <p>The front destination sign shall have no less than 4,800 pixels, 24 rows by 200 columns, with a message display area of not less than 8.01 inches high by not less than 64.6 inches wide.</p> <p>Side Destination Sign</p> <p>Side display area shall have no less than 1,568 pixels, 14 rows by 112 columns with a message display area of not less than 4.3 inches high by not less than 41.6 inches wide. The sign located near the front door shall not block the driver's critical horizontal line of sight.</p> <p>Rear Route Number Sign</p> <p>The route number display area shall have no less than 768 pixels, 16 rows by 48 columns with a message display area of not less than 6.1 inches high by not less than 17.0 inches wide. The rear route number sign shall be located a minimum of 90 inches above ground on the curb side rear corner of the Bus.</p> <p>Destination Sign Control</p> <p>Power to the sign system shall be controlled by the Bus "Master Run" switch. Sign system shall be operable in all switch positions except "Off".</p> <p>Destination messages, route designations, and public relations messages shall be independently selectable via the Operator's Control Unit (OCU) which shall include a display monitor. The OCU shall communicate to the main processor board via a standard RS 485 serial bus and SAE J1708. Software shall be capable of programming 10,000 message lines. The number of public relations messages shall be limited only by the remaining number of message lines not used for destination purposes. The three-digit destination code shall accept all hexadecimal numbers (i.e. 0-9, A, B, C, D, E, & F).</p> <p>The rear route number sign shall be controlled by the same OCU that operates the destination signs. The OCU display monitor readout shall show the exact information displayed on the destination signs and route number sign.</p> <p>Sign displays shall have alternating message capability with programmable blanking time between message lines as may be required. Variable blanking times shall be programmable between 0.5 to 25 seconds in duration. Each line message or blanking time for each message shall be individually programmable. The message display units shall incorporate an automatic blanking feature that will cause the display area to blank within 30 seconds of the bus master power switch being turned "Off".</p>

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		<p>An emergency message shall be initiated by the closure, or opening, of a dry contact switch or relay. The emergency message shall be displayed on the exterior of the bus only. The OCU shall not display the emergency message. The destination sign shall automatically resume normal operation only after battery power to the destination sign system is removed and restored through the battery disconnect switch.</p> <p>Destination Sign Programming</p> <p>The electronic sign system shall be programmable via an integral connector located in the front destination sign area. Software shall be furnished for programming the sign system via an IBM compatible lap-top computer. Software shall be capable of providing a high degree of flexibility to create, or select preprogrammed, fonts and graphic displays. The sign shall have the capability of being programmed in the field using a PC or field programmer. Message program information shall be transferable to and/or from the field programmer device, via a USB 2.0 or better.</p> <p>The LACMTA shall provide the Contractor with a complete listing of destination sign readings for initial sign programming by the manufacturer.</p> <p>Run Number Sign</p> <p>A three-character electronic run number display shall be provided at a LACMTA approved location in the right front windshield. All three character spaces shall have the capability to display 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and X readings.</p>
19	RFP - Amendment No. 7	<p>TS 86.1 Camera Surveillance System</p> <p>An automatic digital video recording system shall be provided powered directly from batteries, bypassing the Master Battery Disconnect Switch(es), to operate (record images) at all times with the Master Control Switch in any position except "Off". The system shall operate up to one hour (independently programmable) after the Master Switch is turned off. The system shall be self-initiating and operate at any time, with the Master switch in any position, including "Off", if triggered by the activation of the Bus SAS. When triggered, the system shall tag images (write protect) to prevent overwrite.</p> <p>All cameras must automatically adjust to light changes to capture images that have sufficient clarity at night, with bus lights on and off. A day-to-night demonstration shall be required to establish camera performance and final placement for optimum views and clarity. The LACMTA shall witness the demonstration and approve the final placement of the cameras. This demonstration must be successfully completed prior to approval of the Pilot Bus(es).</p> <p>The types (part numbers), of cameras shall be minimized with a single camera type for interior, and a single camera type for exterior of Bus. Exceptions to this requirement shall be considered on a case-by-case basis during Pre-Production meetings.</p> <p>Interior Cameras</p> <p>The camera housing shall be vandal resistant but allow access for routine servicing. Field of view of the cameras shall be adjusted with a 60 degree vertical and 60 degree horizontal without relocating the camera. Each camera shall be IP type color images. Front interior camera(s) at front door passenger boarding area shall record</p>

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		<p>audio subject to LACMTA approval during Pre-Production meetings. Cameras shall be placed for best recording of the following five areas:</p> <ul style="list-style-type: none"> a) Forward 1/3 of passenger area, view of front vestibule, farebox transactions and field-of-view to include Operator and image of bus number located on Operator's barrier. b) Front door, passenger boarding. c) Rear door, passenger exiting. d) Middle 1/3 passenger area. e) Rear 1/3 passenger seating area starting from behind rear door with a primary emphasis on the rearmost seats. <p>Interior Camera Monitors A video monitoring system including two, color, LCD video monitors with a minimum 15 inch diagonal dimension and all necessary brackets, cabling and other equipment needed for installation shall be provided to allow passengers easy viewing of video images captured by existing interior bus cameras. Monitors and equipment shall be installed in compliance with Driver Provisions, Controls and Instrumentation (Refer to Sections TS 46 -TS 48) and any applicable ADA or safety standards. The first monitor shall be mounted above the driver's area facing the entrance door and display a live video feed of the passengers boarding the bus. The second monitor shall be mounted in passenger area of the bus facing the rear of the bus and display a live video feed of the passengers riding on the bus including those in wheelchair securement areas. The monitors shall be of a ruggedized design intended for use in a transit bus environment including suitable protection from overvoltage and spikes generated from jump starts, shorts, etc. Monitors and equipment shall not be installed in a manner or located such that the performance or life of the components or system will be shortened when operating within the design operating profile. Monitors shall include a replaceable shield or durable film over the monitor screens to protect them from vandalism. This sacrificial layer shall be replaceable in 5e minutes or less using simple hand tools. Monitor enclosures and screens shall not be affected by periodic cleaning using commercially available cleaning agents, solvents and other chemicals used for removal of graffiti.</p> <p>Exterior Cameras Cameras shall be IP type, rated for water spray and submersion, (IP65 and IP67), housed in impact resistant, moisture resistant, low profile housings which do not protrude more than 2.5 inches from the bus body. If used, a cover placed over the camera lens shall be glass. Curbside camera housings shall be ruggedized to protect from impacts with trees and other objects encountered during routine service. This shall include a supplemental metal shield if necessary to meet</p>

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		<p>this requirement. The camera circuitry and lens shall be easily replaceable from inside the bus or by removing the housing from outside the bus using common hand tools. Camera positions and adjustment are subject to LACMTA approval at Pilot Bus. Reusable waterproof seals to prevent water damage to the camera and circuitry shall be provided which will not require the use of additional sealant such as silicon after servicing the camera. The system shall be designed or configured such that the failure of any individual camera will not affect operation of the remaining cameras.</p> <p>Cameras shall be placed for best recording of the following four areas:</p> <ul style="list-style-type: none"> a) Forward looking through windshield (Accident Surveillance) b) The curb side area of the bus, (including exit door), and street from 10 feet beyond front bumper to 10 feet beyond rear bumper c) Street side area of the bus and street from ten feet beyond the front bumper to 10 feet beyond the rear bumper d) Rear camera shall view the ground behind the bus from the bumper to approximately 25 feet back when gear select is placed in "Reverse" position. <p>Forward Accident Surveillance Camera The forward looking surveillance camera shall be positioned to obtain images of the exterior front of the bus and forward approximately 100 feet of roadway to record images in the event of an accident.</p> <p>Camera Monitor Dash mounted monitor for viewing of selected camera images when; gear selector is placed in "Reverse" or passenger doors are open. Monitor shall be user configurable and capable of simultaneous display of images from multiple cameras. Final monitor configuration is subject to LACMTA approval during Pre-Production meetings</p> <p>Central Processor The video security system central processor shall be packaged in a suitable ventilated, shock mounted and splash resistant enclosure keyed to LACMTA standards, located within the ITS enclosure, subject to LACMTA approval in Pre-Production meetings. Images shall be stored by the system on a removable mobile rated hard drive provided with a security lock typical to the existing LACMTA base station.</p> <p>Images stored on the hard drive shall be organized for automatic transmittal via a digital modem. The hard drive shall have capacity to store a minimum of 240 images per second for 30 continuous days (18 hours per day) before automatic overwrite occurs.</p> <p>The DVR shall be capable of recording in multiple formats including JPEG and in H.264 compression with up to D1 resolution to avoid loss of detail on zoomed images. The DVR must be able to switch record rate, compression and resolution seamlessly without loss of video during transition. System shall be capable of</p>

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		<p>accepting both analog NTSC and high definition wide dynamic range IP cameras. All image requests and subsequent downloaded files shall have the capability to be stored on a hard drive. The hard drive shall be easily removed and video files viewed at a separate location equipped with the same drive mechanism.</p> <p>System Management</p> <p>Processor shall utilize GPS data to synchronize system time and tag video files with location coordinates allowing files to be searched on a geographic location basis. System shall utilize a WLAN compatible with wireless networks in use at LACMTA divisions and shall incorporate a system management tool for; wireless download of video files in a timely manner, software upgrades, camera checks, configuration changes and health reports as required. Final configuration is subject to LACMTA approval in Pre-Production meetings.</p> <p>System management tool shall be a virtual implementation and provide expansion capability including compatibility with existing video management applications at LACMTA.</p> <p>In addition, System Management Tool shall: (include on pricing sheet)</p> <ul style="list-style-type: none"> • Be configured to run in Master-Slave mode under Virtual Box. • Provide the ability to replicate user accounts and passwords from Master to Slave. • Include provisions for future application authentication to Metro Microsoft Active Directory. • Allow user management at Master server and all Slave servers with inherent accounts from Master. • Backup the restore virtual image via the host operating system to last backup state. • Support Metro Enterprise backup and archive management tools such as IBM Tivoli. • Support use of Metro's MS Windows 2008 R2 approval image on host servers with Metro domain and security policies. • Allow NAS storage at remote sites. • Include OS and application security and patch management process. • Be optimized for hardware utilization in shared computing resources with Orbital DIS. <p>WLAN shall also be capable of transmitting encrypted video images or files on a real-time basis to a laptop PC held by law enforcement personal adjacent to or</p>

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		<p>behind the bus. DVR status and event data shall also be made available through J1708/1587 interface to ATMS VAN. DVR shall be individually programmable to record each camera sequentially.</p> <p>Pricing of the system management tool for use at up to 13 LACMTA operating divisions shall be provided to the LACMTA on Price Form PF-4, Schedule C of Prices of Diagnostic Test Equipment.</p> <p>Enhanced Video Recording System Option</p> <p>Pricing for optional features to enhance the video recording system shall be provided on Price Form PF-1, Schedule of Optional Vehicle Configuration. The features shall include items listed below along with any other enhancements that Contractor believes would improve functionality and ease of use for the video recording system.</p> <ul style="list-style-type: none"> • System Management tool to include video search capability using GPS coordinates as reference. • Ability of video system to analyze and discern events such as wheelchair passengers and generate report information with summary data such as wheelchair passenger count and boarding/alighting locations. • The ability to utilize the dash mounted display for diagnostic work or configuration changes on the DVR. • Incorporation of a 360 degree camera for better surveillance of bus interior.
19	Contract Mod. No.: 12	<p>TS 19.2 Exhaust System</p> <p>Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof. The exhaust pipe shall be of sufficient height to prevent exhaust gases and waste heat from re-entering the bus, discoloring or causing heat deformation to the roof of the bus. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component, including the exhaust after-treatment compartment area. Heat shield shall be installed between Catalytic Converter and HVAC unit to protect HVAC unit and wire harnesses in the area from radiant heat emanating from the Catalytic Converter after engine shut down, subject to LACMTA approval. The exhaust outlet shall be designed to minimize rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the after-treatment.</p> <p>Exhaust system shall incorporate joints as necessary to facilitate removal and replacement of individual components including exhaust muffler or, if required to meet emissions requirements, catalyst units. Mounting cushions, if provided, must last the life of the engine and shall not deteriorate when exposed to high exhaust system temperatures. Exhaust piping joints shall be machined V-band clamp design. Flexible exhaust lines necessary to accommodate engine movement shall be constructed from stainless steel bellows. Exhaust piping in the engine enclosure shall include reusable metal jacket that is easy to replace.</p>

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Ref #	Reference #	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue
20	Contract Mod. No.: 12	<p>TS 23.1 Engine Compartment Bulkheads</p> <p>The passenger and engine compartment shall be separated by fire-resistant bulkheads. The engine compartment shall include areas where the engine and exhaust system are housed. This bulkhead shall preclude or retard propagation of an engine compartment fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90A, latest revision. Only necessary openings shall be allowed in the bulkhead, and these shall be fire-proof. Any passageways for the climate control system air shall be separated from the engine compartment by fireproof material. Piping through the bulkhead shall have copper, brass, or fireproof fittings sealed at the bulkhead with copper or steel piping on the forward side. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. The conduit and bulkhead connector shall be sealed with fireproof material at the fire wall. Engine access panels in the bulkhead shall be fabricated of fireproof material and hinged to the bulkhead secured with fireproof fasteners. These panels, their fasteners and the bulkhead shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the bulkhead. Access panels shall be constructed to prevent vapors and fumes from entering the passenger compartment.</p>
21	Contract Mod. No.: 12	<p>TS 73.5.1 Transit Bus</p> <p>Brake lights shall be provided in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.</p> <p>High and Center Mount Red Brake Lamp</p> <p>Bus shall include red, high and center mount brake lamp(s) along the backside of the bus in addition to the lower brake lamps required under FMVSS 108. The high and center mount brake lamp(s) shall illuminate steady with brake application. Two LED seven-inch diameter sealed tail lights or 2-inch by eighteen-inch LED strip lights shall be mounted on each side of the engine closure door or rear end panels, so that the lights are not affected by engine heat (Refer to Section TS 88.1 for Approved Products). The (red) stop/tail lights shall be mounted directly above the (amber) directional signal lights. Two additional LED (red) stop lights shall be located above the engine compartment door on the centerline of the bus. If stop and tail lights are not visible from the rear when engine door is in the open position, two LED four-inch diameter amber hazard warning lights, one on each side of engine compartment, shall be furnished and activated by the turn signals. Each light shall be replaceable as an individual unit. Plastic lenses shall be protected with a high performance scratch and chemical resistant coating to prevent deterioration.</p>

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22	Contract Mod. No.: 12	<p>TS 75.2 Modesty Panels</p> <p>Sturdy divider panels constructed of durable, unpainted, stainless steel complementing the interior shall be provided to act as both a physical and visual barrier for seated passengers in front of each leading row of forward facing seats.</p> <p>Design and installation of modesty panels located in front of forward-facing seats shall include a handhold or grab handle along its top edge. These dividers shall be mounted on the sidewall and shall project toward the aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend from at least the window opening of the side windows, and those forward of transverse seats shall extend downward to one and 1.5 inches above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways shall provide no less than a 2.5 inches clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails if passengers assist are not provided by other means.</p> <p>The modesty panel and its mounting shall withstand a static force of 250 pounds applied to a four x four inch area in the center of the panel without permanent visible deformation.</p> <p>At the rear door area a clear non-glass panel, with multiple layer protective film installed on both sides, from above the modesty panel to the top of the daylight opening and attached to the stanchion.</p> <p>Modesty panels shall be bolted or riveted to handrails or installed in U-channels with self-locking nuts and securely attached to stanchion and body side. Modesty panels located at the forward edge of the upper floor area shall be attached along the top to handrails for added stiffness. Panels shall be attached to bottom extruded anodized aluminum rails for stiffness.</p>
23	Contract Mod. No.: 12	<p>TS 87 Event Data Recorder (EDR)</p> <p>EDR shall be installed on the bus. The unit shall be installed as low as possible. The EDR shall be able to communicate over the J1939 CAN line and shall be equipped with three-axis accelerometer. The system shall be capable of recording available fault codes including DM1 messages. Settings are to be finalized with the LACMTA during Pre-Production. The EDR shall broadcast via the J1939 data communication link severe impact events to the vehicle monitoring system and also trigger an event in the camera system. The EDR shall also tag an event from a signal received over the J1939 CAN line from the silent alarm switch signal and the camera event button and in turn broadcast these events to the vehicle monitoring system. The EDR shall also record the following operational data:</p> <ul style="list-style-type: none"> • Head lights on or off.

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		<ul style="list-style-type: none">• Turn signals and hazard lights on or off.• Ignition on or off.• Low air pressure warning.• Whether moving in forward or reverse or idling.• Parking brake is on or off.• Retarder switch on or off• Brakes – Stopping distance• Vehicle Acceleration/Deceleration• HVAC operating information• Entrance and Exit Doors operating information

End of Attachment I



Metro™

Technical Specifications

**(GROUP A - 40-FOOT CNG BUSES)
Contract Modification No. 12**

Contract No.: OP28367-000

**FORTY-FOOT (40') LOW FLOOR
CNG BUS PROCUREMENT**

January 14, 2019
~~**November 10, 2017**~~

VOLUME II OF II

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SECTION 6: TECHNICAL SPECIFICATIONS

GENERAL (TS 1-TS 5)

TS 1. Scope

These technical specifications contain the LACMTA's requirements for wheelchair accessible low floor transit buses, which accommodate the widest spectrum of passengers including children, adults, the elderly, and the physically disabled, conforming to all applicable ADA regulations. These buses shall provide maximum passenger appeal in appearance, comfort, and safety; combined with excellence in operating characteristics, standardization with existing LACMTA fleet, economy of operation, maximum efficiency, optimum seating, and conformity with federal, state and local regulations and emission standards. Buses shall include interior and exterior styling features in common with existing Metro BRT type buses such as streamlined appearance. These buses shall incorporate a high level of subsystem integration coordinated with central diagnostic functions and single point Operator interface. Buses shall have a minimum expected life of 12 years or 500,000 miles, whichever comes first. Refer to Table 17 for design life goals.

Metro will consider and evaluate proposals of Zero Emission (ZE) buses that meet legal, dimensional, maintainability and performance requirements outlined in this document. Vendors proposing electric buses for consideration should also include a list of any specialty equipment used for fueling and/or recharging vehicle, any specialty support and/or diagnostic equipment, and any other unique equipment that will be necessary to support daily operation of the vehicle. Any specialty equipment required to support the ZEB project should be itemized and listed along with estimated installation costs as part of each Contractor's proposal. Any ZE buses proposed in response to this solicitation shall meet CARB's definition for zero emission buses.

These technical specifications have been prepared with emphasis on in-service reliability. The basic structure of the bus including major suspension components shall be designed to last the life of the bus without major overhaul or replacement.

Wherever brand, manufacturer or product names are indicated in the Technical Specification, they are included for the purpose of establishing identification and a general description of the Goods, Equipment, Components or parts. Wherever such names appear, the term "OR APPROVED EQUAL" is deemed to follow. The decision whether a proposed Item is an approved equal will be rendered by LACMTA as defined by Contract SP-34 Non-Restrictive Clauses.

TS 2. Definitions

Ackerman Geometry: A geometric arrangement of linkages in the steering of a vehicle designed to solve the problem of wheels on the inside and outside of a turn needing to trace out circles of different radii. The intention of Ackermann geometry is to avoid the need for tires to slip sideways when following the path around a curve.

Alternative: An alternative specification condition to the default bus configuration. LACMTA may define alternatives to the default configuration to satisfy local operating requirements. Alternatives for the default configuration will be clearly identified.

Ambient Temperature: The temperature of the surrounding air. For testing purposes, ambient temperature must be between 16°C (50°F) and 38°C (100°F).

Analog Signals: A continuously variable signal that is solely dependent upon magnitude to express information content.

Aspect Ratio: The ratio of height to width of a character.

Audible Discrete Frequency: An audible discrete frequency is determined to exist if the sound power level in any 1/3-octave band exceeds the average of the sound power levels of the two adjacent 1/3-octave bands by four decibels (dB) or more.

Auxiliary Power System: Provides single or three phase power for functions other than propulsion.

Battery: One or more electrochemical cells that convert stored chemical energy into electricity.

Battery Compartment: Low-voltage energy storage, i.e. 12/24 VDC batteries.

Battery Management System (BMS): Monitors energy, as well as temperature, cell or module voltages, and total pack voltage. The BMS adjusts the control strategy algorithms to maintain the batteries at uniform state of charge and optimal temperatures.

Braking Resistor: Device that converts electrical energy into heat, typically used as a retarder to supplement or replace the regenerative braking.

Burst Pressure: The highest pressure reached in a container during a burst test.

Capacity (fuel container): The water volume of a container in gallons (liters).

Cells: Individual components (i.e., battery or capacitor cells).

Code: A legal requirement.

Combination Gas Relief Device: A relief device that is activated by a combination of high pressures or high temperatures, acting either independently or together.

Composite Container for Compressed Gas: A container fabricated of two or more materials that interact to facilitate the container design criteria.

Compressed Natural Gas (CNG): Mixtures of hydrocarbon gases and vapors consisting principally of methane in gaseous form that has been compressed for use as a vehicular fuel.

Container: A pressure vessel, cylinder or cylinders permanently manifold together, used to store compressed gas.

Container Appurtenances: Devices connected to container openings for safety, control or operating purposes.

Container Valve: A valve connected directly to a container outlet.

Curb Weight: Weight of vehicle, including maximum fuel, oil and coolant; and all equipment required for operation and required by this Specification, but without passengers or driver.

dBA: Decibels with reference to 0.0002 microbar as measured on the “A” scale.

DC to DC Converter: A module that converts a source of direct current from one voltage level to another.

Default Configuration Bus: The bus described if no alternatives are selected. Signing, colors, the destination sign reading list and other information must be provided by the LACMTA.

Defueling: The process of removing fuel from a tank or container.

Defueling Port: Device that allows for vehicle defueling, or the point at which this occurs

Design Operating Profile: The anticipated design requirements are based on LACMTA's operating environment for LACMTA's service area and as designed in TS 5.7. Specific characteristics include; "CBD type" urban heavy-duty duty-cycle, high passenger loading, five to 100 percent relative humidity, temperature range of -10°F to 120°F, and elevation range of 200 feet below sea level to 3,000 feet above sea level.

Destroyed: Physically made permanently unusable.

Discrete Signal: A signal that can take only pre-defined values, usually of a binary 0 or 1 nature, where 0 is battery ground potential and 1 is a defined battery positive potential.

Driver's Eye Range: The 95th-percentile ellipse defined in SAE Recommended Practice J941, except that the height of the ellipse shall be determined from the seat at its reference height.

Duty Cycle: A service cycle that utilizes only the CBD portion of the FTA ADB heavy-duty transit Vehicle cycle. The CBD portion shall be further modified to add 20 minutes of idle time.

Electric: A vehicle that uses one distinct power sources to propel the vehicle.

Electric System Controller (ESC): Regulates energy flow throughout electric system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (voltages, currents, temperatures, etc.) within specified operating ranges.

Electric Drive System (EDS): The mechanical and/or electromechanical components, including traction motors and energy storage system, which comprise the traction drive portion of the electric propulsion system.

Electronic Parts Catalog (EPC): Digital versions of the illustrated parts catalog that can upload into Metro's Enterprise Asset Management (EAM) or Enterprise Resource Planning (ERP) systems.

Energy Density: The relationship between the weight of an energy storage device and its power output in units of watt-hours per kilogram (Wh/kg).

Energy Storage System (ESS): A component or system of components that stores energy and for which its supply of energy is rechargeable by the on-vehicle system (engine/regenerative braking/ generator) or an off-vehicle energy source.

Engine Package: Complete engine assembly incorporating accessories necessary for operation as applicable. Package shall include at a minimum; turbocharger(s), supercharger(s), electronic control modules, manifolds, throttle body, starter, air compressor, hydraulic pump and engine mounted filters.

Extended Warranty: Warranties that extend past the minimum warranty periods defined in the warranty requirements.

Failures Classifications are listed below.

- **Class 1 Failure (Physical Safety):** A failure that could lead directly to passenger, bus operator or other injury and/or results in a crash.
- **Class 2 Failure (Road Call):** A failure resulting in an interruption of service. Passengers are removed from the bus at the point of failure; the bus is unable to continue in revenue service. Service is discontinued until the bus is replaced or repaired at the point of failure.
- **Class 3 Failure (Bus Change):** A failure that requires removal of the bus from service during its assignments. The bus is operable to a rendezvous point but cannot be used in passenger service until repairs are made.
- **Class 4 Failure (Bad Order):** A failure not related to safety that degrades the operation of the bus but does not require the bus's removal from service.

Fill Pressure for Compressed Gas: The pressure attained at the actual time of filling. Fill pressure varies according to the gas temperatures in the container, which are dependent on the charging parameters and the ambient conditions. The maximum dispensed pressure shall not exceed 125 percent of service pressure.

Fireproof: Materials that will not burn or melt at temperatures less than 2000 °F.

Fire Resistant: Materials that have a flame spread index less than 150 as measured in a radiant panel flame test per ASTM-E 162.

Firewall: A fire resistant barrier designed to slow the spread of fire for a prescribed period of time.

Flow Capacity: For natural gas flow, this is the capacity in volume per unit time (normal cubic meters/minute or standard cubic feet per minute) discharged at the required flow rating pressure.

Free Floor Space: Floor area available to standees, excluding the area under seats, area occupied by feet of seated passengers, the vestibule area forward of the standee line, and any floor space indicated by manufacturer as non-standee areas such as, the floor space “swept” by passenger doors during operation. Floor area of 1.5 sq. ft. shall be allocated for the feet of each seated passenger that protrudes into the standee area.

Fuel Cell: A device that converts the chemical energy from a fuel into electricity through a chemical reaction with oxygen and another oxidizing agent.

Fuel Line: The pipe, tubing or hose on a vehicle, including all related fittings, through which natural gas passes.

Fuel Management System: Fuel system components that control or contribute to engine air fuel mixing and metering, and the ignition and combustion of a given air-fuel mixture. The fuel management system would include, but is not limited to, reducer/regulator valves, fuel metering equipment (e.g. carburetor, injectors), sensors (e.g., main throttle, waste gate).

Fusible Material: A metal, alloy or other material capable of being melted by heat.

Gross Axle Weight Rating (GAWR): The maximum total weight as determined by the axle manufacturer, at which the axle can be safely and reliably operated for its intended purpose.

Gross Load: 150 pounds for every designed passenger seating position, for the driver, and for each 1.5 sq.-ft. of free floor space.

Gross Vehicle Weight (GVW): Curb weight plus gross load.

Gross Vehicle Weight Rating (GVWR): The maximum total weight as determined by the vehicle manufacturer, at which the vehicle can be safely and reliably operated for its intended purpose.

Hazardous Voltage: Greater than 50 volts (AC and DC).

Head Injury Criteria (HIC): The following equation presents the definition of head injury criteria:

$$\left[\frac{1}{t_1 - t_2} \int_{t_1}^{t_2} (a) dt \right]^{2.5} (t_2 - t_1)$$

Where a = the resultant acceleration at the center of gravity of the head form expressed as a multiple of g, the acceleration of gravity. t_1 and t_2 = any two points in time during the impact.

High Pressure: Those portions of the CNG fuel system exposed to full container or cylinder pressure.

High Voltage (HV): Greater than 600 volts (AC and DC).

High Voltage Charger: Regulated DC supply used to charge the propulsion battery pack.

Hose: Flexible line.

Illustrated Parts Catalog (IPC): A series of assemblies and sub-assemblies that combine into a parts manual with sections. Metro recognizes that a complete illustrated part catalog includes component breakdown in a disassembly sequence and their illustrations.

Intermediate Pressure: The portion of a CNG system after the first pressure regulator, but before the engine pressure regulator. Intermediate pressure on a CNG vehicle is generally from 3.5 to 0.5 MPa (510 to 70 psi).

Inverter: A module that converts DC to and from AC.

Jerk: The rate of change of acceleration shall be minimized throughout the acceleration/deceleration range and shall not be greater than 15.5 mph/sec/sec (0.3g/sec).

Labeled: Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization, which is acceptable to the authority having jurisdiction and concerned with product evaluation, which maintains periodic inspection of production labeled equipment or materials, and by labeling, the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Leakage: Release of contents through a Defect or a crack. See *Rupture*.

Line: All tubes, flexible and hard, that carry fluids.

Liner: Inner gas-tight container or gas container to which the overwrap is applied.

Local Regulations: Regulations below the state level.

Low-Floor Bus: A bus that, between at least the front (entrance) and rear (exit) doors, has a floor sufficiently low and level so as to remove the need for steps in the aisle between the doors and in the vicinity of these doors.

Low Voltage (LV): 50 volts or less (AC and DC).

Low Voltage Generation: Provides 12 or 24 volt DC to properly charge and maintain the charge on low voltage batteries as well as provide power for a variety of bus systems including; lighting, multiplex and other control modules.

Lower Explosive Limit: The lowest concentration of gas where, given an ignition source, combustion is possible.

Maintenance Personnel Skill Levels: Defined below are the LACMTA's maintenance personnel skill levels:

- **3M:** LACMTA Mechanic
- **2M:** Bus Service Attendant

Master Run Switch: Rotary four-position switch controlling the following functions:

- **Off:** All systems off
- **Day Run:** All electrical systems and engine on except; headlights, parking lights, and marker lights
- **Night Run:** All electrical systems and engine on including; headlights, parking lights, marker lights, and interior light system
- **Night Park:** Same as “Off” except that marker lights, destination signs, parking lights, curbside interior lights, and instrument panel lights are on

Maximum Service Temperature: The maximum temperature to which a container/cylinder will be subjected in normal service.

Metallic Hose: A hose whose strength depends primarily on the strength of its metallic parts; it can have metallic liners or covers, or both.

Metering Valve: A valve intended to control the rate of flow of natural gas.

Module: An assembly of individual components.

Motor (Electric): A device that converts electrical energy into mechanical energy.

Motor (Traction): An electric motor used to power the driving wheels of the bus.

Operating Pressure: The varying pressure developed in a container during service.

Physical Layer: The first layer of the seven-layer International Standards Organization (ISO) Open Systems Interconnect (OSI) reference model. This provides the mechanical, electrical, functional and procedural characteristics required to gain access to the transmission medium (e.g., cable) and is responsible for transporting binary information between computerized systems.

Pipe: Nonflexible line.

Power: Work or energy divided by time.

Power Density: Power divided by mass, volume or area.

Pressure Relief Device (PRD): A pressure and/or temperature activated device used to vent the container/cylinder contents and thereby prevent rupture of an NGV fuel container/cylinder, when subjected to a standard fire test as required by fuel container/cylinder standards.

Propulsion Power Assembly (PPA): System that provides propulsion for the vehicle proportional to operator commands. Includes; engine, transmission, cooling and other applicable systems (See SP-01).

Primary Power Unit (PPU): System that provides propulsion power for the vehicle proportional to operator commands. Includes; controllers, energy conversion, electric drive, cooling and other applicable systems (See SP-01).

Radiator Package: Complete system with accessories necessary for operation. Package shall include at a minimum; heat exchanger(s), cooling fan(s), electronic controller(s) with diagnostic communications and alternator if applicable.

Real-Time Clock (RTC): Computer clock that keeps track of the current time.

Regenerative Braking: Deceleration of the bus by switching motors to act as generators, which return vehicle kinetic energy to the energy storage system.

Rejectable Damage: In terms of NGV fuel containers/cylinders, this is damage as outlined in CGA C-6.4, "Methods for External Visual Inspection of Natural Gas Vehicle Fuel Containers and Their Installations," and in agreement with the manufacturer's recommendations.

Response Time: Response times shall be measured from the activation or deactivation of the accelerator or brake pedal to the initial response of an on-board accelerometer measuring longitudinal Bus acceleration. Response times for power to brake, brake to power, coast to power and coast to brake shall be no greater than 0.20 seconds.

Retarder: Device used to augment or replace some of the functions of primary friction based braking systems of the bus.

Rupture: Sudden and unstable damage propagation in the structural components of the container resulting in a loss of contents. See *Leakage*.

Seated Load: 150 pounds for every designed passenger seating position and for the driver.

SLW (Seated Load Weight): Curb weight plus seated load.

Serial Data Signals: A current loop based representation of ASCII or alphanumeric data used for transferring information between devices by transmitting a sequence of individual bits in a prearranged order of significance.

Service Life: The Bus shall be designed to operate in transit service at least 40,000 miles per year for 12 years or 500,000 miles.

Service Pressure: The settled pressure at a uniform gas temperature of 21°C (70°F) and full gas content. It is the pressure for which the equipment has been constructed, under normal conditions. Also referred to as the nominal service pressure or working pressure.

Settled Pressure: The gas pressure when a given settled temperature, usually 21°C (70°F), is reached.

Settled Temperature: The uniform gas temperature after any change in temperature caused by filling has dissipated.

Simplified Technical English (STE): A set of writings rules that guide non-English speaking technician writers. Four steps are used to establish a simplified technical dictionary:

- Keyword
- Approved meaning
- Approved example
- What is not approved (sample sentences)

Solid State Alternator: A module that converts high-voltage DC to low-voltage DC (typically 12/24 volt systems).

Sources of Ignition: Devices or equipment that because of their modes of use or operation, are capable of providing sufficient thermal energy to ignite flammable compressed natural gas-air mixtures when introduced into such a mixture, or when such a mixture comes into contact with them.

Special Tools: Tools not normally stocked by the LACMTA.

Specification: A particular or detailed statement, account or listing of the various elements, materials, dimensions, etc. involved in the manufacturing and construction of a product.

Standard: A firm guideline from a consensus group.

Standards: Standards referenced in “Technical Specifications” are the latest revisions unless otherwise stated.

Standee Line: A line marked across the bus aisle to designate the areas that passengers may not occupy when the bus is moving.

State of Charge (SOC): Quantity of electric energy remaining in the battery relative to the maximum rated amp-hour (Ah) capacity of the battery expressed in a percentage. This is a dynamic measurement used for the energy storage system. A full SOC indicates that the energy storage system cannot accept further charging from charging device or the regenerative braking system.

Stress Loops: The “pigtailed” commonly used to absorb flexing in piping.

Structure: The basic body, including floor deck material and installation, load-bearing external panels, structural components, axle mounting provisions and suspension beams and attachment points.

Tamper Resistant: Fasteners or components that cannot be easily removed or modified using pocket knives, coins, or other similar items commonly carried by passengers.

Thermally Activated Gas Relief Device: A relief device that is activated by high temperatures and generally contains a fusible material.

Vestibule: Area in front of the standee line, including Operator’s area.

Wheelchair: A mobility aid belonging to any class of three- or four-wheeled devices, usable indoors, designed for and used by individuals with mobility impairments, whether operated manually or powered. A “common wheelchair” is such a device that does not exceed 30 inches in width and 48 inches in length measured two inches above the ground, and does not weigh more than 600 pounds. when occupied.

Wheelchair Ramp: A device for allowing ingress and egress of persons or wheelchairs between ground or curb level and the floor level of the bus. The terms “wheelchair ramp” and “ramp” are used interchangeably in this specification.

Zero Emission Bus, (ZEB): A bus meeting California Air Resources Board zero emission standard.

TS 2.1 Abbreviations

Abbreviation and Acronyms

A/C	air conditioning
ABS	anti-lock braking system
AC	alternating current
ACQ	alkaline copper quaternary
ADA	Americans with Disabilities Act
AFSS	automatic fire suppression system

Ah	amp hour
ALR	auto-locking retractor
ANSI	American National Standards Institute
APA	The Engineered Wood Association, formerly the American Plywood Association
APC	Automatic Passenger Counter
APTA	American Public Transportation Association
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASTM	ASTM International, formerly the American Society for Testing and Materials
ATC	Automatic Traction Control
ATMS	Advanced Transportation Management System
AVA	Automated Voice Annunciation
AVL	Automatic Vehicle Location
AWG	American Wire Gauge
AWS	American Welding Society
BAFO	Best and Final Offer
BMCS	Bureau of Motor Carrier Safety
BMS	Battery Management System
BRT	Bus Rapid Transit
CALOSHA	California Occupational Safety and Health Administration
CAL TITLE 13	California Code of Regulations, Title 13, Motor Vehicle Code
CAN	Controller Area Network
CARB	California Air Resources Board
CBD	Central Business District
CCS	climate control system
CCTV	closed-circuit television
cfm	cubic feet per minute
CGA	Compressed Gas Association
CNG	compressed natural gas
CSA	Canadian Standards Association
dB	decibel
DBE	disadvantaged business enterprise
DC	direct current
DDU	driver display unit
DEF	diesel exhaust fluid
DOT	Department of Transportation
DPF	diesel particulate filter
ECM	engine control and monitoring
ECS	emission control system
ELR	emergency locking retractor
EMI	electromagnetic interference
EPA	Environmental Protection Agency
ESS	energy storage system
FEA	finite element analysis
FEMA	failure mode effects analysis
FM	Factory Mutual
FMCSA	Federal Motor Carrier Safety Administration
FMCSR	Federal Motor Carrier Safety Regulations
FMVSS	Federal Motor Vehicle Safety Standards
Ft.	foot or feet
FTA	Federal Transit Administration
GAWR	gross axle weight rating
GPS	global positioning system
GVW	gross vehicle weight
GVWR	gross vehicle weight rating

H-point	hip-point
EDS	electric drive system
HMI	human-machine interface
ESC	electric system controller
HV	high voltage
HVAC	heating, ventilation and air conditioning
IBSS	Incident Based Surveillance System
I/O	input/output
IEEE	Institute of Electrical and Electronics Engineers
In.	inch or inches
ISO	International Standards Organization
LAN	local area network
lb.	pound
lbs.	pounds
LCD	liquid crystal display
LED	light emitting diode
LEL	lower explosive limit
LV	low voltage
mA	milliampere
MDT	mobile data terminal
MPa	mega-Pascal
MTTF	mean time to fix
NC	normally closed
NFPA	National Fire Protection Association
NGV	natural gas vehicle
NOx	nitrogen oxide
NO	normally open
NTP	notice to proceed
OCU	operator control unit
OEM	original equipment manufacturer
OSI	Open Systems Interconnect
PA	public address system
PMO	project management oversight
PPA	propulsion power assembly
PPU	primary propulsion unit or prime power unit
PPV	price per vehicle
PRD	pressure relief device
psia	pounds per square inch absolute
psi	pounds per square inch
RF	radio frequency
RFI	radio frequency interference
rms	root mean square
RTC	real-time clock
SAE	SAE International, formerly the Society of Automotive Engineers
SAS	silent alarm system
scf	standard cubic feet
scfm	standard cubic feet a minute
SLW	seated load weight
SOC	state of charge
SPI	Society of the Plastics Industry
UFS	Universal Fare System
UL	Underwriters Laboratories
UNECE	United Nations Economic Commission for Europe
USDHEW	United State Department of Health, Education, and Welfare

V	volt or volts
VAC	volt or volts AC
VDC	volts of direct current
Wh	watt-hours
VIN	vehicle information number
ZEB	zero emission bus

TS 3. Referenced Publications

The documents or portions thereof referenced within this specification shall be considered part of the requirements of the specification. The edition indicated for each referenced document is the current edition, as of the date of the LACMTA issuance of this specification.

TS 4. Legal Requirements

The Contractor shall comply with all applicable federal, state and local regulations. These shall include but not be limited to ADA, as well as state and local accessibility, emissions, safety and security requirements. Local regulations are defined as those below the state level.

Buses shall meet all applicable FMVSS and shall accommodate all applicable FMCSR regulations in effect at location of the LACMTA and the date of manufacture.

In the event of any conflict between the requirements of these specifications and any applicable legal requirement, the legal requirement shall prevail. Technical requirements that exceed the legal requirements are not considered to conflict.

TS 5. Overall Requirements

The Contractor shall ensure that the application and installation of major bus subcomponents and systems are compliant with all such subcomponent vendors' requirements and recommendations. Contractor and LACMTA shall identify subcomponent vendors that shall submit installation/application approval documents, (including necessary documents and/or diagrams to verify configuration), with the completion of the Pilot and First Article Bus. Components used in the vehicle shall be of heavy-duty design and proven in transit service.

The Contractor shall submit to LACMTA the life expectancy of specified components in LACMTA's revenue service and duty cycle per the attached list I Life Cycle Cost Submittal Form. The projected life expectancy shall be based upon actual in-service experience wherever practical. If in-service data is not available, the projected life expectancy shall be based upon durability testing utilizing the best applicable industry practices as may be promulgated by such organizations as SAE, ANSI, ASTM or other acknowledged industry organizations.

Without exception, all technical information, drawings, nameplates, etc. shall be written in the English language. For all means of communications, i.e., letters, cables, telephone conversations, meetings, etc., the English language shall be used. The English System of units shall be used in connection with this Contract.

TS 5.1 Weight

It shall be a design goal to construct each bus as light in weight as possible without degradation of safety, appearance, comfort, traction or performance.

Buses at a capacity load shall not exceed the tire factor limits, brake test criteria or structural design criteria.

The Contractor shall submit a certified weight slip for the curb weight of each axle as well as the total curb weight of each bus upon delivery.

TS 5.2 Capacity

The vehicle shall be designed to carry the gross vehicle weight, which shall not exceed the bus GVWR.

TS 5.3 Service Life

The minimum useful design life of the bus in transit service shall be at least 12 years or 500,000 miles. It shall be capable of operating at least 40,000 miles per year, including the 12th year.

TS 5.4 Maintenance and Inspection

Scheduled maintenance tasks shall be related and shall be grouped in maximum mileage intervals. Scheduled maintenance actions such as filter or belt replacements and other adjustments shall not be required at intervals of less than 6,000 miles except for routine daily service performed during fueling operations. Higher levels of scheduled maintenance tasks shall occur at even multiples of not less than 6,000 miles.

Test ports, as required, shall be provided for commonly checked functions on the bus, such as air intake, exhaust, hydraulic, pneumatic, brakes, charge-air and engine cooling systems.

The bus manufacturer shall give prime consideration to the routine problems of maintaining the vehicle. All bus components and systems, both mechanical and electrical, which will require periodic physical work or inspection processes, shall be installed so that a minimum of time is consumed in gaining access to the critical repair areas. To the extent practical, disconnection or removal of components unrelated to a specific maintenance and/or repair task shall be unnecessary. It shall not be necessary to disassemble portions of the Bus structure and/or equipment such as seats and flooring under seats in order to gain access to these areas. Relative accessibility of components, measure in time to gain access, shall be prioritized for items requiring more frequent service.

Bus shall be designed to facilitate the disassembly, reassembly, servicing or maintenance, using tools and equipment that are normally available as standard commercial items. Bus design shall include features that maximize the intervals between scheduled service requirements for major bus systems while minimizing service time needed to perform the preventative maintenance work. Design goal shall be to minimize diagnostic time required for major bus systems repair.

Requirements for the use of unique specialized tools will be minimized. The body and structure of the Bus shall be designed for ease of maintenance and repair. Individual panels or other equipment that may be damaged in normal service shall be repairable or replaceable. Ease of repair shall be related to the vulnerability of the item to damage in service.

Contractor shall provide a list of all special tools and pricing required for maintaining this equipment. Said list shall be submitted as a supplement to Form PF-3-Schedule B of Prices Special Tools.

NOTE: Tools such as compartment door keys, bellows gauges and other tools that are required for daily maintenance and inspections shall not be included in the special tool list and shall be furnished for each bus.

TS 5.5 Interchangeability

Unless otherwise agreed, all units and components procured under this Contract, whether provided by Suppliers or manufactured by the Contractor, shall be duplicates in design, manufacture and installation to ensure interchangeability among buses in each order group in this procurement. This interchangeability shall extend to the individual components as well as to their locations in the buses. These components shall include, but are not limited to, passenger window hardware, interior trim, lamps, lamp lenses and seat assemblies. Components with non-identical functions shall not be, or appear to be, interchangeable.

Any one component or unit used in the construction of these buses shall be an exact duplicate in design, manufacture and assembly for each bus in each order group in this Contract. Contractor shall identify and secure approval for any changes in components or unit construction provided within a Contract.

In the event that the Contractor is unable to comply with the interchangeability requirement, the Contractor must notify the LACMTA and obtain the LACMTA's prior written approval, including any changes in pricing.

LACMTA shall review proposed product changes on a case-by-case basis and shall have the right to require extended warranties to ensure that product changes perform at least as well as the originally supplied products.

TS 5.6 Training

The Contractor shall have one or more qualified instructors who shall be available at the LACMTA between the hours of 7:00 a.m. and 5:00 p.m. during the period immediately after acceptance of the Pilot Bus. Contractor provided Instructor(s) shall conduct regular and "train the trainer" type classes, for various size groups, to advise LACMTA trainers and mechanics on the proper operation and maintenance of equipment. Training shall be provided throughout the Contract period up to the conclusion of the initial Warranty period for the Option Buses, one (1) year following receipt of the final bus.

Base Order Buses

The Contractor shall provide pricing for up to 1,000 Instructor class-room hours with the bus order. The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor at the time of Pilot Bus review. Training shall be provided throughout the Contract period up to the conclusion of the initial Warranty period following receipt of the final Bus.

Option Order Buses

For each Option order, Contractor shall also be required to provide Instructor training. The quantity of training hours shall be determined by the quantity of Option Buses ordered and shall be equal to five hours of training per Option Bus up to a maximum of 500 instructor class-room hours for each Option order. The LACMTA may elect to reduce the amount of training required for the Option orders. The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor.

TS 5.6.1 Training Curriculum

The Contractor shall develop and submit a training curriculum using the most current version Microsoft Office Word and/or Power Point, subject to LACMTA approval. The curriculum will be discussed during Pre-Production meetings and submitted to the LACMTA no later than 30 days prior to delivery of the Pilot Bus. The curriculum shall be designed specifically for the LACMTA Bus order and shall cover all major systems ordered on the buses including, but not limited to:

- Engine/Propulsion System
- Transmission/Electric Drive
- HVAC System
- Electrical Systems
- Electronic Controls and Sub-systems
- Special Equipment (Fire and Gas Detection, Operator's seats etc.)
- ABS Brake System
- Steering and Suspension
- Pneumatic System
- Passenger Door/Wheelchair ramp system
- Fuel/Battery system and delivery
- Maintenance Bus Orientation
- Operator Bus Orientation
- Security Camera System

- Bus Defueling Procedures
- Engine/Propulsion Cooling System
- Electronic Cooling System
- PPU
- Energy Storage System (including BMS)
- Automatic Passenger Counter

TS 5.6.2 Teaching Materials

The Contractor shall provide to the LACMTA Maintenance Instruction Department visual and other teaching materials as needed during classroom instruction. Teaching materials shall be subject to LACMTA approval. Typical teaching materials include items such as; printed technical literature, training modules, service training and operating manuals, slides, DVD presentations, overhead presentations, etc.

TS 5.6.3 Optional Training Aids

The items in this section are discretionary and may be purchased through this contract, subject to LACMTA approval.

Special Training Aids

The Contractor shall supply pricing for items a through k, special training aids, as listed below for use by LACMTA training staff. Pricing for these aids is to be provided to the LACMTA on Form PF-5-Schedule D of Prices Training Aids. The Special Training aids are to be provided not later than the delivery date for the first production Bus.

System Simulation Training Boards must be designed to imitate a described bus system and shall be mounted vertically on a sturdy roll around frame. Simulation Boards can be approximately three- foot by six foot and in no case larger than four feet by eight feet. Boards shall not be taller than 7 feet to enable the training boards to pass through doors. Simulation boards shall be provided with a 120 VAC power cord. The use of actual Bus components for simulation is desired; however, extremely bulky or heavy items such as large fan motors, A/C compressor, starter, alternators, engine controls, transmission controls, doors, and other similar devices may be smaller or modeled.

- One complete running engine and transmission assembly** - Including cooling and fueling systems, mounted on a suitable roll around stand.
- One complete static transmission assembly** - For visual purposes, mounted on a roll around stand with considerable cut-away sections that improve visibility and insight into the operation of the transmission.
- One complete static front axle assembly** - For visual purposes, mounted on a roll around stand with considerable cut-away sections that improve visibility and insight into the operation of the front axle assembly.
- One complete static rear axle assembly** - For visual purposes, mounted on a roll around stand with considerable cut-away sections that improve visibility and insight into the operation of the rear axle assembly.
- ATECH Electrical Training Board Kits** - General electrical training. Kit to include GM Specialized Electronic Trainer, Guide Book, four resistors, dual filament light, blank board and horn.

System Simulation Training Boards:

- Anti-Lock Brake / Air Brake Board** - Fully functional ABS training board. Bendix design bus disc brake air system training board with all air valve and electrical instrumentation.
- Electric Air Conditioning Training Simulator Module** - A/C system training board to highlight new system products. Board must be fully functional and shall be made to give mechanics a general

perspective of A/C and heating components. Module should be similar to what is used during APTA bus Roadeo competitions.

- h) **Fire Suppression** - One complete bus set of equipment on display board of fire and gas detection system
- i) **Video Security System** – One complete bus set of equipment for training simulator including all cameras, DVR and the monitor system.
- j) **Destination Sign** – One complete bus set of equipment for training simulator including all signs, cables and controller.
- k) **Multiplex Electrical Training Board** - A mock-up board, where key components including all functioning switches, modules, lights, diagnostic ports, and diagnostic switches are replicated on a functional model, shall be provided as a tool for diagnostic, design verification and training purposes.

E-Learning/Interactive Training Media

The Contractor shall provide pricing for 25 hours of CNG/Electric Bus interactive learning seat time to LACMTA on Form PF-5 Schedule D of Prices, Training Aids. The media shall provide a high level of student interactivity, including but not limited to: questions review, component identification, tool use, circuit building, component testing. The 25 hours shall be broken down as follows:

TABLE 1
E-Learning Media Hours

CNG Bus			Electric Bus		
Module #	System	Hrs.	Module #	System	Hrs.
Module 1	Engine and Transmission	6	Module 1	Safety Procedures	1
Module 2	Electrical System	3	Module 2	Powertrain	4
Module 3	Vehicle Multiplex System	3	Module 3	Electrical System	4
Module 4	HVAC System	2	Module 4	Vehicle Multiplex System	3
Module 5	Brake, Axles, and Air System	4	Module 5	HVAC System	2
Module 6	CNG Fuel System	2	Module 6	Brake, Axles, and Air System	4
Module 7	Entrance/Exit Doors	2	Module 7	PM Procedures	2
Module 8	Cooling System	1	Module 8	Entrance/Exit Doors	2
Module 9	Wheelchair Ramp	1	Module 9	Cooling System	1
Module 10	Towing and Recovery	1	Module 10	Wheelchair Ramp	1
			Module 11	Towing and Recovery	1

Each module shall include: introduction, component operation, component testing, system diagnosis, and diagnostic software/tool use. The content in each module shall be presented with the following breakdown: video content (5-10 percent), slide content with V/O (40-45 percent), student interactivity (45 percent), skills assessment (5 percent). All modules shall have LA Metro branding and a full electronic text student handout. All handouts shall be in MS Word and editable.

The content shall be delivered via DVD, ready for installation and operational on any platform including Microsoft, MAC and Android. All content shall be developed using HTML5 programming and optimized for web browsing. All content shall be navigated through an industry standard e-learning programs graphical user interface (GUI) subject to LACMTA approval.

TS 5.6.4 Manuals

Manual Review and Approval

The Contractor shall be solely responsible for the accuracy and completeness of the manuals and the conversion of the Parts manual into Electronic Parts Catalog (EPC). The LACMTA will assemble a technical review committee to define acceptance criteria of the manuals deliverables, quality standards, file formats, expected results and the testing methods to be used. The Contractor shall put together a team with the technical capabilities to successfully complete these deliverables to LACMTA's satisfaction.

The Contractor will be required to participate in Manual Review and Approval process and attend one service manual review meeting held at the LACMTA shortly following LACMTA Notice to Proceed. Except for the Parts Index, the draft manuals shall be shipped simultaneously with the first Pilot Bus. The final meeting will be scheduled after receipt of draft manuals but prior to the ship date of the first Production Bus.

Draft Manuals

Except for the Parts Index, the Contractor shall provide the LACMTA with draft manuals simultaneously with the Pilot Bus: Draft manuals shall include:

- Ten draft hardcopies each of the Service, Parts and Operator's manuals plus a list of all proposed OEM Component Repair manuals, simultaneously to the shipping of the first Pilot Bus.
- Draft Parts manuals are further defined to include a minimum of 95 percent of all part numbers with an error rate of less than 5 percent. It will be the responsibility of the Contractor to ensure the accuracy of all part numbers.
- Hard copy manuals shall be provided in suitable 3-post binders clearly identified with the Bus manufacturer and model number, LACMTA Bus series number, revision date, and table of contents.
- A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production Bus.

Final Manuals

Final DVD editions of Service, Parts and Operator's manuals must be delivered within 90 days after the start date for production Buses. Following the 90 day period after start of production the LACMTA may withhold \$10,000 per Bus delivered until all maintenance and parts manuals are received.

- Ten final hardcopy sets of Service and Parts manuals shall be provided for each 100 Buses and 12 total sets for Subsystem OEM manuals.
- For any Option Buses, four hardcopy sets of Service manuals shall be provided for each 100 Option Buses.
- Twenty final edition Service and Parts manuals excluding subsystem OEM component manuals shall be provided on DVD
- The Contractor shall supply two final hardcopy Operator's manuals per every 10 buses and five total final electronic copies on DVD.
- Contractor shall supply a listing of diagnostic codes with final service manuals delivered that covers trouble shooting fault trees/codes related to the PPU.

If separate subsystem OEM component supplier manuals are provided for preventative maintenance, diagnostics, parts and repair, then the number of manuals provided shall correspond with the quantities described above.

Manuals on DVD

Final edition Service and Parts manuals shall include an index and search function to locate items by subject, part name, or system. Updates shall be delivered to the Maintenance Instruction Department as they occur. Updates must be identified with effected system and with update revision dates.

The DVD versions shall be provided with licenses which permit the MTA to load the manuals on an unlimited number of MTA computers and/or server units. Neither generic nor poor quality reproductions shall be acceptable. Manuals must be in English. The DVD version may consist of multiple DVDs.

The Contractor must be able to work with the 3rd party EPC provider (Digabit, Inc., 850 Englewood Pkwy. #200, Englewood, CO 80110 (Phone # 303 957-2822)) directly to convert their Parts manual into an EPC format suitable for use with LACMTA's current ERP/EAM systems. EPC integration shall include the ability of the contractor to provide information in the current format for initial EPC publishing needs and continue working with the EPC publishing provider using current data formatting standards over the life cycle of the bus.

Manual - Updates

Updates to the manuals covering revisions, corrections or additions shall be grouped and released to the LACMTA as discovered or disclosed by LACMTA at a minimum of once per year but not to exceed three times per year for 12 years. Updates shall be provided in electronic and hardcopy format and shall be delivered to the LACMTA Maintenance Instruction Department. Updates must be identified with defected system and with update revision dates.

Service Manuals

Service manuals shall be divided into separate sections as listed below:

- a) Preventative Maintenance Procedures (PMP) by component or system - Specifically for use at LACMTA Operating Divisions. Procedures must identify what inspection criteria procedures are needed for each component or system at intervals by time or mileage. Daily inspection is not acceptable criteria for preventative maintenance.
- b) Diagnostic Procedures - Include troubleshooting guides for all air, fluid, mechanical and electrical systems. Include schematics for fuel, air, hydraulic, coolant, HVAC, multiplex, braking and electrical with wiring harness drawings.
- c) Component Repair/Service - The manuals must be organized to show every subsystem in the bus including all re-buildable components used. For example, the steering box, air compressor, power steering pump, differential, transmission/electric drive/electric drive and PPU must be included. Component Reference Diagrams must be specific and referenced by exact exploded view diagrams.

PMP Section

PMP manuals shall be specific for the LACMTA's bus order and shall include the manufactures inspection and maintenance requirements for buses covered by this procurement and shall not contain any unrelated or unnecessary requirements. All routine maintenance schedule requirements, including maintenance of major subsystems, shall be provided in one master PMP matrix. The master PMP matrix shall include; specific service task, service mileage, and PMP service manual section reference. The PMP manual shall also include remove-and replace instructions for all sub-system components including: PPA, engine, transmission, starter, alternator, A/C compressor, air compressor, etc.

Diagnostic Section

Diagnostic manuals which may be integrated with the maintenance manual shall include isometric, phantom, and schematic illustrations as necessary to completely describe each system including but not limited to location and routing of air, hydraulic, water, lines and electrical harnesses including all anchor and attachment points. Diagnostic manuals shall also include trouble shooting guides necessary to complete running repairs for all supplied Bus equipment.

All wiring schematics and wiring harness drawings required in Service Manuals shall be provided in a separate publication in 11 X 17 inch uniform format. OEM schematics and those provided by all subsystem manufacturers shall be uniform diagrams with an emphasis on readability by mechanics performing diagnostic functions. Drawings shall provide functional grouping, continuity and interfacing at all connection points to eliminate unnecessary interfacing between multiple drawings and subsystem supplier drawings. Electrical schematic drawings shall include diagrams to clearly and accurately show locations of all electrical connectors splice and ground points for the Bus wiring harnesses.

Component Repair/Service Section

Fourteen sets of Repair Manuals necessary to rebuild all Contractor supplied Units including: PPU, transmission/electric drive, HVAC system, starter, alternator, air compressor, etc., shall be provided. Each copy shall be the latest hardcopy edition issued by the OEM component manufacturer. Repair manuals shall be comprehensive and shall cover all aspects of repair from tear-down through final test as recommended by the Bus OEM. Repair manuals shall be grouped in sets and with a table of contents. Each set shall be organized and mounted onto a suitable table top holding rack subject to LACMTA approval. The LACMTA

requires fourteen sets of wall posters with the repair manuals showing subsystem, component and part assembly, parts numbers, torque values, installation notes, etc. A list of subsystem component repair manuals shall be submitted for LACMTA review at time of Pilot Bus delivery.

Parts Manuals

Must be specific and referenced by exact exploded-view diagrams and organized to coordinate with Service Manuals for ease of use. Parts manuals shall be specific to the LACMTA bus order including subsystem OEM PPU and transmission/electric drive parts listings. IPC and EPC manuals provided shall include illustrations with necessary exploded diagrams and data arranged so that part numbers can be readily found and identified in the illustration for each system and subsystem component, assembly, subassembly or piece part, from an orderly breakdown of the complete bus. An assembly or subassembly is an identifiable portion of a component of a system or subsystem.

Parts manuals shall contain a reference part number index, listed in numerical order with descriptions, and page numbers. The comprehensive number index shall include major subsystem parts numbers which includes the PPU, transmission/electric drive/, and air conditioning. A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production bus.

The parts list index shall also be provided to the LACMTA in a PC spreadsheet file on a DVD compatible with Microsoft Excel and include subsystem supplier part numbers, part description, and price. OEM component supplier part numbers are required.

Price List

Ten copies of the current price list shall be provided separately as a supplement to the final parts manuals. Price lists shall be updated at least annually and provided for the life of the bus as they are updated.

Operator's Manuals

The Operator manuals shall be specific to the LACMTA bus configuration and designed for a LACMTA Bus Operator target audience, without extraneous material or information. Manuals shall clearly outline the features and controls, indicators necessary for safe and proper operation of the buses including ADA equipment.

TS 5.6.5 Special Equipment

Option, Special Service Equipment

The items in this section are discretionary and may be purchased through this contract, subject to LACMTA approval.

The Contractor shall supply pricing for 30 sets of Special Service Equipment listed below for use by LACMTA training staff. Pricing for this special service equipment is to be provided to the LACMTA on Form PF-4-Schedule C of Prices Special Service Equipment.

The LACMTA is aware that diagnostic equipment and/or software has been developed or is being developed by many of the OEMs to assist in the maintenance of the Buses. Proposer is required to submit a list of recommended special equipment, software and/or diagnostic tools deemed necessary to provide state-of-the-art service for the bus systems. Depending on the type of available equipment and/or software, the LACMTA may wish to obtain complete sets of such Special Service Equipment and/or software, plus any additional tools identified by the OEM manufacturer required to diagnose, calibrate, or remove-and-replace, all equipment provided with this bus order. The purchase of any such Special Equipment and/or software is at the sole option of the LACMTA. Because of technological changes which may occur prior to and during the actual production of the buses, the LACMTA reserves the right to issue Change Orders for updated diagnostic equipment, tools and software, and other Special Service Equipment at any time prior to Contract closeout.

For the Base order or any Option order that is exercised the Contractor shall provide pricing for Diagnostic Tools and Equipment listed below. The quantities listed below are for 300 Base Vehicles. Quantities for

Diagnostic Tools and Equipment of Option Vehicles will be determined at the time the Option is exercised. At a minimum, Proposers shall provide a complete listing of such currently available equipment and/or software and the proposed pricing in the Price Forms.

Engine/Propulsion and Electric Drive/Transmission:

- Engine/Propulsion Diagnostic software, including necessary cables and connectors with one year software registration.
- Transmission/Electric Drive diagnostic software, including necessary cables and connectors.
- PPU diagnostic software, including necessary cables and adapters.
- Nexiq Technologies USB Link PC to Vehicle Interface.
- ABS/Regenerative Braking diagnostic software, including necessary cables and connectors.
- Engine/Propulsion cooling system diagnostic or programming software.
- Power Management diagnostic tools and software.
- Battery Management diagnostic tools and software.

Electrical/Vehicle Control System:

- Multiplex/Vehicle Control software and connection kit to include applicable cables, connectors and translator boxes, no registration or upgrade fees attached.
- Diagnostic laptop (to be defined) to include: applicable cables, connectors and translator boxes.
- Multiplex Module programmers, (if applicable).

Energy Storage and BMS

- Power management diagnostic software and connection kit to include applicable cables and adapters, including registration fees.

Doors

- Door System diagnostic or programming software.

Interior:

- ITS Diagnostic Kits including test fixture(s) and associated software application(s) that allows for installing components of each group, (Video Security, IBSS and Destination Sign) so that all the components of each group are easily accessible for programming, replacement, adjustment and troubleshooting including but not limited to all cables, DVR docking station, cameras, etc. Diagnostic kits should be integrated with the Training Aids to allow off-the-bus training and familiarization of the systems.
- Destination Sign Diagnostic Equipment (J1708 Protocol Boxes/software).

Heating Ventilation Air Conditioning (HVAC):

- A/C interface software and cable.

Diagnostic PC:

- Diagnostic laptops with necessary interface cables, power adapters.

TS 5.6.6 Diagnostic Laptop PC Specifications

Optional diagnostic laptop shall be Dell Latitude E6540 and at a minimum contain the following:

TABLE 2
Laptop Specifications

Category	Description
Processor	Intel Core i5-6300U (Dual Core, 2.4GHz, 3M cache)
Operating System	Windows 7 Professional English, French, Spanish 64-bit (Includes

	Windows 10 Pro License)
Memory	8GB (2x4GB) 2133MHz DDR4 Memory
Hard Drive	500GB 7200rpm 7.2krpm HD
Video Card	AMD Radeon RT M360, for I5-6300U (Vpro Capable)
Optical Drive	Dell External USB Slim DVD+/-RW Optical Drive
Battery	Primary 4-cell 62W/HR Battery
Adapter	65 Watt AC Adaptor
Power Cord	US Power Cord
LCD	15.6-inch HD (1366x768) Anti-Glare LCD
Wireless	Intel Dual-Band Wireless-AC 8260 Wi-Fi + BTW8260AC 4.1 Wireless Driver (2x2)
Keyboard	Internal Dual Pointing Keyboard, English
Security Hardware	Absolute Computrace Complete 5 Year - Education
System Management	No Out-of-Band System Management

System shall be compatible with all diagnostic software. Contractor shall provide a complete listing of all proposed software and hardware to the LACMTA Project Manager prior to purchasing.

Because of the time delay between the procurement process and receipt of computer equipment, the final laptop computer configuration shall be subject to approval by the LACMTA at delivery to ensure it has all of the appropriate and necessary software and is compatible with LACMTA's other existing laptop computers. All laptop PCs shall include a suitable protective carrying "soft" case and a Microsoft mouse.

TS 5.6.7 Recommended Spare Parts List

The Contractor shall attend at least one Parts Provisioning Meeting with the LACMTA's Inventory Planning staff to discuss recommended spare parts. The Parts Provisioning meeting shall occur at least 60 days prior to the first production Bus being delivered. At the meeting, the Contractor shall provide a bill of material and a list of recommended spare parts for the buses ordered. The recommended spare parts list shall include the quantity of each item per bus, the estimated normal lead time, and recommended minimum/maximum quantities. As changes are implemented and corrections are made, the recommended spare parts list shall be updated throughout the Contract period and life of the bus. The Contractor Parts subsequently ordered by LACMTA must be delivered within thirty (30) days after initial Bus delivery or within 30 days of placement of the order, whichever is later.

TS 5.6.8 In-Process and As-Built Drawings

The Contractor shall, no later than 30 days prior to commencing production, supply the LACMTA with two sets of hardcopy scale drawings suitable for conducting repairs on every area of the vehicle, including all major systems and sub-system installations. Electrical and air schematics shall also be provided. In addition, the Contractor shall provide a description of the electronic configuration, layout and functionality of the bus including communication paths and power distribution. Drawings shall be organized in a logical, easily searchable format consistent with parts and or maintenance manuals, and shall include a table of contents searchable by parts or systems descriptions.

Drawings shall also be supplied in electronic format compatible with AutoCAD, PRO-E or other LACMTA approved design software. Contractor shall update these specific drawing to conform to "as-built". Five sets of Conforming drawings shall be delivered to the LACMTA within 60 days after final bus delivery.

Drawings shall include at a minimum the following:

- Entire structure of the bus
- Interior body with dimensions
- Exterior body with dimensions
- Floor
- Glazing and frames

- Engine and Transmission mounts
- PPU installation and mounting
- Fuel containers and supporting structure
- Passenger assists layout
- Seat placement and dimensions
- Passenger door and window dimensions
- Wiring schematics and drawings
- Wiring harnesses and cables drawings
- Plumbing schematics (pneumatic/hydraulic) and drawings
- Suspension
- Any specialized bracketry or mounts
- Battery tray
- Paint Scheme
- Interior decal placement
- Exterior decal placement
- Destination Signs drawings and schematics
- Frame Drainage Plan
- AFSS installation and routing
- ADA device installation

TS 5.7 Operating Environment

The bus shall achieve normal operation in ambient temperature ranges of 0° F to 120° F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 1,500 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 0 °F, above 120° F or at altitudes above 1,500 feet. Altitude requirements above 1,500 feet will need separate discussions with the engine manufacturer to ensure that performance requirements are not compromised. Speed, grade-ability and acceleration performance requirements shall be met at, or corrected to, 77° F, 29.31 inches Hg, dry air per SAE J1995 with all accessories on including A/C.

TS 5.8 Noise

Noise Level Test Conditions

Instrumentation and other general requirements shall conform to SAE Standards; J336, J366 and J2805. The bus shall be empty except for test personnel, not to exceed four persons, and the test equipment. All openings shall be closed and all accessories shall be operating at maximum output during the test. The bus shall accelerate at full throttle from a standstill to 35 mph on level commercial asphalt or concrete pavement.

TS 5.8.1 Interior Noise

The combination of inner and outer panels and any material used between them shall provide sufficient sound insulation so that a sound source with a level of 80 dBA measured at the outside skin of the bus shall have a sound level of 65 dBA or less at any point inside the bus. These conditions shall prevail with all openings, including doors and windows, closed and with the engine and accessories switched off.

The bus-generated noise level experienced by a passenger at any seat location in the bus shall not exceed 78 dBA. The driver area shall not experience a noise level of more than 75 dBA. Measurements of interior noise levels shall be taken in accordance with SAEJ2805 for portion of testing under acceleration. The bus shall also be operated at various speeds to check for audible vibrations.

TS 5.8.2 Exterior Noise

Airborne noise generated by the bus and measured from either side shall not exceed 80 dBA under full power acceleration when operated at 0 to 35 mph at curb weight. The maximum noise level generated by the bus pulling away from a stop at full power shall not exceed 83 dBA. The bus-generated noise at curb idle shall not exceed 65dBA. If the noise contains an audible discrete frequency, a penalty of 5 dBA shall be added to the

sound level measured. The Contractor shall comply with the exterior noise requirements defined in local laws and ordinances identified by the LACMTA and SAEJ366.

The bus builder shall minimize all transient noises generated by the bus and/or by accessories. These efforts shall include the application of mufflers on exhaust air ports for the kneeling valve, dryer and brake exhaust if their sound levels exceed 78 dBA interior or 83 dBA exterior.

TS 5.9 Fire Safety

The bus shall be designed and manufactured in accordance with all applicable fire safety and smoke emission regulations. These provisions shall include the use of fire-retardant/low-smoke materials, fire detection systems, bulkheads and facilitation of passenger evacuation. A barrier shall separate the passenger and drive system compartments and shall incorporate fire resistant materials to create a firewall. Contractor must provide required certificates of compliance prior to manufacture of the Pilot Bus.

TS 5.9.1 Materials

All materials used in the construction of the passenger compartment of the bus shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision. Materials entirely enclosed from the passenger compartment, such as insulation within the sidewalls and sub-floor, need not comply. In addition, smaller components and items, such as seat grab rails, switch knobs, small light lenses, door seals, window seals, steering wheel, steering column and escape hatches shall be exempt from this requirement.

TS 5.10 Fire Suppression

The purpose of the suppression system is to ensure bus and passenger safety and survivability in the event of a fire. The AFSS system design shall include sensors and nozzles in all areas that are known to commonly have bus fires.

The AFSS system shall meet or exceed the environmental requirements of SAE J1211 and be approved by Underwriters Laboratory or Factory Mutual. At a minimum, the engine compartment, rear-mount HVAC compartment, exhaust area and high current electrical areas (except the battery compartment) at rear of bus shall be equipped with an automatic fire sensing and suppression (AFSS) system product, subject to LACMTA approval during proposal period.

AFSS Operation

The AFSS system shall be powered through the solenoid battery cutoff switch(es) and be activated automatically by the AFSS system sensors. The AFSS shall provide a programmable time-delayed signal to the engine shut-down controls following detection of a fire. The AFSS initiated engine shut-down shall include an integrated Engine Stop Over-Ride to permit the Operator more time, if required, to slow and stop the Bus (Refer to Section TS 46.5 Table 9).

The AFSS sensors shall detect fires in monitored areas and immediately activate the fire alarm signal in the Operator's compartment and fire warning light on the Operator's indicator panel. The AFSS system shall activate fast-acting extinguisher(s) which release suppression agent to all areas monitored. If water based, the distribution system shall utilize nozzles for high-pressure water mist, and shall deliver water droplets between 50-80µm (micrometer). After a system discharge, the AFSS shall be able to clear alarm condition and be ready for reactivation following a simple system reset. The only cost to prepare system for reuse will be for recharge of agent and clean up.

AFSS Monitor Panel

The system shall have a supervision monitoring panel located above the Operators' side console subject to LACMTA approval in Pre-Production meetings. Monitor panel shall include visual indicators for a) Operational Status, for sensors, harness, and extinguishers, b) Fire or system discharged, and c) Power Failure. Monitor

panel shall be capable of identifying each individual sensor (gas or fire) and location of each sensor. Monitor panel shall be capable of recording and storing system events in non-volatile memory. In the event of power loss, events shall still be retrievable after power is restored.

AFSS Sensor

Linear heat detectors shall be mechanically protected from abrasion with use of a spring wire external jacket. All heat sensors shall be installed per the manufacturer's recommendations to sensor fires, extreme temperatures or conditions that are sufficient to ignite combustible materials in the monitored areas. The AFSS/GDS control module shall provide a fault signal to the AFSS status indicator located in the Operator's area in the event of a sensor failure, and the fault shall be traceable to each fire and gas sensor for easy diagnostic purposes. Fault data shall be recorded and accessible even after loss of battery power.

AFSS Agent

The agent shall be approved by Underwriters Laboratory or Factory Mutual Research Corporation and have no ozone depleting property and no global warming potential per USA EPA guidelines.

AFSS Cylinder(s)

The AFSS agent cylinders shall use DOT shippable linear actuators or electric solenoid valves (squibs are prohibited) attached to DOT certified bottles which do not require hydrostatic retest for a minimum of twelve years. Cylinder(s) shall be compatible with suppression agents. Each cylinder shall have a pressure gauge with easy to read "Go-No-Go" type indicator which is visible when the cylinder(s) is installed on the bus. Each agent cylinder shall have a low pressure sensor to monitor agent cylinder pressure from the display panel. Low agent cylinder pressure shall indicate a fault condition on the display panel.

TS 5.11 Gas Detection System (GDS)

GDS system shall be provided to monitor the engine compartment and each separate fuel storage area(s) and shall automatically activate audible and visible alarms in the Operators' area at levels of the lower explosive limit (LEL), of natural gas (methane), subject to LACMTA approval during proposal period.

GDS Operation

The GDS system shall be powered through the solenoid battery cutoff switch(es) and be activated automatically by the GDS system sensors. The system shall be capable of detecting gas in concentrations from 20 percent to 100 percent of LEL and shall continue to indicate the presence of gas at concentrations above 100 percent LEL. A control button shall be provided to silence the GDS audible alarm. The GDS shall provide a programmable time-delayed signal to the engine shut-down controls following detection of methane 50 percent LEL of the gas selected for fuel as described in TS 46.5 Table 9. The GDS initiated engine shut-down shall include an integrated Engine Stop Over-Ride to permit the Operator more time, if required, to slow and stop the bus (Refer to Section TS 46.5 Table 9). The GDS shall be in full time sampling mode at all times.

GDS Monitor Panel

The system shall have a supervision monitoring panel located above the Operators' side console area subject to LACMTA approval in Pre-Production meetings. Monitor panel shall indicate operational status of the sensors, harness, and calibration with visual indicators provided on the Operators' indicator panel. Visual indicators shall include a) System OK (power on and calibrated), b) Gas Alarm, c) Service Required and d) Monitor each gas sensor for trace gas, significant gas, and trouble conditions for ease of system diagnostics..

GDS Calibration

System shall not require calibration. System diagnostics shall not require more than 20 minutes and shall provide traceability to individual sensor failures during diagnostic work.

TS 5.12 Respect for the Environment

In the design and manufacture of the bus, the Contractor shall make every effort to reduce the amount of potentially hazardous waste. In accordance with Section 6002 of the Resource Conservation and Recovery Act, the Contractor shall use, whenever possible and allowed by the specifications, recycled materials in the manufacture of the bus.

TS 5.13 Water Leak Testing

The roof, windows, windshields, and all doors of all Buses shall be water tested for a minimum of 30 continuous minutes in order that leaks may be detected and corrected. The HVAC shall be turned on only for the first 15 minutes of the test. The water test should replicate a sustained driving rain contacting all surfaces equally. Water spray nozzles shall be located to provide an overlapping pattern to effectively test the full length of the roof, sides, front and back of the bus at a flow rate of 0.04 gal/min/ft²

TS 5.14 Fasteners and Securements

Unless otherwise specified all bolts, nuts and washers shall use Metric or English system dimensions. All bolts, nuts, washers shall be SAE Grade 5 or better and be designed to resist corrosion for the life of the bus. Stainless steel fasteners are required for the structure exterior, suspension system, fuel system, HVAC system, PPA area and mirror/camera attachments. Where the bus design requires high-strength fasteners, zinc plated, or phosphate coated (only if zinc is not available) fasteners shall be provided. Zinc plated fasteners may be used in areas requiring welding. Exceptions to the use of stainless steel or zinc plated fasteners shall be approved on a case-by-case basis.

The use of plastic tie wraps shall be limited to bundling small diameter lines (under one-inch diameter); they shall not be used as an attachment device unless approved by LACMTA during proposal period. The failure of any number of tie wraps over the life of the bus shall not result in a required repair action or service interruption.

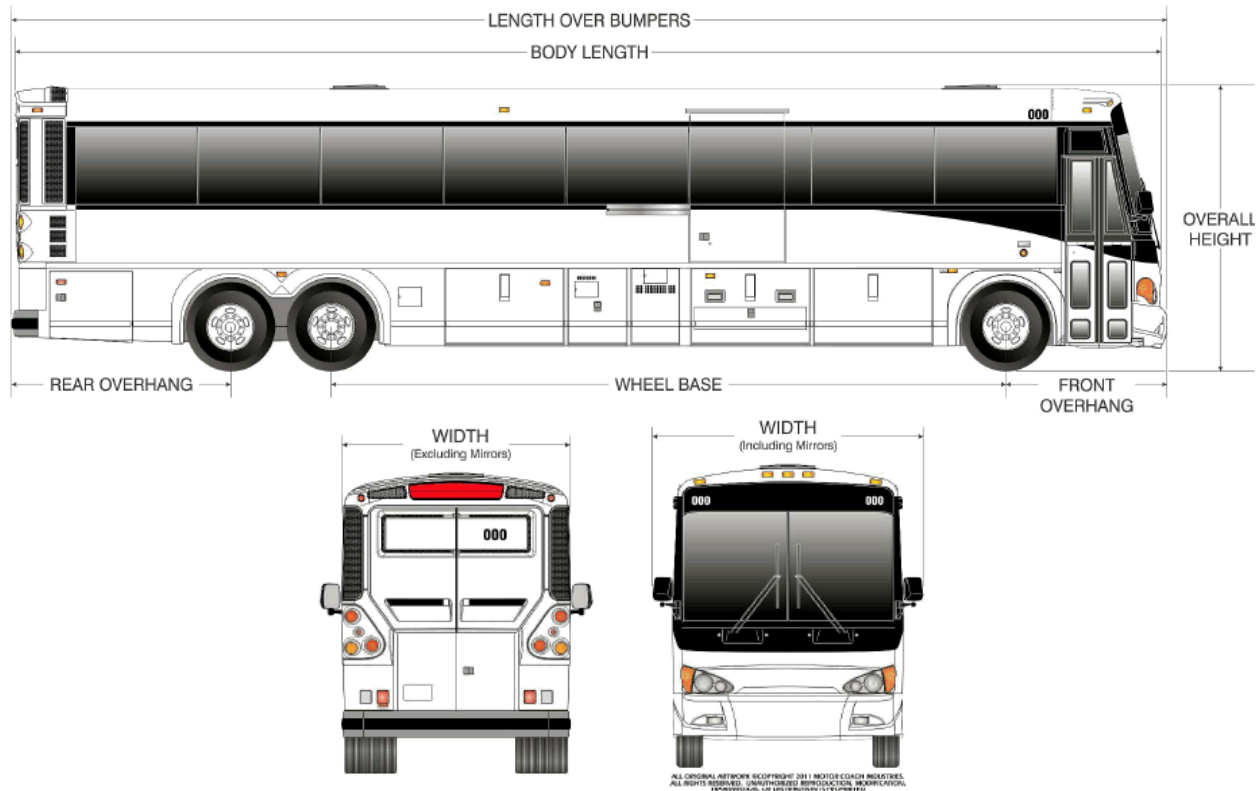
All wire harnesses assemblies and wire bundles over 18 inches long shall be secured with suitable wire trays or fully wrapped PTFE or Nylon insulated P-clamps, or other suitable method approved by the LACMTA. P-clamps not used for wiring support shall be orange, fully wrapped silicone insulated. The use of plastic tie wraps shall be limited to bundling wires; they shall not be used as a primary attachment device unless approved by LACMTA during proposal period. The failure of any number of tie wraps shall not result in a required repair action or service interruption. Supports for wires, cables, or harnesses shall be insulated from contact with wire, cable or harness by a fully cushioned, non-conductive material. Supports for all electrical cables, harnesses and bundles will be subject to LACMTA approval during proposal period and shall be of premium quality.

DIMENSIONS (TS 6)

TS 6. Physical Size

With exceptions such as exterior mirrors, marker and signal lights, bumpers, fender skirts, washers, wipers, ad frames, cameras, object detection systems, bicycle racks, feelers and rub-rails, the bus shall have the following overall dimensions as shown in Figure 1 at static conditions and design height.

FIGURE 1
Transit Bus Exterior Dimensions



TS 6.1 Bus Length

For ease of use, the following tolerances will be allowable for each given bus length.

Body Length - 40 feet

Length Over Bumpers –40-1/2 feet to 44 feet

TS 6.2 Bus Width

TS 6.2.1 Transit Bus

102 inches Width Bus

Body width shall be 102 inches (+0, -1 inch).

TS 6.2.2 Commuter Bus

Not applicable.

TS 6.3 Bus Height

Maximum Overall Height

Maximum overall height shall be 135 inches, including all rigid, roof-mounted items such as A/C, exhaust, fuel system and cover, etc.

TS 6.4 Step Height

TS 6.4.1 Transit Bus

The step height shall not exceed 16.0 inches at either doorway without kneeling. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.4.2 Commuter Bus

Not applicable.

TS 6.4.3 Articulated Bus

Not applicable.

TS 6.5 Underbody Clearance

The bus shall maintain the minimum clearance dimensions as defined and shown in Figure 2, regardless of load, up to the gross vehicle weight rating.

TS 6.6 Ramp Clearances

The approach angle is the angle measured between a line tangent to the front tire static loaded radius arc, (axle centerline), and the initial point of structural interference forward of the front tire to the ground.

The departure angle is the angle measured between a line tangent to the rear tire static loaded radius arc, (axle centerline), and the initial point of structural interference rearward of the rear tire to the ground.

The break over angle is the angle measured between two lines tangent to the front and rear tire static loaded radius arcs, (axle centerlines), and intersecting at a point on the underside of the vehicle that defines the largest ramp over which the vehicle can roll.

TABLE 3
Default Breakover Angle

Angle	30 to 45 ft. Bus
Approach	9 deg. (min.)
Front breakover	8 deg. (min.)
Departure	8.5 deg. (min.)

TS 6.7 Ground Clearance

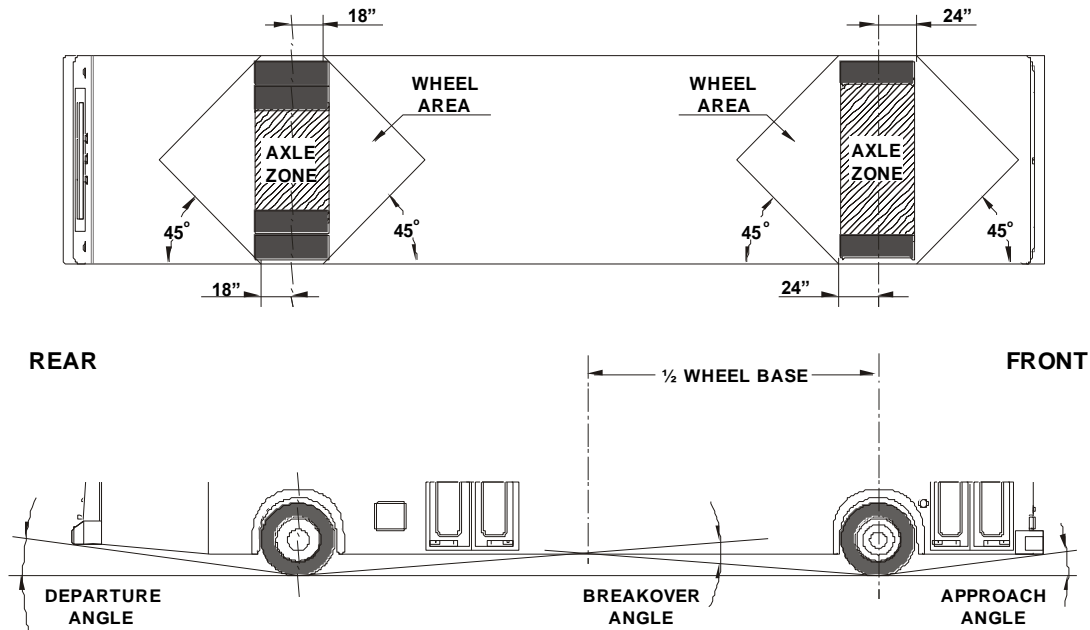
Ground clearance shall be no less than 8.5 inches, (eight inches at jacking pad) except within the axle zone and wheel area.

Axle zone clearance, which is the projected area between tires and wheels on the same axial centerline, shall be no less than 5.4 inches.

Wheel area clearance shall be no less than six inches for parts fixed to the bus body and five inches for parts that move vertically with the axles.

— **FIGURE 2**

Transit Bus Minimum Road Clearance



TS 6.8 Floor Height

TS 6.8.1 Transit Bus

Height of the step above the street shall be no more than 16 inches measured at the centerline of the front and rear doorway. All floor measurements shall be with the bus at the design running height and on a level surface and with the standard installed tires. A maximum of two steps are allowed to accommodate a raised aisle floor in the rear of the bus.

TS 6.8.2 Commuter Bus

Not applicable.

TS 6.9 Interior Headroom

Headroom above the aisle and at the centerline of the aisle seats shall be no less than 78 inches in the forward half of the bus tapering to no less than 74 inches forward of the rear settee. At the centerline of the window seats, headroom shall be no lower than 65 inches reducing to 60 inches at the side wall, except for parcel racks and reading lights, if specified. Headroom at the back of the rear bench seat may be reduced to a minimum of 56 inches, but it shall increase to the ceiling height at the front of the seat cushion. In any area of the bus directly over the head of a seated passenger and positioned where a passenger entering or leaving the seat is prone to strike his or her head, padding shall be provided on the overhead paneling.

TS 6.10 Aisle Width

The minimum clear aisle width between pairs of transverse seats with all attached hardware shall be at least 22 inches.

The aisle width between the front wheelhouses shall be at least 35.5 inches, and the entire area between the front wheelhouses shall be available for passengers and mobility aid devices.

VEHICLE PERFORMANCE (TS 7-TS 8)

TS 7. Power Requirements

The propulsion system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed and grade-ability requirements, and operate all propulsion-driven accessories using actual road test or dynamometer results and computerized vehicle performance data.

TS 7.1 Top Speed

The bus shall be capable of achieving a top speed of 65 mph on a straight, level road at GVWR with all accessories operating. The bus shall be capable of safely maintaining the vehicle speed for the discrete bus range specified in proposed bus.

NOTE: Values are assumed to be sustained. Manufacturer shall supply LACMTA with data, if there is a variance between peak performance and sustained vehicle performance.

TS 7.2 Grade-ability

Grade-ability requirements shall be met from a standing stop on grades with a dry commercial asphalt or concrete pavement at GVWR with all accessories operating.

The propulsion system shall enable the bus to achieve and maintain a speed of 40 mph on a 2.5 percent ascending grade and 15 mph on a 10 percent ascending grade for the discrete bus range specified in proposed bus.

NOTE: Values are assumed to be sustained. Manufacturer shall supply LACMTA with data, if there is a variance between peak performance and sustained vehicle performance.

TS 7.3 Acceleration

TS 7.3.1 Acceleration (CNG)

The acceleration shall meet the requirements in Table 4 below and shall be sufficiently gradual and smooth to prevent throwing standing passengers off-balance. Acceleration measurement shall commence when the accelerator is depressed.

TABLE 4a

Maximum Start Acceleration Times on a Level Surface¹

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	18
40	30
50	60
Top speed	

1. Vehicle weight = GVWR

Jerk

The rate of change of acceleration shall be minimized throughout the acceleration/deceleration range and shall not be greater than 15.5 mph/sec/sec (0.3g/sec)

Response Time

Response times shall be measured from the activation or deactivation of the accelerator or brake pedal to the initial response of an on-board accelerometer measuring longitudinal Bus acceleration. Response times for power to brake, brake to power, coast to power and to brake shall be no greater than 0.20 seconds.

TS 7.3.2 Acceleration Electric or Zero Emission

The propulsion and braking systems shall meet the performance requirements of the Duty Cycle.

Braking application and performance shall remain consistent regardless of EV system State of Charge (SOC) or other variances related to regenerative braking.

The system shall be programmable to allow optimization of acceleration and deceleration rate. Performance may be affected when reprogramming.

TABLE 4b

Maximum Start Acceleration Times on a Level Surface¹

Speed (mph)	Maximum time (seconds)
10	5
20	10
30	18
40	30
50	60
Top speed	

1. Vehicle weight = GVWR

Jerk

The rate of change of acceleration shall be minimized throughout the acceleration/deceleration range and shall not be greater than 15.5 mph/sec/sec (0.3g/sec)

Response Time

Response times shall be measured from the activation or deactivation of the accelerator or brake pedal to the initial response of an on-board accelerometer measuring longitudinal Bus acceleration. Response times for power to brake, brake to power, coast to power and to brake shall be no greater than 0.20 seconds.

TS 7.3.3 Acceleration (Commuter Bus)

Not applicable.

TS 7.4 Operating Range

The operating range of the Bus shall be designed to meet the operating profile as stated in the applicable section and performance requirements as stated below.

TS 7.4.1 Diesel (Transit Bus)

Not applicable.

TS 7.4.2 Diesel (Commuter Bus)

Not applicable.

TS 7.4.3 CNG

A compressed natural gas fuel system consisting of fuel cylinders, filler provisions, fuel lines, pressure reduction, and auxiliary equipment necessary to safely operate under all operating conditions shall be provided. The Contractor shall provide sufficient fuel capacity to give the Bus a 400-mile range before the low fuel warning light comes on. The 400-mile range shall be based on:

- A service cycle that utilizes only the CBD portion of the FTA ADB heavy-duty transit bus cycle as administered by The Altoona Bus Research and Testing Center.
- The CBD portion shall be further modified to add 20 minutes of idle time.

The Contractor shall provide the LACMTA with a technical analysis which supports the proposed CNG fuel system design compliance to the LACMTA's range of operation requirement including the proposed fuel capacity. The analysis shall contain at a minimum:

- Source of fuel economy information (pounds per mile or standard cubic feet per mile).
- Summary of the gas quality used in the calculations.
- Bus condition including weight.

The analysis shall use the natural gas data supplied below based on 70 ° F ambient temperature.

TABLE 5
LACMTA CNG Fuel Properties

Lower Heating Value Btu/lb.	Molecular Weight	Density @ 3,614.7 psia	Density @ 14.7 psia	Specific Gravity
21904	16.734	12.49 lb./cu ft.	0.044 lb./cu ft.	0.580

The analysis shall be provided with the Proposal.

The system shall be capable of refueling at a minimum rate of 5,000 scfm.

TS 7.4.4 Electric (Zero Emission)

The Contractor shall provide sufficient energy storage and charger charging systems to give the bus a cumulative 300-mile daily operating range before the low power warning light comes on. The 300-mile range shall be based on:

- A service cycle that utilizes only the CBD portion of the FTA ADB heavy-duty transit bus cycle with all accessories operating at full capacity.
- The CBD portion shall be further modified to add 20 minutes of idle time.

The Contractor shall provide the LACMTA with a technical analysis which supports the proposed energy storage and charger systems design compliance to the MTA's range of operation requirement including the proposed energy storage system capacity. The analysis shall contain at a minimum:

- Source of energy storage and charger systems information (kilowatt-hour per mile).
- Bus condition including weight.

TS 8. Fuel Economy

Test results from the Altoona fuel economy tests or other applicable test procedures shall be provided to the LACMTA. Results shall include vehicle configuration and test environment information.

POWERPLANT (TS 9-TS 19)

TS 9. Engine

The Propulsion Power Assembly (PPA) shall consist of an engine and transmission, and support equipment mounted in a compartment in the rear of the bus in T-drive configuration. . The propulsion system shall be designed to minimize exhaust emissions and maximize fuel economy while meeting the specified performance requirements.

Prior to manufacturing the Pilot Bus, the Contractor shall coordinate a technical review with the LACMTA and engine and transmission suppliers covering integration and installation design. As part of the technical review, the Contractor shall advise the LACMTA concerning engine and transmission features and control system options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality.

Prior to start of production, the Contractor shall provide documentation from the Sub-suppliers, which supports their approval, that the engine and transmission installation, support system design, and components used specifically for the LACMTA's contract meet the OEM requirements and recommendations.

The engine shall comply with applicable local, state, and/or federal emissions and useful life requirements. Components of the fuel management and/or control system shall have a design life of not less than 150,000 miles without replacement or major service. The lifetime estimate shall be based on the defined design operating profile while operating under conditions in TS 5.7.

The engine shall be equipped with an electronically controlled management system (ECM), compatible with either 12- or 24-volt power distribution. The engine control system shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. The engine's electronic management system shall monitor operating conditions and provide instantaneous adjustments to optimize both engine and bus performance. The system shall be programmable to allow optimization of parameters or adjustable features.

The engine starting system shall be protected by an interlock that prevents its engagement when the engine is running. Special equipment or procedures may be employed to start the bus when exposed to temperatures less than 30° F for a minimum of four hours without the engine in operation. The integration of all systems on the vehicle relative to engine idle speed shall be the responsibility of the vehicle manufacturer to meet the requirements of LACMTA.

The engine control system shall protect the engine against progressive damage. The system shall monitor conditions critical for safe operation and automatically de-rate power and/or speed and initiate engine shutdown as needed.

The engine shall be designed for city transit bus application. The engine shall be designed to operate without failure for 300,000 miles in LACMTA revenue service without major failure or significant deterioration. Electronic controls, supplied by the OEM engine manufacturer, such as throttle control, programmable control module(s), and engine protection system, shall be provided and integrated with other bus electronic systems.

Automatic Engine Protection/Shutdown Override Feature

A control shall be available to the Operator that when depressed and released will delay the engine shutdown for 30 seconds to allow the bus to be moved. Override action shall be recorded. This data shall be retrievable by the LACMTA.

TS 9.1 Engine (CNG)

The engine shall meet all regulatory requirements when operating on fuel equal to CARB Specifications for Compressed Natural Gas #2292.5. The four predominant characteristics that must be met are Methane, Ethane, Butane, and Propane.

Standard Requirements for a Fast Idle Device

The engine shall be equipped with an operator-controlled fast idle device. The fast idle control shall be a two-way switch mounted on the dash or side console and shall activate only with the transmission in neutral and the parking brake applied. The fast idle device may be activated and controlled automatically by the control system for heavy loads, e.g. air conditioning.

Oil filtration systems shall be approved by the engine and transmission OEM and be designed with by-pass circuits, as needed, in the event that a filter becomes plugged.

TS 9.1.1 Engine Compartment Control Panel

A rear control panel shall be provided for the convenience and safety of LACMTA mechanics. The control panel shall be located in the engine compartment located in an area where it shall not be damaged during repairs. The control panel wiring, switches, and gauges shall be water proof with IP 65 and IP 67 ratings to withstand steam cleaning.

Control Panel Gauges and Indicators

The following mechanical, electrical dial gauges, or digital display, subject to LACMTA approval during proposal period, shall be mounted on, or adjacent to, the engine compartment control panel:

- **Oil Pressure Gauge:** 0-100 psi - Accuracy ± 2 , psi, shall indicate oil pressure at a main oil galley.
- **Temperature Gauge:** 0-250° F - Accuracy $\pm 2^\circ$ F, shall indicate engine block coolant temperature.
- **Air Filter Restriction Gauge:** 0-20 inches H₂O- Accuracy ± 1 inch. H₂O, shall indicate air filter restriction.
- **Voltage Gauge(s):** Battery voltage gauge to monitor both 12 and 24-volt electrical systems with a range of 0-48-Volt.

Engine Panel Controls

The following controls shall be located on the engine compartment control panel:

- a) **Rear Run Switch:** Three-position toggle switch, marked REAR, OFF, and FRONT positions.
- b) **Light Switch:** Two-position toggle switch with waterproof cover labeled "Compartment" for control of the minimum of five LED lamps.
- c) **Engine Start:** Starter switch marked "START" shall operate the starter motor only when the rear run switch is in the "REAR" position and transmission is in neutral, and fuel fill door is closed. The Operators start button shall be deactivated when the Rear Run Switch is in "REAR" Position.
- d) **Engine Speed Control:** A spring-return control knob or toggle switch marked "ENGINE SPEED" shall be provided that will increase engine RPM from idle to maximum controlled free speed. The switch shall be activated only when the Rear Run Switch is in the "REAR" position, the transmission is in neutral and parking brake set.
- e) **Diagnostic Test Ports:** Additional to the ports required in the Operators' area per Specification Section TS 46.5 and Table 9.

TS 9.2 Propulsion System Electric (Zero Emission)

TS 9.2.1 Propulsion System Description

The bus shall be powered by an electric propulsion system. Function and operation of the bus shall be transparent to the bus operator and passengers. The OEM shall ensure that the bus structure can successfully accept the installation of the propulsion system and be operated on the stated duty-cycle for a period of 12 years without a structural failure. At a minimum, the propulsion system shall comply with applicable local, state and/or federal emissions and useful life requirements. The propulsion system shall comply with local, state and federal (maintenance) and other applicable sections.

The electric drive system shall be rated for the GVWR or greater of the bus.

TS 9.2.2 Propulsion System Service

The propulsion system shall be arranged so that accessibility for all routine maintenance is ensured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems. However, LACMTA shall recognize that properly rated equipment and safety electrical work practices are essential when servicing high-voltage electric components. The air compressor, radiator, all propulsion accessories, and any other component requiring service or replacement shall be easily removable. The Contractor shall provide all specialty tools and diagnostic equipment required for maintaining the propulsion system in accordance with the Special Tools List.

All compartments and areas that include components using hazardous or higher voltages, shall incorporate safety warning labels to provide appropriate warning for service personnel. A secondary label shall be included to list the voltages in use within the compartment or area. Labels shall be visible when approaching the area. Labels shall include pictograph symbols for easy recognition.

TS 9.2.3 Primary Propulsion Unit and Traction Motor

The propulsion system may be configured in a variety of methods depending upon type of driver, series and/or parallel. The definition of motor in the context of this specification assumes that the device can provide or consume energy as well as provide or retard mechanical motion.

TS 9.2.4 Energy Storage, Controller and Charging Systems

Design and performance shall be provided to LACMTA. Energy storage shall be of a commercial design capable of operating in the LACMTA transit environment. The primary charging of the energy storage system shall be accomplished by the on-board electric system controller and regenerative braking.

Thermal management will be provided to ensure optimal life and performance of the ESS over the environmental operating range.

Energy storage system SOC correction methods stated in SAE J2711 shall be utilized.

Master Disconnect Switch

A single master switch shall be provided near the battery compartment or other appropriate area for disconnecting of all battery positives in the event of an emergency. The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion when the batteries are washed off or are in normal service.

In the event of an emergency, turning the master battery switch "Off" with the PPU operating shall shut off the PPU and shall not damage any component of the electrical system. The master battery switch shall be capable of carrying and interrupting the total circuit load. Master battery switch shall be capable of being locked in the "Open" or "Off" position or suitable alternative to prevent accidental turn on.

Shop Charging System

The Contractor shall supply and install battery charger either on the bus or at MTA operating facility capable of recharging the electric/hybrid bus propulsion batteries to a state necessary for the bus to complete a cumulative 300 miles per day according to the route profile as stated in the "Design Operating Profile", and section TS 5.7.

On-Route Charging System

If required to meet daily operating range requirement in Section TS 7.4, battery electric buses will be outfitted with suitable on-route charging systems. The charging system shall be an overhead contact system or an in-ground inductive charging system. All charging systems shall allow driver to easily connect without the need of a complex bus guidance system. Connecting to charging system shall not require the driver to leave his/her seat. Safety protocols shall not energize the charging system until the bus is parked in designated charging position, and the charging system is properly interfaced with the bus. Brake and drive interlock shall prevent inadvertent movement of the bus while charging.

TS 9.2.5 Electric System Controller (ESC)

The ESC regulates energy flow throughout electric system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters, (e.g., voltages, currents, temperatures, etc.) within specified operating ranges.

The controller shall monitor the process inputs and execute outputs as appropriate to control the operation of all propulsion system components.

Primary Power Unit (PPU)

The PPU and related emission system shall meet California Air Resources Board (CARB) standards for zero emissions.

Contractor shall provide LACMTA with expected durability of the PPU and related emissions systems. The PPU shall be equipped with an electrically controlled management system, compatible with multiplex wiring system and either 12- or 24-volt electrical systems.

The PPU shall have on-board diagnostic capabilities, able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in Operator's area and inside PPU compartment. The on-board diagnostic system shall inform the Operator via visual and audible alarms when out-of-parameter conditions exist for vital PPU functions.

Fuel Cell

The fuel cell power assembly shall consist of fuel cell, electric motor, transmission and support equipment (fuel cell driven bus) or fuel cell, battery, transmission and support equipment (battery dominant fuel cell bus). In both cases, the fuel cell can be of any type (characterized by the electrolyte used), however the fuel is limited to hydrogen, only. The fuel cell and its embedded electronics should have a design life of 300,000 miles without failure, significant deterioration, replacement or major service.

TS 9.2.6 Engine

Refer to Section TS 9.1 Engine (CNG).

TS 10. Cooling Systems

The cooling systems shall be of sufficient size and designed to maintain fluids and engine intake air at safe, continuous operating temperatures during the most severe operations possible with the bus loaded to GVWR and with ambient conditions as listed in Section TS 5.7 with a 10 percent minimum reserve capacity in accordance with engine and transmission manufacturers' cooling system requirements. The cooling system fan

controls should sense the temperatures of the operating fluids and the intake air, and if either is above safe operating conditions the cooling fan should be engaged. The fan control system shall be designed with a fail-safe mode of "fan on." The cooling system shall provide functional service while operating in the design operating profile environment.

The cooling system shall be equipped with ethylene glycol base engine coolant approved by the engine manufacturer and compatible with the LACMTA's existing coolant product. Use of LACMTA's standard coolant shall not adversely affect the cooling system's performance. Coolant shall meet the propulsion system manufacturer's most stringent requirements for coolant properties.

The cooling system shall be self-purging requiring no special procedures to remove air from the system when coolant is installed or added. Quarter-turn ball valves shall permit complete shut-off of both lines for the heating and defroster units. All low points in the cooling system shall be equipped with drain cocks. The radiator drain plug provided at the radiator shall be a minimum ½-inch dry break type (Refer to TS 88.1 for approved products). The drain plug shall be protected from damage and have a provision for attaching a drain adapter for directing the draining fluid into a container. This shall be accomplished without having the coolant drain onto or through any structure of body parts.

The radiator and charge air cooler unit(s) shall be mounted in such a manner to be replaceable by one LACMTA mechanic within the MTTF specified in TS 88.2. The units shall be easily accessible for cleaning and maintenance by one LACMTA mechanic in less than one hour. Mounting shall be designed so that a LACMTA mechanic can gain full access to the fan side of the units for cleaning without the use of tools. This may be accomplished by swing out design, removable fan shroud section, or suitable inspection door.

For CNG applications, radiator piping shall be stainless steel or brass tubing, if practicable, hoses shall be eliminated. Necessary hoses shall be impervious to all bus fluids. All hoses shall be secured with stainless steel clamps that provide a complete 360-degree seal. The clamps shall maintain a constant tension at all times, expanding and contracting with the hose in response to temperature changes and aging of the hose material. All coolant hoses shall have appropriate sized, constant torque, hose clamps.

TS 10.1 Engine Cooling

A heavy-duty stainless steel radiator surge tank shall provide sufficient draw down capacity as required by the engine manufacturer. A heavy-duty single glass tube, (non-plastic), shall be provided to determine satisfactory engine coolant level accessible by opening the surge tank access door. A spring-loaded, push-button type valve or lever shall be provided to safely release pressure or vacuum in the cooling system no more than 65 inches above the ground. Surge tank filler cap shall have a safety lock. A ¼-inch NPT port shall be provided in a convenient location in the surge tank for the LACMTA's pressure testing equipment, subject to LACMTA approval in Pre-Production meetings. The system shall be designed to allow coolant to be added while the cooling system is at full operating temperature incorporating an un-pressurized coolant overflow reservoir.

The radiator shall be of durable corrosion-resistant construction with metal header tanks for CNG bus only. No heat producing components, such as intake charge-air-coolers, or climate control system components shall be mounted between the engine cooling air intake aperture and the radiator. Sensor port fittings (1/8-inch NPTF) shall be provided in the upper and lower sections of the radiator to allow the use of thermocouple for diagnostics. Louvered fins are not acceptable.

Self-Cleaning

Radiator and charge air cooler fan(s) shall be electrically driven and capable of reverse operations for periodic self-cleaning of the radiator and charge air cooler. For multiple fans, system shall be designed to prevent air recirculation in the event of individual fan failure.

A cooling system pressure gauge with an operating range of 0-30 psi, easily readable through the surge tank access door, shall be installed to monitor static and operating pressures.

TS 10.1.1 Radiator Screen

Screen in Front of Radiator

The radiator input shall be protected by an easily cleanable screen designed to collect large debris. Radiators with a fin density greater than 12 fins per inch or a louvered slit design shall not be used. No heat-producing components or climate-control system components shall be mounted between the engine cooling air intake aperture and the radiator. The radiator and charge air cooler shall be designed to withstand thermal fatigue and vibration associated with the installed configuration. The radiator and charge air cooler cores shall be easily cleaned (to include engine side core surface) with standard pressure-washing equipment.

TS 10.1.2 Coolant

Standard Requirement for Coolant Filtration

The engine cooling system shall be equipped with a properly sized water filter with a spin-on element. When replacing the water filter, only the water in the filter will be lost.

TS 10.1.3 Fan Drive Design

Electric Fans

The bus shall be equipped with an electric fan drive cooling system. A screen guard must be installed on electric motor fans per SAE J1308. (Refer to Section TS 10.1 Engine Cooling). The cooling system shall be equipped with a master controller with the following capabilities:

- a) Multiple electric DC brushless pusher type variable speed fans with electronic feedback controls.
- b) Communicate on the J1939 CAN data link with system diagnostic reporting via DM1 messaging
- c) Review and download data via a laptop with service tool software
- d) Capable of software and calibration up-dates, receiving commands from the engine/PPU
- e) Sense engine compartment temperature and activate fans if maximum temperature is exceeded.
- f) Report fault codes by lighting an engine compartment LED flashing light.
- g) Collect and store cooling system and vehicle performance histogram data.
- h) If system controller loses communication with the engine/PPU or sensors, it shall direct all fans to go into a default speed mode to avoid vehicle shutdown.
- i) If fans lose communication with system controller, they shall go into a default mode to avoid vehicle shutdown.

TS 10.1.4 Mounting

Standard Mounting Design

Mounting location of radiator and charge air cooler shall be the Contractor's standard design. (Refer to Section TS 10 Cooling Systems).

TS 10.2 Charge Air Cooling

The charge air cooling system shall provide maximum air intake temperature reduction with minimal pressure loss. The charge air radiator shall be sized and positioned to meet engine manufacturer's requirements. Air ducting and fittings shall be protected against heat sources and shall be configured to minimize restrictions and maintain sealing integrity.

Charge air piping and fittings shall be designed to minimize air restrictions and leaks.

TS 10.3 Transmission Cooling

The transmission shall be cooled by a dedicated heat exchanger sized to maintain operating fluid within the transmission manufacturer's recommended parameters of flow, pressure and temperature. The transmission cooling system shall be matched to retarder and engine cooling systems to ensure that all operating fluids remain within recommended temperature limits established by each component manufacturer. The engine

cooling system should provide coolant bypass flow to the transmission cooling system with the engine thermostats closed. The heat exchanger will have provisions to drain transmission oil during routine servicing.

TS 10.4 Electric Drive System Cooling

The thermal management system shall maintain electric system components within their design operating temperature limits. Refer to Section TS 10.1 inclusive for additional requirements.

TS 11. Transmission (Conventional Powertrain)

The transmission shall be designed for city transit bus application. The transmission shall be multiple speeds, automatic shift with torque converter, retarder, electronic controls, and have integrated oil cooler. Gross input power, gross input torque and rated input speed shall be compatible with the engine. The transmission shall be designed to operate for not less than 300,000 miles on the design operating profile without replacement or major service. The transmission should be easily removable without disturbing the engine and accessible for service.

The electronic controls shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks. Electronic controls shall provide consistent shift quality and compensate for changing conditions such as variations in vehicle weight and engine power.

The transmission shall be flushed of any non-synthetic transmission oil and filled with an OEM approved synthetic fluid designed for extended drain intervals. Unless otherwise agreed to in writing, the synthetic transmission oil provided by the Contractor shall be compatible with the LACMTA's existing synthetic transmission oil.

A brake pedal application of nominal 6 psi shall be required by the driver to engage forward or reverse range from the neutral position to prevent sudden acceleration of the bus from a parked position.

The electronically controlled transmission shall have on-board diagnostic capabilities, be able to monitor functions, store and time stamp out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. The transmission shall contain built-in protection software to guard against severe damage. The on-board diagnostic system shall trigger a visual alarm to the driver when the electronic control unit detects a malfunction.

An electronic transmission fluid level monitoring and protection system shall be provided.

TS 12. Retarder (Transit Bus)

The powertrain shall be equipped with a retarder designed to extend brake lining service life. The application of the retarder shall cause a smooth blending of both retarder and service brake function and shall activate the brake lights.

The retarder application shall be controlled by the throttle pedal and shall be integrated with the ABS system controls so that actuation of ABS shall override the operation of the brake retarder.

Throttle Pedal Activation of the Retarder

The retarder shall apply approximately 1/3 of its total application with a resulting deceleration of no greater than 0.077g when the throttle pedal is completely released. The retarder shall apply approximately 2/3 of its total application with a resulting deceleration of no greater than 0.14g with light brake application. Maximum retarder shall be achieved when brake pedal is fully depressed to engage service brakes, with a maximum resulting deceleration of approximately 0.20g in an empty bus. The resulting decelerations specified include the effects of engine braking, wind resistance and rolling resistance.

The thermostatically controlled cooling fan shall be activated when the retarder is engaged and the coolant temperature reaches the maximum operating temperature established by the engine and transmission manufacturers.

Retarder Disable Switch

The retarder disable switch shall be located behind the destination sign door, subject to LACMTA approval in Pre-Production meetings.

Regenerative Braking

The electric propulsion system shall be equipped with a regenerative braking system designed to extend brake lining service life, and capture braking energy to recharge the Energy Storage System. The application of the regenerative braking shall cause a smooth blending of both regenerative brake and service brake function and shall not activate the brake lights independent of the service brake.

Regenerative Braking Disable Switch

The regenerative braking disable switch shall be located behind the destination sign door, subject to LACMTA approval in preproduction meetings.

TS 13. Engine Brake (Commuter Bus)

Not applicable.

TS 14. Mounting

All PPA/PPU mounting shall be mechanically isolated to minimize transfer of vibration to the body structure and provide a minimum clearance of 0.75 inches. Mounts shall control the movement of the PPA/PPU so as not to affect performance of belt-driven accessories or cause strain in piping and wiring connections to the PPA/PPU.

PPA/PPU mounts shall be manufactured from high grade rubber material and shall last for three years or 150,000 miles, whichever comes first. PPA/PPU mounts shall not deteriorate from contact with oil, heat, and ozone present in the engine compartment.

All air, fuel, fluid, electrical, and other cabling connecting the cradle assembly to the bus, shall have "bulkhead" connections in the proximity of the fire wall to facilitate the replacement of powertrain assemblies. Hoses, cables, and harnesses shall not require unclamping in order to remove the PPA.

TS 14.1 Service

The propulsion system shall be arranged for ease of access and maintenance. The Contractor shall list all special tools, fixtures or facility requirements recommended for servicing. The muffler, exhaust system, air cleaner, air compressor, starter, alternator, radiator, all accessories and any other component requiring service or replacement shall be easily removable and independent of the engine and transmission removal.

No special tools, other than dollies and hoists, shall be required to remove the PPA/PPU. Two LACMTA mechanics shall be able to remove, replace, and prepare the complete PPA/PPU assembly for service within a MTTF of 12-man hours. The MTTF does not include miscellaneous preparation such as placing the bus on stands and removing the bumper, if necessary.

Engine tune-up, PPA/PPU removal and replacement, cylinder heads, and accessories, including, but not limited to muffler, exhaust system, air compressor, alternator(s), starter, and A/C compressor, shall be serviceable from a flat floor and with the use of a pit or hoist.

The Contractor shall provide two suitable dollies for each spare PPA/PPU purchased under this Contract. The Contractor shall mount and ship any spare PPA/PPUs purchased and delivered under this contract onto these

dollies. The PPA/PPU dollies shall be designed, subject to LACMTA approval in Pre-Production meetings, for long term storage of spare PPA/PPUs and also aid the LACMTA in PPA/PPU replacement to meet the specified MTTF. Use of the PPA/PPU dollies shall be included in the Service manual. The dolly wheels shall be heavy-duty, approximately six inch diameter, with solid steel wheels. The Contractor shall provide the LACMTA with sufficient fabrication drawings needed to manufacture additional dollies.

PPA/PPU driven accessories shall be unit mounted for quick removal and repair. Accessory drive systems including belts shall operate without failure or unscheduled adjustment for 50,000 miles in LACMTA service. Accessories shall be driven at speeds sufficient to assure adequate system performance during extended periods of idle and low route speed operation. To the maximum extent possible, belt drive systems shall be self-adjusting after initial installation adjustment. Belt drives that require manual tensioning shall be designed to facilitate easy service/maintenance, subject to LACMTA approval at the Pre-Production Meeting. Accessory drive belts shall be guarded in accordance with CAL OSHA article 45, Belt and Pulley Drives, Section 4070 "Guarding."

All fillers shall be easily accessible with standard funnels, pour spouts and automatic dispensing equipment.

All fluid fill locations shall be color coded to ensure correct fluid is added: red for transmission fluid, yellow for engine oil. Fill points shall include easy to read labels prominently displayed at the fill point indicating the type and specification of fluid to be added. The engine oil filler cap shall be a spring loaded with sufficient force to retain the cap in a closed position after servicing with no additional action by a service attendant.

All lubricant sumps, including engine, transmission, transmission cooler and hydraulic reservoir, shall be fitted with magnetic type, external, dry break drain plugs of standard size. Any fluid intended to be used on the bus requires a Maintenance Safety Data Sheet (MSDS) to be submitted for LACMTA approval. These fluids shall also be compatible and mixable with the respective LACMTA approved fluids used for the same application.

No engine bypass oil filter.

Engine Oil Pressure and Coolant Temperature Gauges

Engine oil pressure and coolant temperature gauges required in engine compartment.

Engine Air Cleaner

An air cleaner with a dry filter element and a graduated air filter restriction indicator shall be provided. The location of the air intake system shall be designed to minimize the entry of dust and debris and to maximize the life of the air filter. The engine air duct shall be designed to minimize the entry of water into the air intake system. Drainage provisions shall be included to allow any water/moisture to drain prior to entry into air filter.

The engine air inlet system shall be provided which meets the requirements of the OEM engine manufacturer. The air inlet system shall include a heavy-duty, high dust capacity, dry paper air filter with outside-to-inside air flow with an initial efficiency of 99 percent when tested per SAE Standard J726C, latest edition. The air filter shall be positioned for easy access and service, subject to LACMTA approval during proposal period.

Air inlet piping from the air filter to engine inlet shall use T-bolt type heavy duty, minimum ¾ inch wide, band clamps at all joints. One 1/4 inch NPTF test port, with brass plug, shall be provided near the air filter. The test port shall be positioned for easy accessibility with the engine door open.

TS 15. Hydraulic Systems

Hydraulic system service tasks shall be minimized and scheduled no more frequently than those of other major bus systems. All elements of the hydraulic system shall be easily accessible for service or unit replacement. Critical points in the hydraulic system shall be fitted with service ports so that portable diagnostic equipment may be connected or sensors for an off-board diagnostic system permanently attached to monitor system operation when applicable. A tamper-proof priority system shall prevent the loss of power steering during operation of the Bus if other devices are also powered by the hydraulic system.

The hydraulic system shall operate within the allowable temperature range as specified by the lubricant manufacturer. Any hydraulically driven system shall be subject to LACMTA approval at the Pilot Bus. The hydraulic system shall be filled with premium approved synthetic oil that will demonstrate a mean time between fluid replacements in excess of 50,000 miles. A system shall be provided to easily determine the level of hydraulic fluid in the reservoir.

The system shall be configured and/or shielded so that failure of any line shall not allow hydraulic fluid to spray or drain onto any component operating above the auto ignition temperature of the fluid.

The hydraulic system (steering) shall be located to accommodate easy service. The hydraulic system filter shall be located in the return, low pressure, circuit to the oil reservoir, or internal to the oil reservoir, subject to LACMTA approval at the Pilot Bus. Sufficient pump cleanable strainers shall be installed to keep the hydraulic pump and system free of contamination. The strainers shall be located for easy access and service.

TS 15.1 Fluid Lines

All lines shall be rigidly supported to prevent chafing damage, fatigue failures, degradation and tension strain. Lines should be sufficiently flexible to minimize mechanical loads on the components. Lines passing through a panel, frame or bulkhead shall be protected by grommets (or similar devices) that fit snugly to both the line and the perimeter of the hole that the line passes through to prevent chafing and wear. Pipes and fluid hoses shall not be bundled with or used to support electrical wire harnesses.

Lines shall be as short as practicable and shall be routed or shielded so that failure of a line shall not allow the contents to spray or drain onto any component operable above the auto-ignition temperature of the fluid.

All hoses, pipes, lines and fittings shall be specified and installed per the manufacturer's recommendations. All straight couplings and elbows shall be braided silicone hose with polyester reinforced flame red silicone liner and royal blue cover. The straight couplings and elbows shall meet SAE J20R3 Class A rating with a temperature range of -65°F to 500°F. All hoses shall be protected from engine exhaust heat which may cause premature failure.

Unless otherwise specified, all hydraulic, fuel, oil, and air lines shall be made with steel tubing. When rigid lines are not practical, flexible fluid lines shall be kept as short as practical. Flexible lines shall be rubber hoses with braided stainless steel jackets except in applications where premium hoses compatible with the fluid type are required. Standard SAE or JIC end fittings shall be used.

Rigid and flexible lines shall be individually supported and readily accessible for inspection and service, including interior lines inside the bus, subject to LACMTA approval in Pre-Production meetings, and shall not touch one another or any part of the bus. Each individual line or hose shall be identified with a steel tag which includes a line number or designator and OEM part number for easy identification.

TS 15.2 Fittings and Clamps

All clamps shall maintain a constant tension at all times, expanding and contracting with the line in response to temperature changes and aging of the line material. The lines shall be designed for use in the environment where they are installed. For example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on.

All hose clamps shall be stainless steel. All hoses shall have appropriately sized, constant torque, hose clamps.

All fluid lines shall be secured using anchor blocks or suitable securement devices.

Compression fittings shall be standardized to prevent the intermixing of components. Compression fitting components from more than one manufacturer shall not be mixed, even if the components are known to be interchangeable.

TS 15.3 Charge Air Piping

Refer to Section TS 10.2 Charge Air Cooling.

TS 16. Radiator

Refer to Section TS 10.1 Engine Cooling.

TS 17. Oil and Hydraulic Lines

Oil and hydraulic lines shall be compatible with the substances they carry. The lines shall be designed and intended for use in the environment where they are installed. For example, high-temperature resistant in the engine compartment, resistant to road salts near the road surface, and so on. Lines within the engine compartment shall be composed of steel tubing where practicable, except in locations where flexible lines are required. Flexible lines shall include hose guard shielding with a 450-degree operating range within the engine compartment. High pressure hose ends shall be clamped and secured to prevent movement of line in event of failure of the line or fitting.

Hydraulic lines of the same size and with the same fittings as those on other piping systems of the bus, but not interchangeable, shall be tagged or marked for use on the hydraulic system only.

TS 18. Fuel

TS 18.1 Fuel Lines

Fuel lines shall be securely mounted, braced and supported as designed by the bus manufacturer to minimize vibration and chafing and shall be protected against damage, corrosion or breakage due to strain or wear.

Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected locations to prevent line or manifold damage from unsecured objects or road debris.

Fuel hose and hose connections, where permitted, shall be made from materials resistant to corrosion and fuel and protected from fretting and high heat. Fuel hoses shall be accessible for ease of serviceability.

TS 18.1.1 Fuel Lines, Diesel

Not applicable.

TS 18.1.2 Fuel Lines, CNG

Fuel lines shall comply with NFPA-52. All tubing shall be a minimum of seamless Type 304 stainless steel (ASTM A269 or equivalent). Fuel lines and fittings shall not be fabricated from cast iron, galvanized pipe, aluminum, plastic, or copper alloy with content exceeding 70 percent copper. Lines, fittings, and hoses shall be clear and free from cuttings, burrs or scale. Thread joining material that is impervious to CNG shall be utilized as required. Fuel lines shall be identifiable as fuel lines only. Fuel lines shall be bent using computer numeric machines (CNC) to assure consistency, no hand bending will be permitted.

The bus manufacturer shall have a documented procedure for testing the high pressure line assembly in accordance with NFPA 52 requirements.

Fuel lines shall be securely mounted braced and supported using “split-block” type or stainless steel P clamps; all mounting clamps shall be mounted to a rigid structure to minimize vibration and shall be protected against damage, corrosion or breakage due to strain, rubbing, or wear. “Floating clamps” (not mounted to a rigid

structure) shall not be permitted. Fuel lines shall not be used to secure other components (wires, air lines, etc.).

Manifolds connecting fuel containers shall be designed and fabricated to minimize vibration and shall be installed in protected location(s) to prevent line or manifold damage from unsecured objects or road debris.

Fuel hose connections, where permitted, shall be less than 48 inches in length, made from materials resistant to corrosion and action of natural gas, and protected from fretting and high heat and shall be supported approximately every 12 inches. Hose support in-between the bus frame and the engine that exceed 12 inches is subject to LACMTA approval during the Pre-Production meeting.

TS 18.2 Design and Construction

TS 18.2.1 Design and Construction, Diesel

Fuel Tank(s)

Not applicable.

TS 18.2.2 Design and Construction, CNG

Fuel Containers/Cylinders

CNG fuel containers/cylinders shall have a minimum service life of 20 years and must be designed, constructed, manufactured, and tested in accordance with the latest revision of at least one of the following:

U.S. Applications:

- NFPA 52-Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems.
- FMVSS 304.
- Any local standard(s) specifically intended for CNG fuel containers.

The design and construction of the fuel system supplied by the OEM shall comply with federal and local regulations.

The fuel cylinders shall have a 3,600 psi service pressure and a working pressure of 125 percent the service pressure. The fuel cylinders shall be mounted on the roof in such a manner that replacement of one cylinder shall not require the removal of additional cylinders. The fuel cylinders shall also be clearly marked with serial numbers that shall be easily visible to mechanics when installed on the bus. Each cylinder shall have a purchased date no more than six months from the date of released for shipment to the LACMTA.

Fuel cylinder construction shall be in accordance with DOT Standard 304, ANSI NGV2, latest revision design and test criteria. Cylinder shall be designed for the lightest weight possible which does not require a hydrostatic re-qualification. Cylinders shall be certified for refueling pressures to 125 percent of working pressure during temperature compensated fueling.

Installation

Fuel cylinders shall be installed and tested in accordance with ANSI/IAS NGV2, latest revision, Basic Requirements for Compressed Natural Gas Vehicles (NGV) Fuel Containers and NFPA 52, Compressed Natural Gas (CNG) Vehicular Fuel Systems Code, latest revision, Section 303. In the case of a low floor transit bus, the placement of containers shall be limited to the roof of the vehicle or in the compartment above the engine of the vehicle.

Fuel cylinders, attached valves, pressure relief devices, and mounting brackets should be installed and protected so that their operation is not affected by bus washers and environmental agents such as rain, snow, ice or mud. These components should be protected from significant damage caused by road debris or collision.

The roof and above the engine mounted containers shall be contained within a skeletal structure resembling a roll cage and contained within an enclosure. The enclosure shall incorporate a hinged clamshell type access. The access panels shall be designed to offer protection from weather and to be sacrificial as a means of providing an escape path to atmosphere upon rapid enclosure pressure rise. The latching method shall utilize quick release captive hardware that can be demonstrated to last the life of the bus. Additional shielding shall be provided surrounding end fittings and valves as needed. Shields shall be attached to the bus structure hinged in a manner that permits one mechanic to unlatch and swing the shield open for routine inspections. As practical, electrical components shall not be located within the roof enclosure and if unavoidable, they shall be intrinsically safe.

The cover(s) shall be hinged along the axis of the bus and open to either side providing complete access to the cylinders with mechanic(s) standing on the roof. A safety latch system shall be provided so that the doors when opened cannot inadvertently close during servicing. Failure of the safety latch(es) shall not result in the cover opening while the bus is in operation. The bus roof shall be coated with "anti-slip" paint applied to areas that will accommodate safe access for routine inspections of the fuel cylinders.

Labeling

CNG fuel systems shall be labeled in accordance with NFPA 52, "Compressed Natural Gas (CNG) Vehicular Fuel Systems Code," latest revision. System expiration dates posted shall match individual cylinder dates. This shall include required labelling in driver area and inspection record labels at fueling area. Each cylinder shall have a purchased date no more than six (6) months from the date of released for shipment to the LACMTA.

Pressure Relief Devices (PRDs)

PRDs must be designed, constructed, manufactured and tested in accordance with ANIS/IAS PRD1, latest revision, "Pressure Relief Devices for Natural Gas Vehicle (NGV) Fuel Containers" and ANSI/IAS NGV2, latest revision, "Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers." All natural gas fuel system piping, including the PRD vent line shall be stainless steel. PRDs shall be vented to the roof area of the Bus with minimum protrusion above the roof line and shall be protected with a suitable cap which shall withstand daily bus wash activity, subject to LACMTA approval during proposal period.

Valves

Valves must be installed in accordance with ANIS/IAS NGV2, latest revision, "Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers" and NFPA 52, "Standard for Compressed Natural Gas (CNG) Vehicular Fuel Systems." Manual valves shall not require the use of a tool to operate.

A quarter turn valve, easily accessible through the fuel door shall isolate the high pressure manifold and fuel storage system from the rest of the engine fuel system. The valve function and open and closed positions shall be clearly marked. An additional minimum ½ inch valve shall be provided for draining the high pressure manifold and any fuel cylinder(s) through a service port. Type and location of the service port shall be subject to LACMTA approval during proposal period.

A primary fuel pressure regulator shall be supplied and mounted in an accessible location for servicing. Coolant lines shall be routed in a manner to prevent trapping air or draining coolant when the regulator is removed for service.

One flow control solenoid operated shut-off valve shall be installed for the system. A control over-ride system shall be provided to operate (open or close) the solenoid valve for defueling. The flow control solenoid valve shall remain in normally closed position until energized, and shall open when the engine is running.

All valves, including solenoid type, shall be designed to operate properly under all possible system flow rates and conditions.

One manually operated shut-off valve and one solenoid valve shall be installed on each individual fuel cylinder or each combined fuel cylinders.

Gauges

Glycerin filled gauges which meets NFPA 52 requirements shall be located in the high and low pressure manifolds which shall indicate fuel system pressure. The high pressure fuel gauge shall have maximum 100 psi increments, 0-5,000 psi, and shall be visible during fueling operations and rated for the maximum system pressure, have welded (not soldered) fittings and have a restrictive orifice. A pressure transducer shall be incorporated into the high pressure fuel manifold which shall provide the Operators' low fuel warning light which shall activate at between 300 and 650 psi.

Fuel Filter

Filters, rated for the system working pressure, shall be provided that meet the engine manufacturer's requirements and are effective for use in LACMTA's CNG compressor environment. Primary and secondary filters shall be coalescing and equipped with a drain valve or plug to periodically drain coalesced contaminants.

Fuel Filler

The fuel filler shall be located 30 to 38 feet measure behind the centerline of the front door, subject to LACMTA approval during proposal period. The filler cap shall be retained to prevent loss and shall be recessed into the body.

The fill and vent receptacles shall be located within an enclosure on the right side of the bus. The access door shall be sized to allow full viewing of gauges, ease of hookups and maneuver of fuel nozzle.

The fuel fill receptacle and vent receptacle attachment shall be robust and capable of routine fueling connects/disconnects without deflection or metal fatigue, and capable of withstanding mechanical loads induced by a fueling drive-away incident without attachment failure. Existing LACMTA fueling system break-away device requires an applied force of 150 lb.-F to cause separation.

A dual fuel filler receptacle shall be located on the right side, rear corner, of the bus, 36 to 50 inches from the street surface. The fill receptacles shall be ANSI/AGA NGV1 or NGV2 certified and shall accept an OPW CT5000 nozzle or approved equal and an OPW CT1000 nozzle or approved equal and shall incorporate dust caps permanently affixed to the receptacles.

A static ground connecting point shall be installed near the fueling receptacles for grounding during fueling/defueling operations.

Fueling System

The fueling port receptacle shall be an ANSI/AGA NGV1 or NGV2 certified receptacle as designated by the LACMTA. The bus shall be capable of being fueled by a LACMTA fuel system nozzle. The fueling port receptacle location shall be such that connection by fueling personnel can be performed without physical strain or interference. A dust cap shall be permanently "tethered" to the fueling port receptacle. To prevent drive-away events, the fueling system shall incorporate a proximity sensor at the fast fill fuel receptacle to detect if a fuel nozzle is connected to it and apply an interlock. A separate sensor shall be incorporated on the fuel fill door. (Refer to Section TS 38.4) The fueling system must be sized to accommodate a minimum fuel flow of 5,000 scfm at 4,250 psi.

Defueling System

The CNG defueling port shall be an NGV-3.1/CGA-12.3 certified receptacle subject to LACMTA approval during proposal period. The CNG defueling port shall be located on the curbside of the bus, in a location that is compatible with the LACMTA's defueling station operation. The defueling system shall incorporate the following characteristics:

- Dust cap permanently "tethered" to the defueling port.
- Device(s) to prevent inadvertent defueling.
- Components compatible with LACMTA's defueling operation.

- The piping and fittings onboard the bus shall be sized to allow the fueling station to meet the following operating parameters:
- Fuel system sized to allow a bus with 20,000 scf on-board to defuel within six hours.
- The atmospheric-vent system shall allow a bus with 20,000 scf of on-board CNG storage to defuel to atmospheric pressure within 80 minutes.
- Location/method of attaching CNG fuel system to earth ground.

TS 19. Emissions and Exhaust

TS 19.1 Exhaust Emissions

The engine and related systems shall meet all applicable emission and engine design guidelines and standards.

The electric vehicle propulsion system shall comply with CARB's zero emissions standard.

TS 19.2 Exhaust System

Exhaust gases and waste heat shall be discharged from the roadside rear corner of the roof. The exhaust pipe shall be of sufficient height to prevent exhaust gases and waste heat from re-entering the bus, discoloring or causing heat deformation to the roof of the bus. The entire exhaust system shall be adequately shielded to prevent heat damage to any bus component, including the exhaust after-treatment compartment area. Heat shield shall be installed between Catalytic Converter and HVAC unit to protect the HVAC unit and wire harnesses in the area from radiant heat emanating from the Catalytic Converter after engine shut down, subject to LACMTA approval. The exhaust outlet shall be designed to minimize rain, snow or water generated from high-pressure washing systems from entering into the exhaust pipe and causing damage to the after-treatment.

Exhaust system shall incorporate joints as necessary to facilitate removal and replacement of individual components including exhaust muffler or, if required to meet emissions requirements, catalyst units. Mounting cushions, if provided, must last the life of the engine and shall not deteriorate when exposed to high exhaust system temperatures. Exhaust piping joints shall be machined V-band clamp design. Flexible exhaust lines necessary to accommodate engine movement shall be constructed from stainless steel bellows. Exhaust piping in the engine enclosure shall include reusable metal jacket that is easy to replace.

TS 19.3 Exhaust After-treatment

An exhaust after-treatment system will be provided to ensure compliance to all applicable EPA regulations in effect.

Diesel Exhaust Fluid Injection

Not applicable.

TS 19.4 Particulate After-treatment

Not applicable.

STRUCTURE (TS 20-TS 30)

TS 20. General

TS 20.1 Design

The structure of the bus shall be designed to withstand the transit service conditions typical of an urban duty cycle throughout its service life. The vehicle structural frame shall be designed to operate with minimal maintenance throughout the 12-year or 500,000-mile design operating profile. The design operating profile specified by the LACMTA shall be considered for this purpose.

TS 21. Altoona Testing

Prior to acceptance of first bus, the vehicle must have completed any FTA-required Altoona testing. Any items that required repeated repairs or replacement must undergo the corrective action with supporting test and analysis. A report clearly describing and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the LACMTA.

If available, the Altoona Test Report shall be provided to the LACMTA with the Proposal submittal. If not available, then the report shall be provided prior to First Article Bus acceptance.

TS 21.1 Structural Validation

Baseline Structural Analysis

The structure of the bus shall have undergone appropriate structural testing and/or analysis. At minimum, appropriate structural testing and analysis shall include Altoona testing or finite element analysis (FEA).

TS 22. Distortion

The bus, loaded to GVWR and under static conditions, shall not exhibit deflection or deformation that impairs the operation of the steering mechanism, doors, windows, passenger escape mechanisms or service doors. Static conditions shall include the vehicle at rest with any one wheel or dual set of wheels on a six inch curb or in a six-inch deep hole.

TS 23. Resonance and Vibration

All structure, body and panel-bending mode frequencies, including vertical, lateral and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible or sensible resonant vibrations during normal service.

TS 23.1 Engine Compartment Bulkheads

The passenger and engine compartment shall be separated by fire-resistant bulkheads. The engine compartment shall include areas where the engine and exhaust system are housed. This bulkhead shall preclude or retard propagation of an engine compartment fire into the passenger compartment and shall be in accordance with the Recommended Fire Safety Practices defined in FTA Docket 90A, latest revision. Only necessary openings shall be allowed in the bulkhead, and these shall be fire-proof. Any passageways for the climate control system air shall be separated from the engine compartment by fireproof material. Piping through the bulkhead shall have copper, brass, or fireproof fittings sealed at the bulkhead with copper or steel piping on the forward side. Wiring may pass through the bulkhead only if connectors or other means are provided to prevent or retard fire propagation through the bulkhead. The conduit and bulkhead connector shall be sealed with fireproof material at the fire wall. Engine access panel in the bulkhead shall be fabricated of fireproof material and hinged to the bulkhead with fireproof fasteners. These panels, their fasteners and the bulkhead shall be constructed and reinforced to minimize warping of the panels during a fire that will compromise the integrity of the bulkhead. Access panels shall be constructed to prevent vapors and fumes from entering the passenger compartment.

TS 23.2 Crashworthiness (Transit Bus)

Contractor shall be required to provide FEA software analysis or other evidence of compliance with this section during the pre-award audit. The bus body and roof structure shall withstand a static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a six inches reduction in any interior dimension. Windows shall remain in place and shall not open under such a load. These requirements must be met without the roof-mounted equipment installed.

The bus shall withstand a 25 mph impact by a 4,000-pound automobile at any side, excluding doorways, along either side of the bus with no more than three inches of permanent structural deformation at seated passenger hip height. This impact shall not result in sharp edges or protrusions in the bus interior.

Exterior panels below 35 inches from ground level shall withstand a static load of 2,000 pounds applied perpendicular to the bus by a pad no larger than five sq. inches. This load shall not result in deformation that prevents installation of new exterior panels to restore the original appearance of the bus.

The bus, at GVWR and under static conditions, shall not exhibit deformation or deflection that impairs operation of doors, windows, or other mechanical elements. Static conditions include the bus at rest with any one wheel or dual set of wheels on a 6-inch curb or in a six-inch deep hole.

All structure, body, and panel-bending mode frequencies, including vertical, lateral, and torsional modes, shall be sufficiently removed from all primary excitation frequencies to minimize audible, visible, or sensible resonant vibrations during normal service.

TS 24. Corrosion

The bus flooring, sides, roof, understructure and axle suspension components shall be designed to resist corrosion or deterioration from atmospheric conditions and de-icing materials for a period of 12 years or 500,000 miles, whichever comes first. It shall maintain structural integrity and nearly maintain original appearance throughout its service life, with the LACMTA's use of proper cleaning and neutralizing agents.

All materials that are not inherently corrosion resistant shall be protected with corrosion-resistant coatings. All joints and connections of dissimilar metals shall be corrosion resistant and shall be protected from galvanic corrosion. All body joints and seams shall be protected by application of polyurethane based sealer, or approved equal, at assembly. Representative samples of all materials and connections shall withstand a two-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces and no weight loss of over one percent.

The entire bus understructure, including wheel housings, shall be spray-coated prior to installation of sub-assemblies with suitable corrosion preventative undercoating which meets the bus manufacturer's corrosion protection specifications. The Contractor shall provide a copy of its proposed undercoating system program at the first Pre-Production meeting.

Corrosion Resistance Requirements for Exposed and Interior Surfaces of Tubing throughout Entire Vehicle

All exposed surfaces and the interior surfaces of tubing and other enclosed members shall be corrosion resistant through incorporation of intrinsically corrosion-resistant materials or through the application of a corrosion protection system.

Additional Corrosion Resistance Requirements

Alternatively the vehicle may be constructed using only inherently corrosion-resistant materials and fasteners such as stainless steel or composites to minimize deterioration

TS 25. Towing

Towing attachment points shall be provided on the front of the bus. Each towing device, when used with a load equalizing sling, shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the bus within 20 degrees of the longitudinal axis of the bus. If applicable, the rear towing device(s) shall not provide a toehold for unauthorized riders. The method of attaching the LACMTA's towing bar shall require the specific approval of the LACMTA in Pre-Production meetings and shall not require the removal, or disconnection, of front suspension or steering components. Removal of the bike rack is permitted for attachment of towing devices. Contractor shall provide 15 sets of any special towing equipment adapters, if required, so that the LACMTA is able to flat tow the bus. Contractor shall demonstrate compliance with these provisions using the Pilot Bus.

Provision of Connectors for Towing

Shop air connectors shall be provided at the front and rear of the bus and shall be capable of supplying all pneumatic systems of the bus with externally sourced compressed air. The location of these shop air connectors shall facilitate towing operations. A second air supply should be provided to allow the rear service brakes to be applied using the tow truck brake signal air pressure to apply the rear primary service brakes.

All male fittings shall have an additional quarter turn manual shut off valve provided near the front bumper for use only during towing, subject to LACMTA approval in Pre-Production meetings. Fittings shall be protected against dirt and moisture when not in use. Air connectors shall be LACMTA standard air chucks conveniently located in the engine compartment. Air lines leading to the external air shall include hand shut-off valves.

Lifted (Unsupported) Front Axle and Flat Towing Capability

The front towing attachment points shall allow attachment of the LACMTA's standard tow bar. The front towing attachment points shall permit towing of the bus at curb weight by the towing device(s) and the LACMTA tow bar without damage to anybody panel or component. These devices shall permit common flat towing.

Two rear recovery devices/tie downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus. The method of attaching the tow bar or adapter shall require the specific approval of the LACMTA in pre-production meetings. Any tow bar or adapter exceeding 50 pounds should have means to maneuver or allow for ease of use and application. Each towing device shall accommodate a crane hook with a one-inch throat.

TS 26. Jacking

It shall be possible to safely jack up the bus, at curb weight, with a common 10-ton floor jack with or without special adapter, when a tire or dual set is completely flat and the bus is on a level, hard surface, without crawling under any portion of the bus. Jacking from a single point shall permit raising the bus sufficiently high to remove and reinstall a wheel and tire assembly. Jacking pads located on the axle or suspension near the wheels shall permit easy and safe jacking with scissors or bottle jack with the flat tire or dual set on a six inches high run-up block not wider than a single tire. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

Jacking and changing any one tire/wheel assembly shall be completed by one LACMTA mechanic. The bus shall withstand such jacking at any one or any combination of wheel locations without permanent deformation or damage.

Yellow Pads

Jacking pads shall be painted safety yellow.

Decals

Apply decals to identify location of jacking pads. The location of the jacking pad shall be identified with a label on the exterior of the bus, directly over the jack pad.

TS 27. Hoisting

The bus axles or jacking plates shall accommodate the lifting pads of a two-post hoist system. Jacking plates, if used as hoisting pads, shall be 5-1/4 square inches, with a turned-down flange not less than 1/2-inch deep on each side (if applicable) to prevent the bus from falling off the hoist. A model or sample jacking plate shall be provided during Pre-Production meetings for approval by LACMTA. Other pads or the bus structure shall support the bus on jack stands independent of the hoist. The manufacturer may be required to demonstrate compatibility with LACMTA hoists as part of the towing demonstration for TS 25.

TS 28. Floor

TS 28.1 Design (Transit Bus)

The floor shall be essentially a continuous plane, except at the wheel housings and platforms. Where the floor meets the walls of the bus, as well as other vertical surfaces such as platform risers, the surface edges shall be blended with a circular section of radius not less than 3/8 inch or installed in a fully sealed butt joint. Similarly, a molding or cover shall prevent debris accumulation between the floor and wheel housings. The vehicle floor in the area of the entrance and exit doors shall have a lateral slope not exceeding two degrees to allow for drainage.

Floor installation, repair, and replacement method shall be subject to LACMTA approval during proposal period.

Bi-level Floor Design

The floor design shall consist of two levels (bi-level construction). Aft of the rear door extending to the rear settee riser, the floor height may be raised to a height no more than 21 inches above the lower level, with equally spaced steps. An increase slope shall be allowed on the upper level, not to exceed 3.5 degrees off the horizontal.

TS 28.2 Design (Commuter Bus)

Not applicable.

TS 28.3 Design (Articulated Transit Bus)

Not applicable.

TS 28.4 Strength

The floor deck may be integral with the basic structure or mounted on the structure securely to prevent chafing or horizontal movement and designed to last the life of the bus. Sheet metal screws shall not be used to retain the floor, and all floor fasteners shall be serviceable from one side only. Any adhesives, bolts or screws used to secure the floor to the structure shall last and remain effective throughout the life of the bus. Tapping plates, if used for the floor fasteners, shall be no less than the same thickness as a standard nut, and all floor fasteners shall be secured and protected from corrosion for the service life of the bus.

The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic deflection of no more than 0.60 inch from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. The floor, with coverings applied, shall withstand a static load of at least 150 pounds applied through the flat end of a ½-inch diameter rod, with 1/32-inch radius, without permanent visible deformation.

TS 28.5 Construction

The floor shall consist of the subfloor and the floor covering that will last the life of the bus. The floor as assembled, including the sealer, attachments and covering shall be waterproof, non-hygroscopic and resistant to mold growth. The subfloor shall be resistant to the effects of moisture, including decay (dry rot). It shall be impervious to wood-destroying insects such as termites.

The floor shall be constructed using composite flooring material approved by the LACMTA during proposal period. All floor surfaces, including edges shall be water proofed, non-hygroscopic, resistant to wet and dry rot, mold growth, and impervious to insects. Floor panels shall be attached to the substructure in such a manner as to be water tight and free from squeaks. Fasteners shall be rust proof.

TS 28.6 Construction (Commuter Bus)

Not applicable.

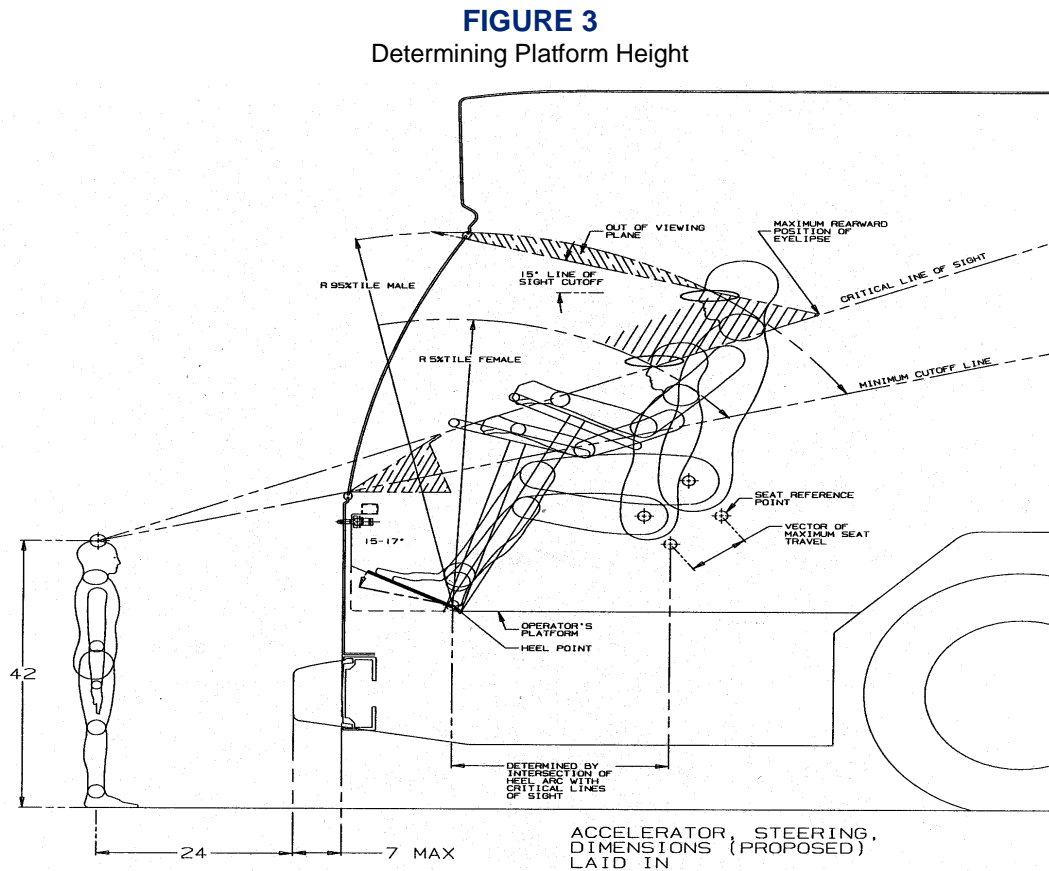
TS 29. Platforms

TS 29.1 Driver's Area

The covering of platform surfaces and risers, except where otherwise indicated, shall be the same material as specified for floor covering. Non-corroding metal trim shall be provided and installed with stainless steel hardware along top edges of platforms unless integral nosing is provided.

TS 29.2 Driver's Platform

The driver's platform shall be of a height such that, in a seated position, the driver can see an object located at an elevation of 42 inches above the road surface, 24 inches from the leading edge of the bumper. Notwithstanding this requirement, the platform height shall not position the driver such that the driver's vertical upward view is less than 15 degrees. A warning decal or sign shall be provided to alert the driver to the change in floor level. Figure 3 illustrates a means by which the platform height can be determined, using the critical line of sight.



TS 29.3 Farebox

Farebox placement should minimize impact to passenger access and minimize interference with the driver's line of sight.

Driver Interface Required; Platform Needed to Bring Height to Driver Access

If the driver's platform is higher than 12 inches, then the farebox is to be mounted on a platform of suitable height to provide accessibility for the driver without compromising passengers' access. A maximum of two steps shall be allowed for access to the Operator's seat pedestal. Farebox stanchion shall be placed to also provide assistance to Operator when entering/exiting driver's seat.

Stanchions

Stanchions shall be located around the farebox in accordance with ADA requirements. and subject to LACMTA approval during proposal period.

TS 29.4 Rear Step Area to Rear Area (Transit Bus)

If the vehicle is of a bi-level floor design, then a rear step area shall be provided along the center aisle of the bus to facilitate passenger traffic between the upper and lower floor levels. This step area shall be cut into the rear platform and shall be approximately the aisle width, a minimum 12 inches deep and approximately half the height of the upper level relative to the lower level. The horizontal surface of this platform shall be covered with skid-resistant material with a visually contrasting nosing and shall be sloped slightly for drainage. A warning decal or sign shall be provided at the immediate platform area to alert passengers to the change in floor level.

If there is an interior raised floor area, a maximum of two steps shall be allowed for access to the raised floor area behind the rear door. All step riser heights shall be the same. Risers shall be continuous, flat planes across the entire width. Step risers may be inclined, not to exceed 10 degrees from the vertical (nosing edge lower). All corners shall have radii no less than ¼-inch to facilitate cleaning.

Each step shall simultaneously support a 300-pound load evenly distributed over the center half of each step-tread without permanent deformation and with elastic deflection of no more than 1/8-inch. Each step tread shall support a load of 500 pounds evenly distributed over the center half of the tread without permanent deformation. The steps shall be sloped only sufficient to preclude water accumulation.

TS 30. Wheel Housing

TS 30.1 Design and Construction

Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to preclude overheating when the bus is operating on the design operating profile. Wheel housings shall be constructed of corrosion-resistant and fire-resistant material. Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to prevent overheating when the bus is operated in revenue service.

Wheel housings, as installed and trimmed, shall withstand impacts of a two- inch steel ball with at least 200 foot-pounds of energy without penetration.

TS 30.2 Design and Construction (Transit Bus)

Interference between the tires and any portion of the bus shall not be possible in maneuvers up to the limit of tire adhesion with weights from curb weight to GVWR. Wheel housings shall be adequately reinforced where seat pedestals are installed. Wheel housings shall have sufficient sound insulation to minimize tire and road noise and meet all noise requirements of this specification.

Design and construction of front wheel housings shall allow for the installation of a radio or electronic equipment storage compartment on the interior top surface.

The finish of the front wheel housings shall be scratch-resistant and complement interior finishes of the bus to minimize the visual impact of the wheel housing. If fiberglass, or other composite material, wheel housings are provided, then they shall be color-impregnated to match interior finishes. The lower portion extending to approximately 10 to 12 inches above the floor shall be equipped with stainless steel trim.

Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than seven inches higher than the wheel well housing. If required for access to suspension components, installation of access panels in the wheel housing must meet all requirements listed including fastening devices, strength and mounting.

TS 30.3 Articulated Joint (Articulated Transit Bus)

Not applicable.

TS 30.4 Raceway (Articulated Transit Bus)

Not applicable.

TS 30.5 Bellows

Not applicable.

CHASSIS (TS 31-TS 38)

TS 31. Suspension

TS 31.1 General Requirements

The front and rear suspensions shall be pneumatic type. The basic suspension system shall last the service life of the bus without major overhaul or replacement. Adjustment points shall be minimized and shall not be subject to a loss of adjustment in service. Routine adjustments shall be easily accomplished by limiting the removal or disconnecting the components. Heavy-duty height control valves shall be provided to keep the bus body in relatively level position and shall contain a dampening or compensating feature to prevent excessive consumption of air resulting from high-frequency axle movements over rough streets. The height control valves will retain the height of the body in relation to the axles under all loading conditions. Regardless of load, the bus relative height to the centerline of the wheels shall not change more than ± 0.5 inches

TS 31.2 Alignment

All axles should be properly aligned so the vehicle tracks accurately within the size and geometry of the vehicle.

TS 31.3 Springs and Shock Absorbers

TS 31.3.1 Suspension Travel

The suspension system shall permit a minimum wheel travel of three inches jounce-upward travel of a wheel when the bus hits a bump (higher than street surface), and three inches rebound-downward travel when the bus comes off a bump and the wheels fall relative to the body. Elastomeric bumpers shall be provided at the limit of jounce travel. Rebound travel may be limited by elastomeric bumpers or hydraulically within the shock absorbers. Suspensions shall incorporate appropriate devices for automatic height control so that regardless of load the bus height relative to the centerline of the wheels does not change more than $\frac{1}{2}$ inch at any point from the height required. The safe operation of a bus cannot be impacted by ride height up to one inch from design normal ride height.

TS 31.3.2 Damping

Vertical damping of the suspension system shall be accomplished by hydraulic shock absorbers mounted to the suspension arms or axles and attached to an appropriate location on the chassis. Damping shall be sufficient to control bus motion to three cycles or less after hitting road perturbations. The shock absorber bushing shall be made of elastomeric material that will last the life of the shock absorber. The damper shall incorporate a secondary hydraulic rebound stop. Shock absorber travel shall be centered on suspension travel to equalize travel to stops in jounce and rebound.

TS 31.3.3 Lubrication

Standard Grease Fittings

Components that do not require regular greasing are desired. A review of all components available that do not require greasing shall be provided with proposal. All elements of steering, suspension and drive systems

requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534. These fittings shall be located for ease of inspection and shall be accessible with a standard grease gun from a pit or with the bus on a hoist. Each element, requiring lubrication, shall have its own grease fitting with a relief path. The lubricant specified shall be standard for all elements on the bus serviced by standard fittings and shall be required no less than every 6,000 miles.

TS 31.3.4 Kneeling/Raising

Kneeling

A kneeling system shall lower the entrance of the bus a minimum of 2.75 inches during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door by the driver. The kneeling control shall provide the following functions:

- Downward control must be held to allow downward kneeling movement.
- Release of the control during downward movement must completely stop the lowering motion and hold the height of the bus at that position.
- Upward control actuation must allow the bus to return to normal floor height without the driver having to hold the control.

The brake and throttle interlock shall prevent movement when the bus is kneeled. The kneeling control shall be disabled when the bus is in motion. The bus shall kneel at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully kneeled position within 4.5 seconds. After kneeling, the bus shall rise within 3 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum vertical acceleration shall not exceed 0.2g, and the jerk shall not exceed 0.3g/second.

An indicator visible to the Operator shall be illuminated until the bus is raised to a height adequate for safe street travel. An audible warning alarm will sound simultaneously with the operation of the kneeler to alert boarding passengers and minimize the sound directed to other areas. The audible alarm sound level shall be automatically adjustable to compensate for ambient sound levels. A warning light mounted near the curbside of the front door, a minimum 2.5 inches diameter amber lens, shall be provided that will blink when the kneel feature is activated. Kneeling shall not be operational while the wheelchair ramp is deployed or in operation.

Raising

The bus shall incorporate a system controlled by the Operator that permits the bus to raise (to account for high curbs) 2.75 inches, measured from normal ride height at the center of the bottom front step regardless of passenger load up to GVWR. Brake and throttle interlock shall be activated to prevent movement when the Bus is raised. The bus shall rise at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully raised position within 4.5 seconds. After rising the bus shall recover (lower) within 3.5 seconds to a ride height permitting the bus to resume service and shall fully recover to the correct operating ride height within 10 seconds. During the lowering operation, the maximum acceleration shall not exceed 0.2g and the jerk shall not exceed 0.3g/sec. measured on the front door step tread.

An indicator visible to the Operator shall be illuminated until the bus has recovered to a height adequate for safe operation. The indicator lights shall be clearly labeled. Warning devices that operate with the high curb system which are visible and audible to passengers near the curbside of the front door shall be provided.

TS 32. Wheels and Tires

TS 32.1 Wheels

All wheels shall be interchangeable and shall be removable without a puller. Wheels shall be compatible with tires in size and load-carrying capacity. Front wheels and tires shall be balanced and counter weighted as an assembly per SAE J1986. Wheel stud nut(s) shall be 1.50-inch in size, (or metric equivalent), and shall be finished with rust preventative in natural steel with no paint.

Wheels and tires shall be removable without disturbing the fender skirts.

Aluminum Wheel

Wheels shall be Alcoa Durabrite polished aluminum. Wheels must be sized to accommodate disc brakes at all wheel locations.

TS 32.2 Tires

Tires shall be suitable for the conditions of transit service and sustained operation at the maximum speed capability of the bus. Load on any tire at GVWR shall not exceed the tire Supplier's rating.

The tires shall be provided under a lease agreement between LACMTA and the tire Supplier. Tires are to be furnished to the Contractor by the LACMTA or authorized representative. Contractor shall provide the LACMTA with a record listing tires installed for each bus delivered. The information shall include the LACMTA brand serial number and mounting location on the bus. Contractor shall conform to tire manufacturer specifications for maximum road speed and duty cycle during bus delivery.

TS 33. Steering

Electrically driven hydraulic assisted or electrically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated. Steering torque applied by the Operator shall not exceed 10 foot-pounds with the front wheels straight ahead. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops. Steering effort shall be measured with the Bus at Seated Load Weight (SLW), stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement with the tires inflated to recommended pressure. Power steering failure shall not result in loss of steering control. While the bus is in operation, the steering effort shall not exceed 55 pounds at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

TS 33.1 Steering Axle (Transit Bus)

Solid Beam Axle and Grease-Type Front Bearings and Seals

The front axle shall be solid beam, non-driving with a load rating sufficient for the bus loaded to GVWR and shall be equipped with preferred unitized grease type front wheel bearings and seals.

All friction points on the front axle shall be equipped with replaceable bushings or inserts and, if needed, lubrication fittings easily accessible from a pit or hoist.

The steering geometry of the outside wheel shall be within two degrees of true Ackerman up to 50 percent lock measured at the inside wheel. The steering geometry shall be within three degrees of true Ackerman for the remaining 100 percent lock measured at the inside wheel.

TS 33.2 Steering and Tag Axles (Commuter Bus)

Not applicable.

TS 33.3 Steering Wheel

TS 33.3.1 Turning Effort

Steering effort shall be measured with the bus at GVWR, stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement and the tires inflated to recommended pressure.

Under these conditions, the torque required to turn the steering wheel 10 degrees shall be no less than 5 foot-pounds and no more than 10 foot-pounds. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops, as the relief valve activates.

Power steering failure shall not result in loss of steering control. With the bus in operation, the steering effort shall not exceed 55 pounds at the steering wheel rim, and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

Caster angle shall be selected to provide a tendency for the return of the front wheels to the straight position with minimal assistance from the driver.

TS 33.3.2 Steering Wheel, General

The steering wheel diameter shall be approximately 18 to 20 inches; the rim diameter shall be $\frac{7}{8}$ to $1\frac{1}{4}$ inches and shaped for firm grip with comfort for long periods of time.

Steering wheel spokes and wheel thickness shall ensure visibility of the dashboard so that vital instrumentation is clearly visible at center neutral position (within the range of a 95th-percentile male, as described in SAE 1050a, Sections 4.2.2 and 4.2.3). Placement of steering column must be as far forward as possible, but either in-line with or behind the instrument cluster.

Foam-covered steering wheel is not acceptable. The steering wheel shall be removable with a standard or universal puller.

TS 33.3.3 Steering Column Tilt

The steering column shall have full tilt capability with an adjustment range of no less than 35 degrees and easily adjustable by the driver.

Steering column shall be a tilt and telescopic model. Column shall be easily adjustable while driver is seated in the driver's seat. The mechanism for adjustments shall be designed for ease of use, durability, utilize detents to position and lock the steering column and not require tightening by hand to apply a clamping force.

TS 33.3.4 Steering Wheel Telescopic Adjustment

The steering wheel shall have full telescoping capability and have a minimum telescopic range of two inches (but no more than 5 inches) and a minimum low-end adjustment of 32 inches, measured from the top of the steering wheel rim in the horizontal position, (0 degrees slope), to the cab floor at the heel point.

TABLE 6

Steering Wheel Height¹ Relative to Angle of Slope

At Minimum Telescopic Height Adjustment (+0 in.)		At Maximum Telescopic Height Adjustment (+5 in.)	
Angle of Slope	Height	Angle of Slope	Height
0 degrees	32 inches	0 degrees	34 inches
15 degrees	26.2 inches	15 degrees	31.2 inches
25 degrees	24.6 inches	25 degrees	29.6 inches
35 degrees	22.5 inches	35 degrees	27.5 inches

1. Measured from bottom portion closest to driver.

TS 34. Drive Axle

The bus shall be driven by a heavy-duty axle with a load rating sufficient for the bus loaded to GVWR. The drive axle shall have a design life to operate for not less than 300,000 miles on the design operating profile without replacement or major repairs. The lubricant drain plug shall be magnetic type. If a planetary gear

design is employed, the oil level in the planetary gears shall be easily checked through the plug or sight gauge. The axle and driveshaft components shall be rated for both propulsion and retardation modes with respect to duty cycle.

NOTE: The retardation duty cycle can be more aggressive than propulsion.

The drive shaft shall be guarded to prevent hitting any critical systems, including brake lines, bus floor or the ground, in the event of a tube or universal joint failure.

End tubes shall be threaded to allow for adjustment of wheel bearing nuts.

Wheel bearings shall be sealed, unitized construction.

Rear axle shall use full synthetic oil meeting axle manufacturer's specifications.

NOTE: Trip recorder to be used in place of hub odometer. (Refer to Section TS 43.1.3)

TS 34.1 Non-Drive Axle

The non-drive axle is the drive axle without the drive gear with a load rating sufficient for the load to GVWR.

TS 35. Tag Axles (Commuter Coach)

Not applicable.

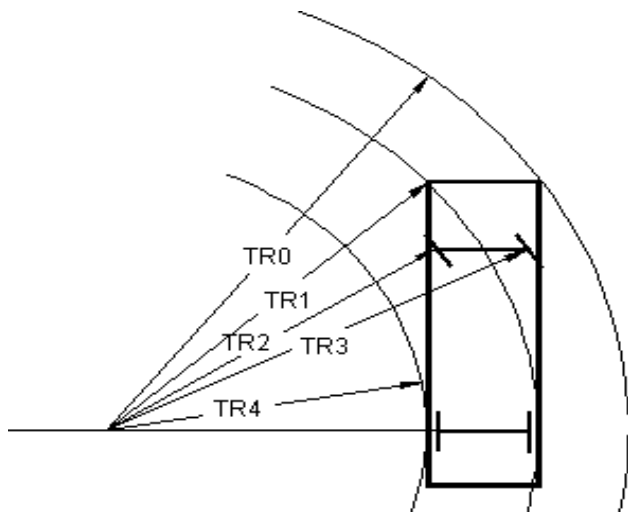
TS 36. Turning Radius

Outside body corner turning radius shall not exceed the maximum at SLW. The front tires shall not rub or interfere in any manner with the bus body parts when turned in either direction under all operating conditions. The turning radius shall be consistent from bus to bus and left to right with no more than six inch difference in measured radius.

TABLE 7
Maximum Turning Radius

Bus Length (approximate)	Maximum Turning Radius (see Figure 4)
40 ft.	44 ft. (TR0)

FIGURE 4
Turning Radius



TS 37. Brakes

TS 37.1 Service Brake

The entire service brake system, including ABS controls, friction material, shall meet applicable FMVSS standards. The entire brake system, including friction material, shall have overhaul or replacement life goal of at least 45,000 miles when operated under LACMTA service.

Brakes shall be self-adjusting. Mechanical Brake Wear indicators, (visible brake sensors), shall utilize stainless steel exposed push rods.

TS 37.2 Actuation

Air-Actuated Brakes

Service brakes shall be controlled and actuated by a compressed air system. Force to activate the brake pedal control shall be an essentially linear function of the bus deceleration rate and shall not exceed 70 pounds at a point seven inches above the heel point of the pedal to achieve maximum braking. The heel point is the location of the driver's heel when his or her foot is rested flat on the pedal and the heel is touching the floor or heel pad of the pedal. The ECU for the ABS system shall be protected, yet in an accessible location to allow for ease of service.

The total braking effort shall be distributed between all wheels in such a ratio as to ensure equal friction material wear rate at all wheel locations. Manufacturer shall demonstrate compliance by providing a copy of a thermodynamic brake balance test upon request.

TS 37.3 Friction Material

The brake linings shall be made of non-asbestos material. In order to aid maintenance personnel in determining extent of wear, a provision such as a scribe line or chamfer indicating the thickness at which replacement becomes necessary shall be provided on each brake lining. No bolts or rivets shall be used to retain the brake lining.

TS 37.4 Hubs and Drums/Discs

Replaceable unitized wheel bearing seals shall run on replaceable wear surfaces. Wheel bearings and hub seals and unitized hub assemblies shall not leak or weep lubricant when operating on the design operating profile for the duration of the initial manufacturer's warranty or 100,000 miles, whichever is longer.

Axle hubs shall be HUB pilot wheel mounting. Hubs shall be painted semi-gloss (50 percent) black with no paint on mating surfaces.

Disc Brakes on All Axles

The bus shall be equipped with disc brakes on all axles, and the brake discs shall allow machining of each side of the disc to obtain smooth surfaces per manufacturer's specifications.

The brake system material and design shall be selected to absorb and dissipate heat quickly so that the heat generated during braking operation does not glaze brake linings.

TS 37.5 Hubs and Drums (Commuter Bus)

Not applicable

TS 37.6 Parking/Emergency Brake

Air Brakes

The parking brake shall be a spring-operated system, actuated by a valve that exhausts compressed air to apply the brakes. The parking brake may be manually enabled when the air pressure is at the operating level per FMVSS 121.

The parking brake shall be actuated by a valve mounted convenient to the Operator, subject to LACMTA approval in Pre-Production meetings. In the event of total loss of air pressure, spring brakes shall be applied automatically.

An audible warning alarm shall be activated when the Master Run switch is in "Off" position or transmission is in neutral and parking brake is not actuated.

Emergency Brake

An emergency brake release shall be provided to release the brakes in the event of automatic emergency brake application. The driver shall be able to manually depress and hold down the emergency brake release valve to release the brakes and maneuver the bus to safety. Once the driver releases the emergency brake release valve, the brakes shall engage to hold the bus in place.

Parking and Emergency brake controls shall be equipped with powder coated metal knobs (no plastic knobs). Colored "yellow" for Parking, and "green" for Emergency release functions.

TS 38. Interlocks (Transit Bus)

TS 38.1 Passenger Door Interlocks

To prevent opening mid and rear passenger doors while the bus is in motion, a speed sensor shall be integrated with the door controls to prevent the mid/rear doors from being enabled or opened unless the bus speed is less than 3 mph.

To preclude movement of the bus, an accelerator interlock shall lock the accelerator in the closed position, and a brake interlock shall engage the service brake system to stop movement of the bus when the driver's door control is moved to a mid/rear door enable or open position, or a mid or rear door panel is opened more than three inches from the fully closed position (as measured at the leading edge of the door panel). This interlock shall also be applied when the emergency release system for the doors is activated.

The interlock engagement shall bring the bus to a smooth stop and shall be capable of holding a fully loaded bus on a six percent grade, with the engine at idle and the transmission in gear, until the interlocks are released. These interlock functions shall be active whenever the vehicle master run switch is in any run position.

All door systems employing brake and accelerator interlocks shall be supplied with supporting failure mode effects analysis (FEMA) documentation, which demonstrates that failure modes are of a failsafe type, thereby never allowing the possibility of release of interlock while an interlocked door is in an unsecured condition, unless the Master Door Interlock switch has been actuated to intentionally release the interlocks. Built in redundancy shall prevent the system from becoming unsafe while a single point failure exists anywhere in the system.

Brake interlock regulator shall be non-adjustable.

Once activated the brake interlock shall not release until the operator makes a 6 psi service brake application.

Accelerator and brake interlock shall not be applied when front door is opened.

TS 38.2 Lift Interlocks

When front ramp/kneel enable switch is activated an accelerator interlock shall disable the accelerator and a brake interlock shall engage the service brake system to stop movement of the bus. Interlocks shall not be released until ramp is fully stowed and the operator makes a 6 psi service brake application.

TS 38.3 Kneel Interlocks

When front ramp/kneel enable switch is activated an accelerator interlock shall disable the accelerator and a brake interlock shall engage the service brake system to stop movement of the bus. Interlocks shall not be released until bus returns to normal operating height and the Operator makes a 6 psi service brake application.

TS 38.4 Fuel/Charging System Interlocks

CNG

The bus shall be designed to remove ignition power from the engine, prevent the transmission from going into gear and disable the engine starter when the sensor detects a fuel nozzle connected to the fast fill receptacle. The interlock shall be of the type such that if the sensor fails, the bus will not start. The system shall provide a separate interlock preventing starting of the engine when fuel fill door is in open position. Both sensing systems shall be a high-reliability design with minimum 95 percent availability for correct operation and function. This interlock shall also be of the type such that if the sensor fails, the bus will not start.

The fuel nozzle proximity sensor prohibits the engagement of the starting circuit and engages the "Fueling in Progress" indication on the dash monitor.

Zero Emission

The bus shall be designed to remove ignition power from the PPU and prevent the drive system from engaging when the sensor detects a charger connected to the charge port. The interlock shall be of the type such that if the sensor fails, the bus will not run. The sensing systems shall be a high-reliability design with minimum 95 percent availability for correct operation and function. This interlock shall also be of the type such that if the sensor fails, the bus will not run.

PNEUMATIC SYSTEM (TS39)

TS 39. Pneumatic System

TS 39.1 General

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity. The bus air system shall meet requirements of California Code 13 CCR 1245 for air leakage and shall not leak as defined by the following tests:

- a) The air pressure in new buses shall not decrease by more than 10 psi over the first 10-minute period of time immediately following initial air build up, as indicated on the brake reservoir dash gauges, (as per TP-FMVSS121).
- b) With the air system fully charged, cooled off and stabilized for 10 minutes, the brake interlock applied, and no other accessories in use (i.e., opening/closing the doors, air actuated wipers), a new bus shall not leak more than 1 psi over the following 15 minutes as indicated on the brake reservoir dash gauges.

Provision shall be made to apply shop air to the bus air systems. A quarter turn manual shut-off valve with quick disconnect fitting shall be easily accessible and located in the engine compartment and shall supply air prior to the air dryer, subject to LACMTA approval in Pre-Production meetings.

Air for the compressor shall be filtered. The air system shall be protected per FMVSS 121 (S5.1.2.3).

Air System Design Operating Profile

The bus air system shall operate the air-powered accessories and the braking system with reserve capacity, as defined by using the following test(s):

With bus loaded to GVWR and operating under normal conditions, the air system and its major components (air compressors, air dryers) shall be designed to operate under the Manhattan Operating Profile as defined per SAE J2711 or an equivalent, without exceeding the technical specifications of the major components. Operating under normal conditions implies –

- All air actuated accessories on.
- Retarders/regenerative brakes in use.
- Ambient temperatures between 32°F and 100°F;
- One kneel operation on every 4th bus stop as defined per SAE J2711.
- Interlock shall be set at each stop.

TABLE 8
Air System Test Profiles

Operating profile (Extract from SAE J2711)	Speed [mph]		Stops [#]	Distance [miles]	Stops [# /miles]
	Top	Average			
UDDS (high speed bus operation)	58.00	19	28.00	11.10	2.53
Orange County (intermediate speed bus operation)	40.63	12.7	31.00	6.54	4.75
Manhattan (low speed bus operation)	25.30	6.8	40.00	4.13	9.69

Kneeling operation shall be achieved as per TS 31.3.4 and implies:

- Bus brought to a complete stop;
- Open all doors (implies activation of brake interlock(s))
- Kneel to meet TS 31.3.4 requirements;
- Wait 10 seconds;
- Close all doors;
- Apply service brakes to release brake interlock(s);
- Raise the bus to safe operation of suspension systems

TS 39.2 Air Compressor

The electrically-driven air compressor shall be sized (designed) to charge the entire air system on new buses from 0 psi to 120 psi in less than five minutes for a single unit bus not exceeding the fast idle speed (~1000 rpm) setting of the engine.

Charge time procedure and conditions: with air spring inflated and the bus at curb weight, all air tanks except emergency tank(s) fully drained, brake interlock, service brakes and air system accessories (i.e., doors, wipers, kneeling device or leveling), must not be activated or engaged during charge up procedure.

The electrically-driven air compressor shall be designed to supply air operating under the Air System Design Operating Profile while remaining within the manufactures air compressor specifications. The discharge temperature (measured at the compressor outlet using a probe thermocouple) shall not exceed 360° F, (410° F for oil-less compressors) excluding temperature spikes of durations less than two seconds and two percent of compressor charge time. Air compressor duty-cycle shall not exceed the compressor manufacturers rating in any 10-minute period under the Manhattan Operating Profile.

Air Compressor Governor

Air governor shall be adjustable with a cap and a red stripe from the cap to the governor body using tamper resistant paint and be mounted in a suitable location which will be easily accessible for maintenance.

TS 39.3 Air Lines and Fittings

Air lines, except necessary flexible lines, shall conform to the installation and material requirements of SAE Standard J1149 for copper tubing with standard, brass, flared or ball sleeve fittings, or SAE Standard J844 for nylon tubing if not subject to temperatures over 200 ° F. The air on the delivery side of the compressor where it enters nylon housing shall not be above the maximum limits as stated in SAE J844. Nylon tubing shall be installed in accordance with the following color-coding standards:

- **Green:** Indicates primary brakes and supply.
- **Red:** Indicates secondary brakes.
- **Brown:** Indicates parking brake.
- **Yellow:** Indicates compressor governor signal.
- **Black:** Indicates accessories.

Line supports shall prevent movement, flexing, tension, strain and vibration. Copper lines shall be supported to prevent the lines from touching one another or any component of the bus. To the extent practicable and before installation, the lines shall be pre-bent on a fixture that prevents tube flattening or excessive local strain. Copper lines shall be bent only once at any point, including pre-bending and installation. Bends shall be provided with large radius, (sweeps), to minimize restrictions to lines. Rigid lines shall be supported at no more than 5-ft. intervals. Nylon lines may be grouped and shall be supported at 30-inch intervals or less. Nylon lines shall incorporate press-to-connect type fittings allowing rapid replacement of lines.

The compressor discharge line between PPA/PPU and body-mounted equipment shall be flexible Teflon hose with a braided stainless steel jacket. Other lines necessary to maintain system reliability shall be flexible Teflon hose with a braided stainless steel jacket. End fittings shall be standard SAE or JIC brass or steel, flared, swivel-type fittings. Flexible hoses shall be as short as practicable and individually supported. They shall not touch one another or any part of the bus except for the supporting grommets. Flexible lines shall be supported at 2-ft. intervals or less.

Air lines shall be clean before installation and shall be installed to minimize air leaks. All air lines shall be routed to prevent water traps to the extent possible. Grommets or insulated clamps shall protect the air lines at all points where they pass through understructure components.

TS 39.4 Air Reservoirs

All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with guarded or flush type drain valves below floor level. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have drain valves mounted below floor level with lines routed to eliminate the possibility of water traps. All air tanks shall have check valves at the inlet side for isolation.

TS 39.5 Air System Dryer

The air system shall be equipped with an air dryer located before the first (supply system) air tank. The air dryer system shall operate automatically and be sized to eliminate moisture and oil in the air system at maximum air compressor discharge volume when engine is at full rated speed and load. The air dryer system shall require minimum routine maintenance. Desiccant shall be replaceable by spin-on filter in 15 minutes or less.

Air system dryer components shall be readily accessible for service and inspection. To the extent practical, disconnection or removal of components unrelated to a specific maintenance and/or repair task shall be unnecessary. Alternating tower air dryers will not be permitted. The air system air dryer shall be located as far from the compressor as possible and in ambient air flow to allow air to cool prior to entering the air dryer. Inlet air temperature to the dryer shall not exceed 150 degrees F.

Requirement for Additional Oil Separator Provision

A provision shall be included to collect/remove oil from the air system to prevent affecting function and/or damaging pneumatic system components. The oil separator shall operate automatically and be sized to eliminate moisture and oil in the air system at maximum air compressor discharge volume when engine is at full rated speed and load.

ELECTRICAL, ELECTRONIC AND DATA COMMUNICATION SYSTEMS (TS 40-TS 45)

TS 40. Overview

The Contractor shall coordinate a technical review with the LACMTA covering control system integration, installation, and design. As part of the technical review, the Contractor shall advise the LACMTA concerning control system features, options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality. The Contractor shall provide documentation including a description of control system operation and system schematics.

A listing of the software part number and revision number and procedure for obtaining new releases shall be identified for each component which is software controlled.

The electrical system will consist of vehicle battery systems and components that generate, distribute and store power throughout the vehicle (i.e., generator, voltage regulator, wiring, relays and connectors).

Electronic devices are individual systems and components that process and store data, integrate electronic information or perform other specific functions.

The data communication system consists of the bi-directional communications networks that electronic devices use to share data with other electronic devices and systems. Communication networks are essential to integrating electronic functions, both onboard the vehicle and off.

Information level systems that require vehicle information for their operations or provide information shall adhere to J1939 data standard.

Data communications systems are typically divided into three levels to reflect the use of multiple data networks:

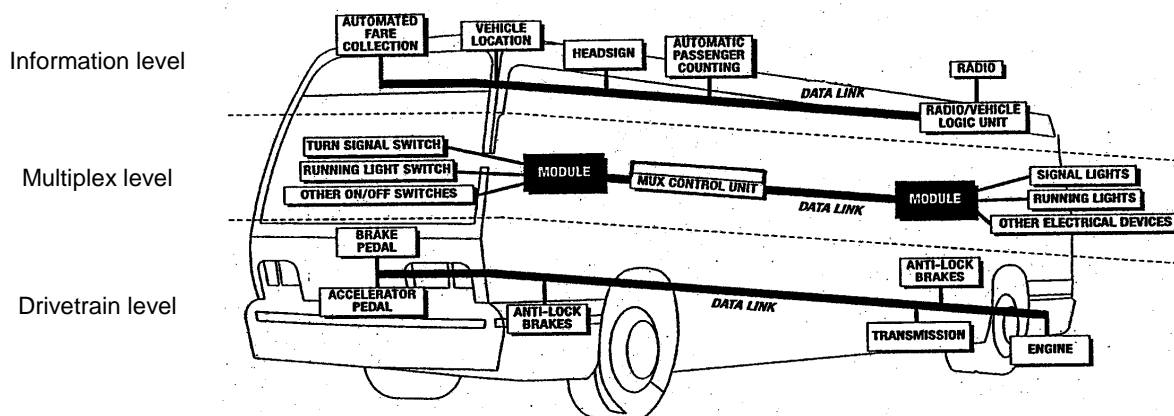
- **Drivetrain level:** Components related to the drivetrain including the propulsion system components (engine and transmission), and anti-lock braking system (ABS), which may include traction control.
- **Information level:** Components whose primary function is the collection, control or display of data that is not necessary to the safe drivability of the vehicle (i.e., the vehicle will continue to operate when those functions are inoperable). These components typically consist of those required for automatic

vehicle location (AVL) systems, destination signs, fare boxes, passenger counters, radio systems, automated voice and signage systems, video surveillance and similar components.

- **Multiplex level:** Electrical or electronic devices controlled through input/output signals such as discrete, analog and serial data information (i.e., on/off switch inputs, relay or relay control outputs). Multiplexing is used to control components not typically found on the drivetrain or information levels, such as lights; wheelchair lifts; doors; heating, ventilation and air conditioning (HVAC) systems; and gateway devices.

FIGURE 5

Data Communications Systems Levels



TS 40.1 Modular Design

Design of the electrical, electronic and data communication systems shall be modular so that each electronic device, apparatus panel, or wiring bundle is easily separable from its interconnect by means of connectors.

Propulsion system wiring shall incorporate an independent wiring harness(es). Replacement of the engine/propulsion compartment wiring harness(es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.

TS 41. Environmental and Mounting Requirements

The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed, as recommended in SAE J1455.

Electrical and electronic equipment shall not be located in an environment that will reduce the performance or shorten the life of the component or electrical system when operating within the design operating profile. No vehicle component shall generate, or be affected by, electromagnetic interference or radio frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54 (R 10).

The LACMTA shall follow recommendations from bus manufacturers and subsystem Suppliers regarding methods to prevent damage from voltage spikes generated from welding, jump starts, shorts, etc.

TS 41.1 Hardware Mounting

The mounting of the hardware shall not be used to provide the sole source ground, and all hardware shall be isolated from potential EMI/RFI, as referenced in SAE J1113.

All electrical/electronic hardware mounted in the interior of the vehicle shall be inaccessible to passengers and hidden from view unless intended to be viewed. The hardware shall be mounted in such a manner as to protect it from splash or spray.

All electrical/electronic hardware mounted on the exterior of the vehicle that is not designed to be installed in an exposed environment shall be mounted in a sealed enclosure.

All electrical/electronic hardware and its mounting shall comply with the shock and vibration requirements of SAE J1455.

All system components shall be easily accessible without requiring any special tools.

TS 42. General Electrical Requirements

TS 42.1 Batteries

TS 42.1.1 Low-Voltage Batteries (24V)

Four Group 31 Maintenance-Free Batteries

Batteries shall be a minimum of four absorbed glass mat thin plate pure lead technology group 31 series, heavy-duty, lead-acid, sealed top battery units for: a) engine starting (including fuel controls, electronic control units and ignition system), and b) other bus loads as needed, subject to LACMTA approval during proposal period. Each battery shall have a purchase date no more than six months from the date of release for shipment to the LACMTA. Positive and negative terminal ends shall be the same size.

Each battery shall have a minimum of 1,000 cold cranking amps and a reserve capacity of no less than 200 minutes. Warranty shall begin at the date of bus acceptance and shall cover an unconditional 48 months.

Starting Batteries

Batteries used for starting the engine shall be located as close to the starter as possible. Starting batteries shall be protected from power loss in the event that lights or other loads are inadvertently left on, up to two hours, which would normally drain the batteries when the engine is not running. Starting with a full charge, starting batteries shall have sufficient energy to provide adequate power after a minimum of five continuous days (Master Run switch "Off", Master Battery switch "On", all lights off, LACMTA installed ITS equipment operating) without charging or engine operation to then properly start the bus.

TS 42.1.2 Battery Cables

The battery terminal ends and cables shall be color-coded with red for the primary positive, black for negative and another color for any intermediate voltage cables. Positive and negative battery cables shall not cross each other if at all possible, be flexible and sufficiently long to reach the batteries with the tray in the extended position without stretching or pulling on any connection and shall not lie directly on top of the batteries. Except as interrupted by the master battery switch, battery and starter wiring shall be continuous cables with connections secured by bolted terminals and shall conform to specification requirements of SAE Standard J1127 – Type SGT, SGX or GXL and SAE Recommended Practice J541.

2100 strand 4/0 cable or greater recommended. Battery cables shall be flexible and of sufficient length to reach the batteries when the battery tray is in the extended position without stretching or pulling on any connection or resting on top of the batteries or on the compartment floor when the tray is stowed. A diagram showing proper cable connections and interconnections shall be located in the battery enclosure. Cables shall be arranged to prevent incorrect installation. Except as interrupted by the master battery disconnect switch(s), solenoid battery cutoff and necessary bus bar(s), battery wiring shall be continuous cables with connections secured by bolted terminals. Heavy-duty battery cables shall not be bent in a radius which stresses insulation and promotes propagation of cracking.

TS 42.1.3 Jump Start

Jump-Start Connector

Independently wired quick connect-disconnect receptacles (one for systems which use a battery equalizer) shall be provided. Connections to jump start connector assembly(s) shall be made through 4/0 cables to the

respective battery circuit. Female receptacles equipped with approximately one- foot 2/0 pigtail cables shall be provided, which are spliced with 4/0 cables that lead to the battery circuit. One 12-volt (if not an equalizer equipped system), and one 24-volt, female labeled receptacles shall be provided to boost start the bus. The receptacles shall be designed to prevent incorrect connection of the LACMTA's jumper cable(s) and shall be provided with protective cover attached with a lanyard. The receptacle(s) shall be located on the curbside rear corner of the bus for convenient jumper cable connection, subject to LACMTA approval in Pre-Production meetings. The receptacle(s) must be labeled. Cables used shall not be bent in such a manner that the radius places stresses on the cable insulation, promoting propagation of cracks.

TS 42.1.4 Battery Compartment

The battery compartment shall prevent accumulation of water and debris on top of the batteries and shall be vented and self-draining. It shall be accessible only from the outside of the vehicle. All components within the battery compartment, and the compartment itself, shall be protected from damage or corrosion from the electrolyte. The inside surface of the battery compartment's access door shall be electrically insulated, as required, to prevent the battery terminals from shorting on the door if the door is damaged in an accident or if a battery comes loose. Battery enclosure, including access door or cover, shall be constructed of fiberglass, suitable plastic material, or stainless steel.

The battery quick disconnect access door shall be identified with a decal.

The battery hold-down bracket shall be constructed of a non-metallic material (plastic or fiberglass).

This access door shall not require any special locking devices to gain access to the switch. The door shall be flush-fitting and incorporate a spring tensioner or equal to retain the door in a closed position when not in use.

The batteries shall be securely mounted on a self-draining stainless steel or other non-corrosive material tray that can accommodate the size and weight of the batteries without deformation. The battery tray shall pull out easily and properly support the batteries while they are being serviced. The tray shall allow each battery cell to be easily serviced and filled. A locking device shall retain the battery tray to the stowed position. A maximum of four batteries shall be securely mounted on each heavy-duty battery tray which shall accommodate the battery system. Tray(s) shall pull out on heavy-duty rollers or swing out easily from outside the bus for service, inspection, and replacement.

If not located in the engine compartment, the same fire-resistant properties must apply to the battery compartment. Sparking devices shall not be located within the battery box.

TS 42.1.5 Auxiliary Electronic Power Supply

If required, gel-pack, or any form of sealed (non-venting) batteries used for auxiliary power are allowed to be mounted on the interior of the vehicle if they are contained in an enclosed, non-airtight compartment and accessible only to maintenance personnel. This compartment shall contain a warning label prohibiting the use of vented lead-acid batteries.

TS 42.1.6 Master Battery Switch

A single master switch shall be provided near the battery compartment for disconnecting of all battery positives (12- and 24 volts), except for safety devices such as the fire suppression system and other systems as specified. The location of the master battery switch shall be clearly identified on the exterior access panel, be accessible in less than 10 seconds for deactivation and prevent corrosion from fumes and battery acid when the batteries are washed off or are in normal service.

Turning the master switch "Off" with the PPA/PPU operating shall shut off the engine/PPU and shall not damage any component of the electrical system. The master battery switch shall be capable of carrying and interrupting the total circuit load. Master battery switch shall be capable of being locked in the Open or Off position.

Single Switch

The batteries shall be equipped with a single switch for disconnecting both 12- and 24 volt power.

Solenoid Battery Cutoff

A low voltage disconnect(s) shall be provided to monitor the battery bank voltage. When the voltage drops below the disconnect voltage, the device(s) opens the solenoid(s), removing power from all parasitic 12- and 24 volts loads that cannot be disconnected through the Master Battery Switch, ensuring that the batteries will maintain the ability to start the bus after being parked for extended periods of up to two months. A toggle switch for overriding automatic operation of Solenoid Battery Cutoff shall be provided.

TS 42.1.7 Low-Voltage Generation and Distribution

The low-voltage generating system shall properly charge batteries with a low state of charge and maintain the state of charge on fully charged batteries. When the vehicle is at standard idle the total low voltage generator load shall not exceed 60 percent of the low voltage generator nameplate rating. The Contractor shall estimate the parasitic loads during the initial stage of the bus design and shall submit a draft report to LACMTA at the Pre-Production meetings. A final report shall be submitted during the Pilot Bus configuration audit. The report shall include:

- Nominal current draw of each 12- and 24 volt system and subsystem
- Calculations of parasitic loads in sleep mode, including LACMTA installed equipment
- The estimated battery discharge time before Low Voltage Disconnect is activated

Voltage monitoring and over-voltage output protection (recommended at 32 volt) shall be provided.

Dedicated power and ground shall be provided as specified by the component or system manufacturer. Cabling to the equipment must be sized to supply the current requirements of heavy-duty systems with no greater than a five percent voltage drop across the length of the cable. Cables with bolted connections shall also meet requirements of SAE J541 for heavy-duty applications.

TS 42.1.8 Circuit Protection

All branch circuits, except battery-to-starting motor and battery-to-generator/alternator circuits, shall be protected by current-limiting devices such as circuit breakers, fuses or solid state devices sized to the requirements of the circuit. Electronic circuit protection for the cranking motor shall be provided to prevent engaging of the motor for more than 30 seconds at a time to prevent overheating. The circuit breakers or fuses shall be easily accessible for authorized personnel.

Fuses shall be used only where it can be demonstrated that circuit breakers are not practical. This requirement applies to in-line fuses supplied by either the Contractor or a Supplier. Fuse holders shall be constructed to be rugged and waterproof. All manual reset circuit breakers critical to the operation of the bus shall be mounted in a location convenient to the LACMTA mechanic with visible indication of open circuits. LACMTA shall consider the application of automatic reset circuit breakers on a case-by-case basis. The Contractor shall show all in-line fuses in the final harness drawings. Any manually resettable circuit breakers shall provide a visible indication of open circuits.

Circuit breakers or fuses shall be sized to a minimum of 15 percent larger than the total circuit load. The current rating for the wire used for each circuit must exceed the size of the circuit protection being used.

TS 42.2 Grounds

The battery shall be grounded to the vehicle chassis/frame at one location only, as close to the batteries as possible. When using a chassis ground system, the chassis shall be grounded to the frame in multiple locations, evenly distributed throughout the vehicle to eliminate ground loops. No more than three ground ring/spade terminal connections shall be made per ground stud. Electronic equipment requiring an isolated

ground to the battery (i.e., electronic ground) shall not be grounded through the chassis. Redundant grounds shall be provided for all electrical equipment except where it can be demonstrated that they are not feasible or practical. Grounds shall not be carried through hinges, bolted joints (unless they are specifically designed as electrical connectors), or power plant mountings. Ground shall be installed in accordance with SAE J1908, Electrical Grounding Practice.

Buses shall include grounding straps mounted under the bus near both front and rear axle areas to dissipate any static electric charge that may accumulate on the buses during use.

TS 42.3 Low Voltage/Low Current Wiring and Terminals

All power and ground wiring shall conform to specification requirements of SAE Recommended Practice J1127, J1128 and J1292 for type GXL and SXL wiring. Double insulation shall be maintained as close to the junction box, electrical compartment or terminals as possible. The requirement for double insulation shall be met by wrapping the harness with plastic electrical tape or by sheathing all wires and harnesses with non-conductive, rigid or flexible conduit. All wires for electrical components and terminations, either at the harness level or individual wires, including bus controls, A/C, engine, transmission, and door systems, with the exception of battery cables, shall be labeled, stamped or color-coded in a fashion that allows unique identification at a spacing not exceeding four inches. All exposed wiring connections for power and ground shall be protected against corrosion by application of an anti-corrosive paste.

Wiring harnesses shall not contain wires of different voltage classes unless all wires within the harness are insulated for the highest voltage present in the harness. Kinking, grounding at multiple points, stretching, and exceeding minimum bend radius shall be prevented.

Strain-relief fittings shall be provided at all points where wiring enters electrical compartments. Grommets or other protective material shall be installed at points where wiring penetrates metal structures outside of electrical enclosures. Wiring supports shall be protective and non-conductive at areas of wire contact and shall not be damaged by heat, water, solvents or chafing.

To the extent practicable, wiring shall not be located in environmentally exposed locations under the vehicle. Wiring and electrical equipment necessarily located under the vehicle shall be insulated from water, heat, corrosion and mechanical damage. Where feasible, front to rear electrical harnesses should be installed above the window line of the vehicle.

All Bus OEM attributed wiring harnesses over five feet long and containing at least five wires shall include 10 percent (minimum one wire) excess wires for spares. This requirement for spare wires does not apply to data links and communication cables. A minimum of 50 percent of the spare wire shall be the same size as the largest wire in the harness excluding the battery cables. Wiring harness length shall allow a minimum of four inches service loop to permit end terminals to be replaced twice without pulling, stretching or replacing the wire.

Crimp on terminals shall use a clear heat shrinkable sleeve that seals the connection and improves the pull out resistance of the termination. Terminals shall be crimped to the wiring according to the connector manufacturer's recommendations for techniques and tools. All cable connectors shall be locking type, keyed and sealed, unless enclosed in watertight cabinets or vehicle interior. Pins shall be removable, crimp contact type, of the correct size and rating for the wire being terminated. Unused pin positions shall be sealed with sealing plugs. Adjacent connectors shall either use different inserts or different insert orientations to prevent incorrect connections.

Terminals shall be crimped, corrosion-resistant and full ring type or interlocking lugs with insulating ferrules. When using pressure type screw terminal strips, only stranded wire shall be used. Insulation clearance shall ensure that wires have a minimum of "visible clearance" and a maximum of two times the conductor diameter or 1/16 inch, whichever is less. When using shielded or coaxial cable, upon stripping of the insulation, the

metallic braid shall be free from frayed strands that can penetrate the insulation of the inner wires. Individual slip-on “spade” or “blade” type connectors are acceptable on a case-by-case basis.

Ultra-sonic and T-splices may be used with 7 AWG or smaller wire. When a T-splice is used, it shall meet these additional requirements:

- It shall include a mechanical clamp in addition to solder on the splice.
- The wire shall support no mechanical load in the area of the splice.
- The wire shall be supported to prevent flexing.

All splicing shall be staggered in the harness so that no two splices are positioned in the same location within the harness. Wiring harnesses shall include labeling for harness part number, connector identification and splice locations.

Wiring located in the engine compartment shall be routed away from high-heat sources or shielded and/or insulated from temperatures exceeding the wiring and connector operating requirements.

The instrument panel and wiring shall be easily accessible for service from the driver’s seat or top of the panel. The instrument panel shall be separately removable and replaceable without damaging the instrument panel or gauges. Wiring shall have sufficient length and be routed to permit service without stretching or chafing the wires.

TS 42.4 Electrical Components

All electrical components, including switches, relays, flashers and circuit breakers, shall be heavy-duty designs with either a successful history of application in heavy-duty vehicles or design specifications for an equivalent environment. To the extent practical, these components shall be designed to last the service life of the Bus and shall be replaceable in less than 5 minutes by an LACMTA mechanic. Sockets for plug-in components, such as relays and circuit breakers, shall be keyed for proper installation and alignment. Plug-in components shall be positively retained in sockets.

All electric motors shall be heavy-duty brushless type where practical, and have a continuous duty rating of no less than 40,000 hours (except cranking motors, washer pumps and wiper motors). Electric motors shall be located for easy replacement and shall be replaceable in less than 30 minutes by an LACMTA mechanic.

Location of electronic modules shall be reviewed for environmental suitability such as heat, water, vibrations, contamination from dust and debris, and other electrical equipment. The system including modules, external wire, connectors, and data bus wiring shall be designed to operate under LACMTA’s Design Operating Profile. All electrical components including relays and circuit breakers must remain unaffected while bus is operated in up to 15 inches of standing water.

TS 42.5 Electrical Compartments

All relays, controllers, flashers, circuit breakers and other electrical components shall be mounted in easily accessible electrical compartments. All compartments exposed to the outside environment shall be corrosion-resistant and sealed to prevent moisture from normal sources, including engine compartment cleaning, reaching the electrical components and circuits in each box. The components and their functions in each electrical compartment shall be identified and their location recorded on a schematic drawing permanently attached to the inside of the access panel or door. The drawing shall be protected from oil, grease, fuel and abrasion. Electrical compartment fires shall not propagate outside the box.

The front compartment shall be completely serviceable from the driver’s seat, vestibule or from the outside. “Rear start and run” controls shall be mounted in an accessible location in the engine compartment and shall be protected from the environment.

TS 43. General Electronic Requirements

If an electronic component has an internal real-time clock, it shall provide its own battery backup to monitor time when battery power is disconnected, and/or it may be updated by a network component. If an electronic component has an hour meter, it shall record accumulated service time without relying on battery backup.

Suppliers shall ensure that their electronic equipment is self-protecting in the event of shorts in the cabling, and also in over-voltage (over 32V DC on a 24V DC nominal voltage rating with a maximum of 50V DC) and reverse polarity conditions. If an electronic component is required to interface with other components, it shall not require external pull-up and/or pull-down resistors. Where this is not possible, the use of a pull-up or pull-down resistor shall be limited as much as possible and easily accessible, shielded, and labeled.

TS 43.1 Wiring and Terminals

Kinking, grounding at multiple points, stretching and reducing the bend radius below the manufacturer's recommended minimum shall not be permitted. The load side shall have a minimum of 18 gage load transfer wire.

Individual slip-on "spade" or "blade" type connectors are acceptable on a case-by-case basis during Pre-Production meeting review.

TS 43.1.1 Discrete I/O (Inputs/Outputs)

All wiring to I/O devices, either at the harness level or individual wires, shall be labeled, stamped or color-coded in a fashion that allows unique identification at a spacing not exceeding four inches. Wiring for each I/O device shall be bundled together. If the I/O terminals are the same voltages, then jumpers may be used to connect the common nodes of each I/O terminal.

TS 43.1.2 Shielding

All wiring that requires shielding shall meet the following minimum requirements. A shield shall be generated by connecting to a ground, which is sourced from a power distribution bus bar or chassis. A shield shall be connected at one location only, typically at one end of the cable. However certain standards or special requirements, such as SAE J1939 or RF applications, have separate shielding techniques that also shall be used as applicable.

When using shielded or coaxial cable, upon stripping of the insulation, the metallic braid shall be free from frayed strands, which can penetrate the insulation of the inner wires. To prevent the introduction of noise, the shield shall not be connected to the common side of a logic circuit.

TS 43.1.3 Communications

The data network cabling shall be selected and installed according to the selected protocol requirements. The physical layer of all network communication systems shall not be used for any purpose other than communication between the system components, unless provided for in the network specifications.

Communications networks that use power line carriers (e.g., data modulated on a 24 volt-power line) shall meet the most stringent applicable wiring and terminal specifications.

Mounting and electrical provisions shall be provided to allow LACMTA installation of existing Fleetwatch JX-55 Vehicle Interface Module in the Operator's area, subject to LACMTA approval during proposal period. A separate J1708 and J1939 interface connector shall be provided inside the ITS enclosure for connection to the existing LACMTA's JX-55 device.

TS 43.1.4 Radio Frequency (RF)

RF components, such as radios, video devices, cameras, global positioning systems (GPS), etc; shall use coaxial or approved cable to carry the signal. All RF systems require special design consideration for losses along the cable. Connectors shall be minimized, since each connector and crimp has a loss that will attribute to attenuation of the signal. Cabling should allow for the removal of antennas or attached electronics without removing the installed cable between them. If this cannot be done, then a conduit of sufficient size shall be provided for ease of attachment of antenna and cable assembly. The corresponding component vendors shall be consulted for proper application of equipment, including installation of cables.

TS 43.1.5 Audio

Cabling used for microphone level and line level signals shall be 22 AWG minimum with shielded twisted pair. Cabling used for amplifier level signals shall be 18 AWG minimum.

TS 44. Multiplexing

TS 44.1 General

The primary purpose of the multiplexing system is control of components necessary to operate the vehicle. This is accomplished by processing information from input devices and controlling output devices through the use of an internal logic program.

Versatility and future expansion shall be provided for by expandable system architecture. The multiplex system shall be capable of accepting new inputs and outputs through the addition of new modules and/or the utilization of existing spare inputs and outputs. All like components in the multiplex system shall be modular and interchangeable with self-diagnostic capabilities. The modules shall be easily accessible for troubleshooting electrical failures and performing system maintenance. Multiplex input/output modules shall use solid-state devices to provide extended service life and individual circuit protection.

Ten percent of the total number of inputs and outputs, or at least one each for each voltage type utilized (0V, 12V, and 24V), at each module location shall be designated as spares.

TS 44.2 System Configuration

Multiplexing may either be distributed or centralized. A distributed system shall process information on multiple control modules within the network. A centralized system shall process the information on a single control module. Either system shall consist of several modules connected to form a control network.

TS 44.2.1 I/O Signals

The input/output for the multiplex system may contain three types of electrical signals: discrete, analog or serial data.

Discrete signals shall reflect the on/off status of switches, levers, limit switches, lights, etc. Analog signals shall reflect numerical data as represented by a voltage signal (0-12V, 10-24V, etc.) or current signal (4-20 mA). Both types of analog signals shall represent the status of variable devices such as rheostats, potentiometers, temperature probes, etc. Serial data signals shall reflect ASCII or alphanumeric data used in the communication between other on-board components.

TS 45. Data Communications

TS 45.1 General

All data communication networks shall be either in accordance with a nationally recognized interface standard, such as those published by SAE, IEEE or ISO, or shall be published to the LACMTA with the following minimum information:

- Protocol requirements for all timing issues (bit, byte, packet, inter-packet timing, idle line timing, etc.) packet sizes, error checking and transport (bulk transfer of data to/from the device).
- Data definition requirements that ensure access to diagnostic information and performance characteristics.
- The capability and procedures for uploading new application or configuration data.
- Access to revision levels of data, application software and firmware.
- The capability and procedures for uploading new firmware or application software.
- Evidence that applicable data shall be broadcast to the network in an efficient manner such that the overall network integrity is not compromised.

Any electronic vehicle components used on a network shall be conformance tested to the corresponding network standard.

TS 45.2 Drivetrain Level

Drivetrain components, consisting of the engine, transmission, retarder, anti-lock braking system and all other related components, shall be integrated and communicate fully with respect to vehicle operation with data using SAE Recommended Communications Protocols such as J1939 and/or J1708/J1587 with forward and backward compatibilities or other open protocols.

TS 45.2.1 Diagnostics, Fault Detection and Data Access

Drivetrain performance, maintenance and diagnostic data, and other electronic messages shall be formatted and transmitted on the communications networks.

The drivetrain level shall have the ability to record abnormal events in memory and provide diagnostic codes and other information to service personnel. At a minimum, this network level shall provide live/fail status, current hardware serial number, software/data revisions and uninterrupted timing functions. The communication port(s) shall be located in the Operator's area, Engine Compartment Control Panel, and ITS Enclosure area, subject to LACMTA approval in Pre-Production meetings.

TS 45.2.2 Programmability (Software)

The drivetrain level components shall be programmable by LACMTA with limitations as specified by the sub-system Supplier.

TS 45.3 Multiplex Level

TS 45.3.1 Data Access

Diagnostic and status information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible inside or adjacent to the ITS Enclosure subject to LACMTA approval in Pre-Production meetings.

A J1708 hardware gateway shall be included to interface with the ATMS wireless communications system for transmittal of diagnostic fault codes from multiplex and drivetrain systems.

TS 45.3.2 Diagnostics and Fault Detection

The multiplex system shall have a proven method of determining its status (system health and input/output status) and detecting either active (online) or inactive (offline) faults through the use of on-board visual/audible indicators.

In addition to the indicators, the system shall employ an advanced diagnostic and fault detection system, which shall be accessible via either a personal computer or a handheld unit. Either unit shall have the ability to check logic function. The diagnostic data can be incorporated into the information level network or the central data access system.

TS 45.3.3 Programmability (Software)

The multiplex system shall have security provisions to protect its software from unwanted changes. This shall be achieved through any or all of the following procedures:

- Password protection.
- Limited distribution of the configuration software.
- Limited access to the programming tools required to change the software.
- Hardware protection that prevents undesired changes to the software.

Provisions for programming the multiplex system shall be possible through a PC or laptop. The multiplex system shall have proper revision control to ensure that the hardware and software are identical on each vehicle equipped with the system. Revision control shall be provided by all of the following:

- Hardware component identification where labels are included on all multiplex hardware to identify components.
- Hardware series identification where all multiplex hardware displays the current hardware serial number and firmware revision employed by the module.
- Software revision identification where all copies of the software in service displays the most recent revision number.
- A method of determining which version of the software is currently in use in the multiplex system.

Revision control labels shall be electronic.

TS 45.4 Electronic Noise Control

Electrical and electronic sub-systems and components on all buses shall not emit electromagnetic radiation that will interfere with on-board systems, components or equipment, telephone service, radio or TV reception or violate regulations of the Federal Communications Commission.

Electrical and electronic sub-systems on the Buses shall not be affected by external sources of RFI/EMI. This includes, but is not limited to, radio and TV transmission, portable electronic devices including computers in the vicinity of/on board the buses, AC or DC power lines, and RFI/EMI emissions from other vehicles.

DRIVER PROVISIONS, CONTROLS AND INSTRUMENTATION (TS 46-TS 49)

TS 46. Driver's Area Controls

TS 46.1 General

In general, when designing the driver's area, it is recommended that SAE J833, "Human Physical Dimensions," be used.

Switches and controls shall be divided into basic groups and assigned to specific areas, (Refer to Table 9), in conformance with SAE Recommended Practice J680, Revised 1988, "Location and Operation of Instruments and Controls in Motor Truck Cabs," and be essentially within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach".

All controls (switches, pushbuttons, knobs, etc.) and indicators shall be labeled and lighted for optimum visibility in all operating conditions. Switches and controls shall be ergonomically placed in a manner which prevents accidental operation. Knobs shall be securely mounted and affixed to preclude loosening. The side console shall be insulated to IP56 level of protection to prevent ingress of water into the components of the panel.

All controls, indicators, and signals necessary for the operation of the bus shall be conveniently positioned in the Operator's area in one of the following locations.

- Front Console Panel.
- Side Console (located on left side of the Operator).
- Floor Mounted.

TS 46.2 Glare

The driver's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.

TS 46.3 Visors/Sun Shades

A sun visor and scissor type sun shade/screen shall be provided to maximize driver's visibility.

Front and Side Window Sun Shade/Visor

An adjustable scissor type pull down solid band sun shade shall be provided for the driver's windshield.

Driver's side window shall have both sun visor and scissor type sun screen.

The sun shade/screen shall be provided in accordance with the California Vehicle Code §26708.2 and must have a sticker or label indicating that the shade/screen should only be used by operators who possess a letter or other document signed by a licensed optometrist certifying that the person must be shaded from the sun due to a physical condition.

Sun shades/screens or visors shall be shaped or positioned to minimize light leakage between the device and windshield pillars. Sun shades/screens or visors shall store out of the way and shall not obstruct airflow from the climate control system or interfere with other equipment, such as the radio handset or the destination control. Deployment of the sun shades/screens or visors shall not restrict vision of the rearview mirrors. Sun shade/screen or visor construction and materials shall be strong enough to resist breakage during adjustments. Sun shades/screens or visors, when deployed, shall be effective in the driver's field of view at angles more than five degrees above the horizontal. Sun shades and visors shall not be transparent.

Visor adjustments shall be made easily by hand with positive locking and releasing devices and shall not be subject to damage by over-tightening. Visors used on driver's window shall extend across the entire width of window and cover a minimum of six inches when flipped down.

For driver's window, scissor type sun shades/screens shall have minimum 35 percent light transmittance and shall be capable of being lowered to the midpoint of the driver's window. When deployed, the shade/screen shall be secure, stable and shall not rattle, sway or intrude into the driver's field-of-view due to the motion of the Bus or as a result of air movement. Once lowered, the shade/screen shall remain in the lowered position until returned to the stowed position by the driver.

TS 46.4 Driver's Controls

Frequently used controls must be in easily accessible locations. These include the door control, kneel control, windshield wiper/washer controls, ramp, and lift and run switch. Any switches and controls necessary for the safe operation of the bus shall be conveniently located and shall provide for ease of operation. They shall be identifiable by shape, touch and permanent markings. Controls also shall be located so that passengers may not easily tamper with control settings.

All panel-mounted switches and controls shall be marked with easily read identifiers. Graphic symbols shall conform to SAE Recommended Practice J2402, "Road Vehicles – Symbols For Controls, Indicators, and Tell Tales," where available and applicable. Color of switches and controls shall be dark, or red for emergency use, with contrasting typography or symbols.

Mechanical switches and controls shall be replaceable, and the wiring at these controls shall be serviceable from a convenient location. Switches, controls and instruments shall be dust- and water-resistant.

TS 46.5 Normal Bus Operation Instrumentation and Controls

The following list identifies bus controls used to operate the bus. These controls are either frequently used or critical to the operation of the bus. They shall be located within easy reach of the Operator. The Operator shall not be required to stand or turn to view or actuate these controls unless specified otherwise.

Systems or components monitored by onboard diagnostics system shall be displayed in clear view of the Operator and provide visual and/or audible indicators. The intensity of indicators shall permit easy determination of on/off status in bright sunlight but shall not cause a distraction or visibility problem at night. All indicators shall be illuminated using backlighting.

The instrument display monitor shall be LCD color touch screen that displays safety related information in a large easy to read gauge or graphic format. LACMTA prefers a system which incorporates the instruments, and diagnostics.

Wherever possible, sensors shall be of the closed circuit type so that failure of the circuit and/or sensor shall activate the malfunction indicator.

The indicator panel shall be located in Area 1 or Area 5, within easy view of the operator instrument panel. All indicators shall have a method of momentarily testing their operation. The audible alarm shall be tamper-resistant and shall have an outlet level between 80 and 83 dBA when measured at the location of the Operator's ear.

On-board displays visible to the Operator shall be limited to indicating the status of those functions described herein that are necessary for the operation of the bus. All other indicators needed for diagnostics and their related interface hardware shall be concealed and protected from unauthorized access. Table 9 represents instruments and alarms. The intent of the overall physical layout of the indicators shall be in a logical grouping of systems and severity nature of the fault.

Gauges shall be readable in all direct or reflected sunlight conditions. All lighting in the dash area shall be a red, orange or blue color, clear incandescent, or an approved equal. No unlit dash markings shall be permitted.

Space shall be provided on the panel for future additions of no less than five spare indicators as the capability of onboard diagnostic systems improves.

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
Instruments					
1.	Air pressure gauge	Air Brake Reservoir gauge(s) 0-150 psi range- Accuracy $\pm 3.5\%$ at cut-out pressure, 10 psi increments, 2-inch minimum. Green needle for Primary system and Red needle for Secondary system	Dash zone 2	Visual indication of primary and secondary air systems	Red Light and buzzer
2.	Destination sign interface	Destination sign interface panel	In approved location on head sign door	Facilitates driver interaction with destination sign system, manual entry	LCD display

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
3.	Farebox interface/ OCU	Farebox Bus operator interface panel	Near farebox	Facilitates driver interaction with farebox system	LCD display
4.	Mobile data terminal/ATMS	Mobile data terminal Bus operator interface panel	Above operators left	Facilitates driver interaction with communication system and master log-on	LCD display with visual status and text messages
5.	Speedometer	Speedometer 0-75 mph range - with odometer, and diagnostic capability, 5-mile increments. Accuracy ± 2 mph. Unit shall be installed so as to be easily readable by the operator.	Dash zone 2	Visual indication of speed and distance traveled, accumulated vehicle mileage, fault condition display	Visual
Controls					
1.	Automatic Fire Suppression System (AFSS) Manual Discharge	Red push button with protective cover	Side console or dash zone 1	Permits driver to override and manually discharge fire suppression system	Red light
2.	AFSS Shutdown over ride	Momentary push button	Over operator's left	Restarts the engine shutdown timer each time the switch is pressed	
3.	Auxiliary power	12-volt power receptacle	Radio Compartment	Power diagnostic equipment	
4.	Dash panel lights	Rotary rheostat or stepping switch	Side Console or Dash zone 1	Provides adjustment for light intensity in night run position	
5.	Defroster fan	Rotary, minimum three-position with detent	Side console or Dash zone 1	Permits defroster fan: off, low, medium or high	
6.	Defroster temperature	Variable position	Side console or Dash zone 1	Adjusts defroster water flow and temperature	
7.	Diagnostic test port- front	SAE data port	Operator's area subject to approval	J1708 and J1939 communications ports	
8.	Drive selector	Touch panel switch	Side console or right front dash	Provides selection of propulsion: forward, reverse and neutral	Gear selection
9.	Driver's ventilation	Infinitely variable speed	Side console or Dash zone 1	Permits supplemental ventilation with infinitely variable speed fan	
10.	Engine run, rear	Three-position switch	Engine compartment control panel	Permits running engine from rear start, normal front run position and off	Amber light on dash
11.	Engine shutdown override	Momentary switch with operation protection	Side console	Permits driver to override auto engine shutdown	
12.	Engine start, front	Approved momentary switch	Side console	Activates engine starter motor	

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
13.	Engine start, rear	Approved momentary switch	Engine compartment control panel	Activates engine starter motor Starter switch marked "START" shall operate the starter motor only when the rear run switch is in the "REAR" position and transmission is in neutral, and fuel fill door is closed. The Operators start button shall be deactivated when the Rear Run Switch is in "REAR" Position	
14.	Exterior Door Switch	Key Switch	Switch shall be located behind an exterior access door near the front curb side of the Bus a minimum of 45 inches above the ground.	Allows operator to close/open, and lock/unlock the front door from outside the bus	
15.	Farebox Lighting Bypass Switch	Switch, ON-OFF	Side console	Controls farebox light	
16.	Fast idle	Two-position switch	Side console	Selects high idle speed of engine	
17.	Front door ramp	Three-position momentary switch	Dash zone 3 or 5	Permits deploy and stow of front ramp	Red light
18.	Front door ramp/kneel enable	Two-position switch	Dash zone 5	Permits ramp and kneel activation from front door area, key required	Red dash indicator Exterior alarm and Amber light
19.	Front kneel	Three-position momentary switch	Dash zone 3 or 5	Permits kneeling activation and raise and normal at front door remote location	Amber or red dash indicator. Ext alarm and Amber light
20.	Gas Detection System (GDS) Shutdown over ride	Momentary push button	Over operator's left	Restarts the engine shutdown timer each time the switch is pressed	
21.	Hazard flashers	Two-position switch	Side console	Activates emergency flashers	Two green lights and Click
22.	High beam	Push button with detent	Left foot panel	Permits driver to go between low and high beam	Blue light
23.	Horn Button	Push button	Button in steering wheel	Activates horn	Dual Horn sound 410 and 500 Hz at 110 dB
24.	HVAC	Switch or switches to control HVAC	Side console	Permits selection of passenger ventilation: off, cool, heat, low fan, high fan or full auto with on/off only	
25.	Indicator/ alarm test button	Momentary switch or programming ¹		Permits driver to activate test of sentry, indicators and audible alarms	All visuals and audible

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
26.	Interior lights	Three-position switch	Side console	Selects mode of passenger compartment lighting: off, on, normal	
27.	Left remote mirror	Four-position type	Side console	Permits two-axis adjustment of left exterior mirror	
28.	Master door/interlock	Two position	Out of operator's reach behind the destination sign door	Permits driver override to disable door and brake/throttle interlock	Red light/Buzzer
29.	Master run switch	Rotary, four-position detent	Side console	Master control for bus with; "off," "Day" run, "Night" run and "Night Park" lights positions	
30.	Microphone	Flexible mounting	Subject to LACMTA approval	Permits driver to make announcements with both hands on the wheel and focusing on road conditions	
31.	Operator's area light switch	Switch	Side console	Controls operator light	
32.	Operator's Heater Control	Rotary knob	Dash zone 3 or 5	Controls operator heater	
33.	PA manual switch	Slide switch	In approved location	Permits driver to manually activate public address microphone	
34.	Park brake release	Pneumatic PPV – Green knob	Side console	Permits driver to push and hold to release brakes	Green knob
35.	Parking brake	Pneumatic PPV –Yellow knob	Side console or Dash zone 1	Permits driver to apply and release parking brake	Red light
36.	Passenger Chime Switch	Switch, ON-OFF	Side console	Controls chime sound	
37.	Passenger door control	Five-position handle type detent	Side console, forward	Permits open/close control of front and rear passenger doors	
38.	Public Address System, Speaker Selector	Switch INTERIOR-BOTH-EXTERIOR	Side console	Select speaker location	
39.	Public Address System, Volume Control	Pushbutton	DCM	Select speaker volume	
40.	Remote Engine Speed Control	Rotary rheostat or spring-loaded toggle switch	Engine compartment control panel	Permits technician to raise and lower engine RPM from engine compartment A spring return control Knob marked "ENGINE SPEED" shall be provided which will increase engine RPM from idle to maximum controlled free speed. The control shall be activated only when the Rear Run Switch is in the "REAR" position, the transmission is in neutral and parking brake set.	

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
41.	Retarder disable	Single-pole with detent	Behind the destination sign door	Permits driver override to disable brake retardation/regeneration	Red light
42.	Right remote mirror	Four-position toggle type	Side console	Permits two-axis adjustment of right exterior mirror	
43.	Silent alarm	Guarded toggle switch, NO and NC contacts	Side console	Activates emergency radio alarm at dispatch and permits covert microphone and/or enables destination sign emergency message	
44.	Turn signals	Momentary push button (two required) raised from other switches	Left foot panel	Activates left and right turn signals	Two green lights and audible indicator
45.	Windshield washer	Push button	Side console or Dash zone 1	Activates windshield washers	
46.	Windshield wiper	One-variable rotary position operating both wipers	Side console or Dash zone 1	Variable speed control of left and right windshield wipers	
Alarms/Indicators					
1.	ABS indicator	Detects system status	Dash zone 2	Displays system failure	Amber light
2.	AFSS Fire detection	Bus operator display	Above operators left	Indication of fire detection activation	Buzzer and red light fire bell
3.	AFSS Status	Okay	Above operators left		Green light
4.	Back-Up	Intermittent sonic alarm	Rear of bus	Reverse gear activated alarm	Beep
5.	Bike rack deployed indicator	Detects bike rack position	Dash zone 2	Indication of bike rack not being in fully stowed position	Amber or red light. Mirror or direct visual allowed.
6.	Charging system indicator (12/24 V)	Detect charging system status	Dash zone 2	Detects no charge condition	Solid red light and buzzer
7.	Check Engine	Engine Check	Dash zone 2		Amber light
8.	Check Transmission	Transmission Check	Dash zone 2		Amber light
9.	Door obstruction	Sensing of door obstruction	Dash zone 2	Indication of rear door sensitive edge activation	Red light and buzzer
10.	GDS Methane detection	Indication of 20% LEL	Above operators left	Detects levels of methane	Flashing red at 20% LEL
11.	GDS Methane detection	Indication of 50% LEL	Above operators left	Detects levels of methane	Solid red at 50% LEL sonic horn
12.	GDS Methane detection function	Detection of system integrity	Above operators left	Detects system failure	No start condition, amber light
13.	HVAC indicator	Detects system status	Dash zone 2	Displays system failure	Amber or red light

TABLE 9 (Transit Bus)
Transit Bus Instruments and Alarms

No.	Device	Description	Location	Function	Visual/ Audible
14.	Low fuel indicator	Amber light	Dash zone 2	Indication of low fuel system level	Amber light
15.	Low system air pressure	Sensing low primary and secondary air tank pressure	Dash zone 2	Indication of low air system pressure	Buzzer and red light
16.	SCR gauge	Level Indicator	Dash zone 2	Displays level of SCR tank and indicates with warning light when low	Red light
17.	Seat Belt Warning	Switch on seat belt latch. Audible alarm and red light	Dash zone 2	Indicates when seat belt is not latched as required	Buzzer and red light
18.	Security Camera System	Camera Fail	Dash zone 2	Indicates system readiness including hard drive installed and system functionality.	Amber light
19.	Speed	Speed	Dash zone 2	Indicates bus speed is less than or equal to 3 mph	Amber light
20.	Stop Engine	Stop Engine	Dash zone 2		Buzzer and red light
21.	Stop Request	Stop Requested	Dash zone 2		Green light, chime
22.	Warning interlocks deactivated	Red indicator light	Dash panel center	Illuminates to warn driver that interlocks have been deactivated.	Red light, sonic alarm
23.	Wheelchair Stop Request	Stop Requested	Wheelchair Chime		Amber light, chime

TS 46.6 Driver Foot Controls

Accelerator and brake pedals shall be designed for ankle motion. Foot surfaces of the pedals and the floor adjacent to pedals shall be faced with wear-resistant, nonskid, replaceable material. Heel rests shall be provided. All foot controls must be installed in a manner that removal can be accomplished by one mechanic working inside the bus.

TS 46.6.1 Pedal Angle

The vertical angle of the accelerator and brake pedals shall be determined from a horizontal plane regardless of the slope of the cab floor. The accelerator and brake pedals shall be positioned at an angle of 37 to 50 degrees at the point of initiation of contact and extend downward to an angle of 10 to 18 degrees at full throttle.

The location of the brake and accelerator pedals shall be determined by the manufacturer, based on space needs, visibility, lower edge of windshield, and vertical H-point.

TS 46.6.2 Pedal Dimensions and Position

The floor-mounted accelerator pedal shall be 10 to 12 inches long and three to four inches wide. Clearance around the pedal must allow for no interference precluding operation.

Pedal travel shall be limited by stops under the pedals. Contractor must provide proof that the ergonomics are appropriate before the Pilot Bus is accepted.

1 to 2 inches Between Brake and Accelerator Pedals

The accelerator and brake pedals shall be positioned such that the spacing between them, measured at the heel of the pedals, is between one and two inches. Both pedals should be located approximately on the same plane coincident to the surface of the pedals.

TS 46.7 Brake and Accelerator Pedals

Brake Pedal

Non-adjustable brake pedal

TS 46.8 Driver Foot Switches

Floor-Mounted Foot Control Platform

The angle of the turn signal platform shall be determined from a horizontal plane, regardless of the slope of the cab floor. The turn signal platform shall be angled at a minimum of 10 degrees and a maximum of 37 degrees. It shall be located no closer to the seat front than the heel point of the accelerator pedal.

Contractor must provide proof that the ergonomics are appropriate before the Pilot Bus is accepted.

Turn Signal Controls

Turn signal controls shall be floor-mounted, foot-controlled, water-resistant, heavy-duty, momentary contact switches.

Foot Switch Control

The control switches for the turn signals shall be mounted on an inclined, floor-mounted stainless steel enclosure or metal plate mounted to an incline integrated into the driver's platform, located to the left of the steering column. The location and design of this enclosure shall be such that foot room for the operator is not impeded. The inclined mounting surface shall be skid-resistant. All other controls, including high beam shall be in a location approved in Pre-Production meetings.

The foot switches shall be UL-listed, heavy-duty type, of a rugged, corrosion-resistant metal construction. The directional foot switches shall be momentary type, while those for the high beam shall be latching type. The spacing of the switches shall be such that inadvertent simultaneous deflection of switches is prevented.

TS 47. Driver's Amenities

TS 47.1 Coat Hanger

Coat Hook

A stainless steel, aluminum, or approved equal, coat hook shall be furnished and installed, subject to LACMTA approval in Pre-Production meetings.

TS 47.2 Drink Holder

No drink holder.

TS 47.3 Storage Box

Storage Box

An enclosed driver storage area shall be provided with a positive latching door and/or lock. The minimum size shall be 2,100 cubic inches.

TS 47.4 Repair Card Holder

A card holder shall be provided in the Operators' area at a location accessible to mechanics standing in the front entry area with the passenger door open, subject to LACMTA approval in Pre-Production meetings, (Refer to Section TS 88.6 for Reference). Sample card holder shall be provided by the LACMTA upon request.

TS 47.5 Safety Equipment

The following items shall be provided and installed within seven feet of the Operator's seat in a location that is easy reach, subject to LACMTA approval in Pre-Production meetings.

- DOT approved heavy-duty emergency reflector kit stored in a storage box.
- Five-pound multipurpose fire extinguisher mounted with universal bracket.

TS 47.6 Bus Registration Holders

A Bus registration holder shall be installed above the Operator near the ceiling, subject to LACMTA approval in Pre-Production meetings.

TS 47.7 Trash Hooks

The Contractor shall provide two interior metal hooks in the area near the farebox for LACMTA supplied plastic trash bags (see attachment). Placement and selection of the hooks shall be reviewed on the Pilot Bus and are subject to LACMTA approval.

TS 48. Windshield Wipers and Washers

TS 48.1 Windshield Wipers

The bus shall be equipped with either a single-control or dual-control, electric, variable speed intermittent windshield wiper(s). At 65 mph, no more than 10 percent of the wiped area shall be lost due to windshield wiper lift. For two-piece windshields, both wipers shall park along the center edges of the windshield glass. Windshield wiper motors and mechanisms shall be easily accessible for repairs or service. The fastener that secures the wiper arm to the drive mechanism shall be corrosion-resistant. After each stroke, the wiper arm shall return to the parked position.

No part of the windshield wiper mechanism shall be damaged by manual manipulation of the arms for cleaning. Windshield wiper motors and mechanism shall be easily accessible for repairs or service from inside or outside the bus and shall be removable as complete units.

Intermittent Wiper with Variable Control

A variable-speed feature shall be provided to allow adjustment of wiper speed for both sides of the windshield between approximately 5 to 16 or 5 to 30 cycles per minute.

An intermittent wiper control shall be provided. The unit shall provide an Operator 5 to 30 second's variance in dwell time of the wiper arms.

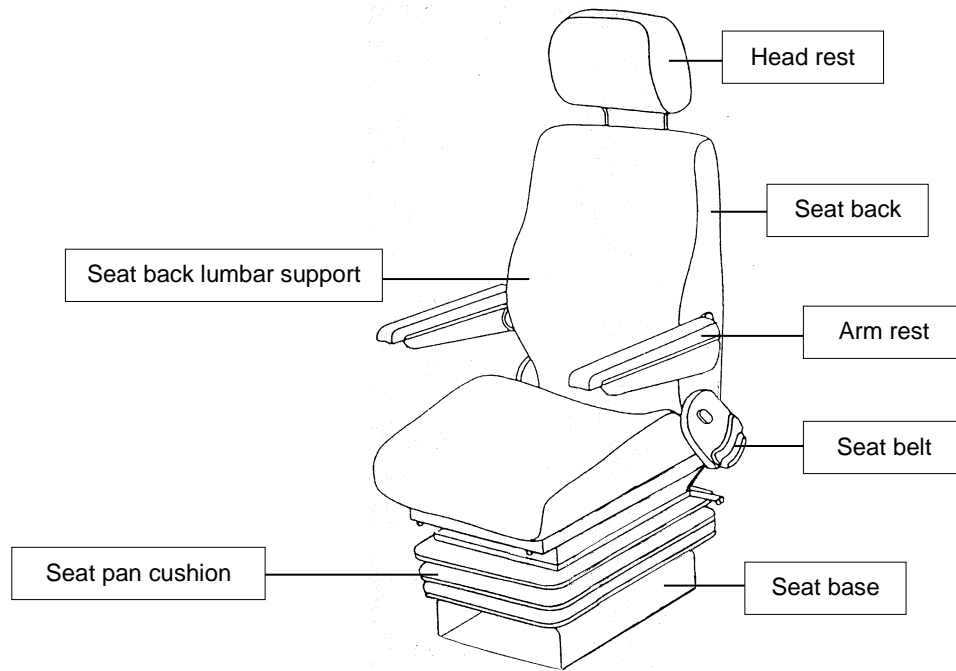
TS 48.2 Windshield Washers

The windshield washer system, when used with the wipers, shall deposit washing fluid evenly and completely wet the entire wiped area.

The windshield washer system shall have a minimum three-gallon reservoir, located for easy refilling from outside of the bus. Reservoir pumps, lines and fittings shall be corrosion-resistant. The reservoir shall be translucent for easy determination of fluid level, if visible, or a fluid level indicator shall be provided.

TS 49. Driver's Seat

FIGURE 6
Driver's Seat



TS 49.1 Dimensions

The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus.

The heavy-duty Operator's seat shall support Operators' in the orthopedically correct seating position.

TS 49.1.1 Seat Pan Cushion Length

Measurement shall be from the front edge of the seat pan to the rear at its intersection with the seat back. The adjustment of the seat pan length shall be no less than 16.5 inches at its minimum length and no more than 20.5 inches at its maximum length.

TS 49.1.2 Seat Pan Cushion Height

Measurement shall be from the cab floor to the top of the level seat at its center midpoint. The seat shall adjust in height from a minimum of 14 inches, with a minimum six-inch vertical range of adjustment.

TS 49.1.3 Seat Pan Cushion Slope

Measurement is the slope of the plane created by connecting the two high points of the seat, one at the rear of the seat at its intersection with the seat back and the other at the front of the seat just before it waterfalls downward at the edge. The slope can be measured using an inclinometer and shall be stated in degrees of incline relative to the horizontal plane (0 degrees). The seat pan shall adjust in its slope from no less than plus 12 degrees (rearward "bucket seat" incline), to no less than minus five degrees (forward slope).

TS 49.1.4 Seat Base Fore/Aft Adjustment

Measurement is the horizontal distance from the heel point to the front edge of the seat. The minimum and maximum distances shall be measured from the front edge of the seat when it is adjusted to its minimum seat pan depth (approximately 15 inches). On all low-floor buses, the seat-base shall travel horizontally a minimum of 11 inches. It shall adjust no closer to the heel point than six inches.

TS 49.1.5 Seat Pan Cushion Width

The driver's seat shall be appropriately dampened to support a minimum weight of 380 pounds. The suspension shall be capable of dampening adjustment in both directions.

Rubber snubbers shall be provided to prevent metal-to-metal contact. Seat suspension shall incorporate a primary and secondary system to minimize bottoming during travel when driving over uneven street surfaces and potholes.

TS 49.1.6 Seat Suspension

The driver's seat shall be appropriately dampened to support a minimum weight of 380 pounds. The suspension shall be capable of dampening adjustment in both directions.

Rubber bumpers shall be provided to prevent metal-to-metal contact.

TS 49.1.7 Seat Back

Width

Measurement is the distance between the outermost points of the front of the seat back, at or near its midpoint in height. The seat back width shall be no less than 19 inches. Seat back will include dual recliner gears on both sides of the seat.

Height

Standard height seat back

TS 49.1.8 Headrests

Four-way adjustable headrest

TS 49.1.9 Seat Back Lumbar Support

Measurement is from the bottom of the seat back at its intersection with the seat pan to the top of the lumbar cushioning. The seat back shall provide adjustable depth lumbar back support with three individual operating lumbar cells within a minimum range of seven to 11 inches.

TS 49.1.10 Seat Back Angle Adjustment

The seat back angle shall be measured relative to a level seat pan, where 90 degrees is the upright position and 90 degrees-plus represents the amount of recline.

The seat back shall adjust in angle from a minimum of no more than 90 degrees (upright) to at least 110 degrees (reclined), with infinite adjustment in between.

TS 49.2 Seat Belt

The belt assembly should include a dual sensitive FMVSS209 emergency-locking retractor (ELR) with maximum inertia tolerance within the lock mechanism. All seat belts should be stored in automatic retractors. The belts shall be mounted to the seat frame so that the driver may adjust the seat without resetting the seat belt. Seat belt shall latch on the operator's right side and include a standard 4.7-inch receptor with seat belt alarm. Seat belt shall include orange three-point webbing and shall have an adjustable shoulder strap D-loop capable of accommodating a 95th-percentile male to a 5th-percentile female. The design of seat belt retraction and driver's area shall incorporate features to prevent damage to the bus or switches and controls when seat belt is released.

The seat and seat belt assemblies as installed in the bus shall withstand static horizontal forces as required in FMVSS 207 and 210. An audible alarm and warning light shall be installed to alert the driver when the seat belt is not in use and the parking brake is released and the master run switch is in "Day Run" or "Night Run".

Belt Length

The lap/shoulder belt assembly shall accommodate all drivers ranging in size from a 95th-percentile male to a 5th-percentile female and shall extend a minimum of 74 inches in length from the retractor.

TS 49.3 Adjustable Armrest

No armrests.

TS 49.4 Seat Control Locations

While seated, the driver shall be able to make seat adjustments by hand without complexity, excessive effort or being pinched. Heavy-duty adjustment mechanisms and controls shall hold the adjustments and shall not be subject to inadvertent changes.

TS 49.5 Seat Structure and Materials

Cushions

The seat bottom shall be at least 4.5 inches of molded silicone foam material in the seating area. The seat back shall be at least three inches of molded polyurethane foam material.

Cushion Materials

Solid black vinyl upholstery (non-perforated vinyl - pleather)

TS 49.6 Pedestal

Four-inch powder coated steel riser with internal tethers.

TS 49.7 Seat Options

Not applicable.

TS 49.8 Mirrors

TS 49.8.1 Exterior Mirrors

The bus shall be equipped with a corrosion-resistant, outside rearview mirrors mounted with stable supports to minimize vibration. Mirrors shall be firmly attached to the bus to minimize vibration and to prevent loss of adjustment with a breakaway or snap/spring-back mounting system. Mirrors shall permit the driver to view the roadway along the sides of the bus, including the rear wheels. Mirrors shall be positioned in a way that will minimize blind spots and high enough to avoid contact with pedestrians and bicyclists. Mirrors shall have integrated turn signals on both sides. Mirrors shall retract or fold sufficiently to allow bus washing operations but avoid contact with windshield. Mechanical stops shall prevent the mirror from contacting the windshield. Detents or friction plates shall be provided to allow positive positioning of mirror arms at pre-determined angles along their adjustment range.

Mirror head assemblies shall be replaceable with simple hand tools in less than 5 minutes. Mirrors shall be made of tempered plate glass or have safety backing to prevent shattering subject to approval during proposal period. Convex mirrors shall be provided, located below the exterior mirrors, on the curb and street side. The convex mirrors shall be integral to the main mirror arm in a similar manner to prevent damage to the exterior mirrors if the convex mirror is hit during operation.

Electrical connection shall be water proof, and located in area protected from bus wash action, and accessible for maintenance to replace mirrors and electrical connections. Adjustment of the mirrors shall be provided by two nubbin switches located to the left of the Operator, subject to LACMTA approval during proposal period. Mirror control wires shall terminate at the bus body adjacent to the mirror bracket attachment point with break-away connector plugs designed to prevent damage to bus wiring in the event the mirror head is damaged due to impact.

Curbside Mirrors

The mirror shall be mounted such that its lower edge is as high as possible but at least 76 inches above the street surface and is visible through the right side portion of the windshield that is cleaned by the windshield wiper. Front door operation shall not affect the view provided by the right side mirror.

Street Side Mirrors

The street side mirror shall be accessible through the Operator's side window. Mirror control wires shall terminate at the bus body adjacent to the mirror bracket attachment point with break-away connector plugs designed to prevent damage to bus wiring in the event the mirror head is damaged due to impact. Street side mirror shall be overhead mounted in a position to minimize potential contact with vehicles or cyclists, subject to LACMTA approval during proposal period.

Remote Adjustment of Curbside Mirror

The driver shall be able to adjust the curbside mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

Remote Adjustment of Street Side Mirror

The driver shall be able to adjust the street-side mirror remotely while seated in the driving position. The control for remote positioning of the mirror shall be a single switch or device.

TS 49.8.2 Interior Mirrors

Mirrors shall be provided to permit the Operator to observe passengers throughout the bus, including entrances and exits, and directly in front of the bus during bicycle loading and unloading activities without leaving his seat and without shoulder movement, subject to LACMTA approval in Pre-Production meetings. Inside mirrors shall not be in the line of sight and obstruct the view of the right outside mirror. Mirror installations shall be placed such that there is no obstruction of the view in other mirrors.

- A convex mirror shall be provided above the front door for use by the Operator in determining that the front door is clear of passengers.
- Mirror(s) shall be provided so that with a full standee load, including standees in the entry area, the Operator will be able to observe passengers in the front and rear door, anywhere in the aisle, and in the rear seats.

Mirror Dimensions

TABLE 10
Mirror Dimensions

SIZE	DESCRIPTION
8"X15" or 8"x16 "	Convex, Operator's Rearview
12" Diameter	Convex, Exit Door
6" Diameter	Relay Mirror
7"x10"	Convex, Front Entrance

WINDOWS (TS 50-TS 53)

TS 50. General

A minimum of 10,000 sq. inches of window area, including operator and door windows, shall be required on each side of the standard configuration bus.

TS 51. Windshield

The windshield shall permit an Operator's field-of-view as referenced in SAE Recommended Practice J1050. The vertically upward view shall be a minimum of 15 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3.5 ft. high no more than two feet. in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90-degree requirement, provided that the divider does not exceed a three-degree angle in the Operator's field-of-view. Windshield pillars shall not exceed 10 degrees of binocular obscuration. The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus.

The windshield shall be easily replaceable by removing zip-locks from the windshield retaining moldings. Bonded-in-place windshields shall not be used. Winglets may be bonded.

TS 51.1 Glazing

The windshield glazing material shall have a ¼ inch nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1 Test Grouping 1A and the Recommended Practices defined in SAE J673.

Glazing shall be solar management glass (SMG) tinted green. The hue shall be consistent throughout the procurement.

Shaded Band

The upper portion of the windshield above the driver's field-of-view shall have a blue or green, shaded band with a luminous transmittance of six to 10 percent when tested in accordance to ASTM D-1003.

TS 52. Driver's Side Window

The driver's side window shall be a high-visibility sliding type, that minimizes window frame or other obstructions to driver's visibility, requiring only the front half of sash to open and latch upon closing, and shall open sufficiently to permit the seated Operator to easily adjust the street-side outside rearview mirror. When in an open position, the window shall not rattle or close during braking. This window section shall slide in tracks or channels designed to last the service life of the bus. The Operator's side window shall not be bonded in place and shall be easily replaceable. The glazing material shall have a single-density tint.

The driver's view, perpendicular through Operator's side window glazing, should extend a minimum of 29 inches (736 mm) to the rear of the heel point on the accelerator, and in any case must accommodate a 95th percentile male operator. The view through the glazing at the front of the assembly should begin not more than 26 inches (560 mm) above the Operator's floor to ensure visibility of an under-mounted convex mirror. Driver's window construction shall maximize ability for full opening of the window.

The driver's side window glazing material shall have a ¼ inch nominal thickness laminated safety glass conforming to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673.

Light transmittance shall be a maximum of 75 percent on the glass area below 53 inches from the Operator platform floor. On the top fixed over bottom slider configuration, the top fixed area above 53 inches may have a maximum one percent light transmittance.

The window frame shall not block the view of the street side mirror when in the fully closed or fully open positions. Operator's side window upper portion above the sunshade shall be shaded dark. Glazing shall be solar management glass tinted blue or green to match the windshield. The hue shall be consistent throughout the procurement.

TS 53. Side Windows

TS 53.1 Configuration

Side window assemblies shall be constructed of heavy-duty aluminum shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. Window assemblies shall incorporate "change in place" design to permit replacement (removal and installation) of each glazing (transparent glass piece less any framing) from windows installed on the bus. This requirement shall permit one mechanic to enter the bus and remove and install each glazing using common hand tools in 60 minutes, or less. The window shall be fully serviceable immediately following replacement of glazing. Change in place method shall be tamper resistant. An additional six minutes will be added for each glazing replacement, if necessary, for replacement of the associated anti-vandalism sacrificial film.

All frame surfaces and components (except the emergency escape handles) shall be finished with black anodizing. Emergency escape latches shall be red, and labeled to indicate their purpose and function. Miscellaneous hardware, such as fasteners and latches, shall be the window manufacturer's standard hardware.

Transom style side windows shall extend from the shoulder height of a seated 5th-percentile female passenger to the eye level of a standing 95th-percentile male passenger in the front section; the rear section window upper edge shall be approximately 56 inches above the floor at the start of the raised deck and no less than 51 inches at the rearmost window's upper edge. Each individual window glazing shall be easily replaceable without removing the entire window assembly or disturbing adjacent window assemblies and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. To the extent practical, the number of different sizes of windows should be minimized.

Quick Change Passenger Side Windows

Glazing in the window assembly shall be capable of being replaced without removing the window from its installed position on the bus using simple hand tools. The glazing shall be held in place mechanically by a system constructed to last the life of the vehicle.

Traditional Frame

- Fully fixed.
- Openable windows with inward-opening transom panels

TS 53.2 Emergency Exit (Egress) Configuration

Minimum Egress

All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.

TS 53.3 Configuration

Operable Windows with Inward-Opening Transom Panels (Fixed Bottom, Tip-In Top)

Each side window shall incorporate an upper transom portion. The transom shall be between 20 and 35 percent of the total window area. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward.

Side windows shall have an upper section that can be opened inward a minimum of four inches to provide maximum interior ventilation. When opened the upper window section shall not interfere with access to the

passenger signal pull cable. The operable section shall be a minimum of eight inches and a maximum of 10 inches in height, hinged at the bottom, and shall be the full width of all windows. In the event of a latch failure the upper window section shall remain in the closed position, and shall latch in the closed position by means of a gas filled cylinder or mechanical spring. Rearmost windows which are lower than shoulder height for seated passengers shall not be opened or equipped with emergency escape provisions, subject to LACMTA approval in Pre-Production meeting.

TS 53.4 Materials

Safety Glass Glazing Panels

Side windows glazing material shall have a minimum of 3/16-inch nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 Safety Glazing Materials and the Recommended Practices defined in SAE J673. Windows on the bus sides and in the rear door shall be grey tint (13 percent) luminous transmittance as measured by ASTM D-1003), complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 20 percent, as measured by ASTM E-424. Luminous transmittance shall be measured by ASTM D-1003. Windows over the destination signs shall not be tinted. To the extent practical, side window glazing for fixed and emergency egress windows shall be interchangeable.

Anti-Vandalism Sacrificial Film

All glazing material that is aft of the front standee line, and in front of the exit door, shall be equipped with an interior single layer 6 mil minimum laminated film. All glazing material that is aft of, and including, the exit door shall be equipped with an interior four layer laminated film. Both types of window film installations are subject to LACMTA approval during proposal period. This material shall be easily installed and removed without the use of specialized tools. Film shall adhere to the window and be resistant to peeling, curling and discoloration by ultraviolet rays. The film shall withstand normal cleaning operations.

TS 53.5 Rear Window

No requirement for rear window.

HEATING, VENTILATING AND AIR CONDITIONING (TS 54-TS 61)

TS 54. Capacity and Performance

The HVAC climate control system shall be modular design and capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs. Contractor shall supply an all-electric driven A/C system with full hermetic or semi-hermetic sealed compressor (no open drive compressor). System shall include - brushless; AC compressor, condenser fan, and evaporator blower motors. High voltage alternator/generator shall be brushless.

With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall control the average passenger compartment temperature within a range between 65 ° to 80°F, while maintaining the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10° to 95°F and at any ambient relative humidity levels between five and 50 percent.

When the bus is operated in outside ambient temperatures of 95° to 115°F, the interior temperature of the bus shall be permitted to rise 0.5° for each degree of exterior temperature in excess of 95°F.

System capacity testing, including pull-down/warm-up, stabilization and profile, shall be conducted in accordance to the APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System."

The recommended locations of temperature probes are only guidelines and may require slight modifications to address actual bus design. Care must be taken to avoid placement of sensing devices in the immediate path of an air duct outlet. In general, the locations are intended to accurately represent the interior passenger area.

To the extent practical, self-sealing couplings shall be used to break and seal the refrigerant lines during removal of major components such as the refrigerant compressor or condenser.

The condenser shall be located to efficiently transfer heat to the atmosphere, and shall not ingest air warmed by the bus mechanical equipment above the ambient temperature or discharge air into any other system of the bus. The condenser and evaporator fan motors shall be brushless and shall be easy to replace in a maximum of one man-hour using simple hand tools. Fan motor replacement shall not require removal of fan housing or air ducting.

The air conditioning system shall employ an accumulator or other strategy in the low pressure circuit to prevent liquid refrigerant from entering the compressor during operation.

Additional testing shall be performed as necessary to ensure compliance to performance requirements stated herein.

Capacity and Performance Requirements

The air-conditioning portion of the HVAC system shall be capable of reducing the passenger compartment temperature from 110 ° to 90 °F in less than 20 minutes after engine start-up. Engine temperature shall be within the normal operating range at the time of start-up of the cool-down test, and the engine speed shall be limited to fast idle, which may be activated by a driver-controlled device. During the cool-down period, the refrigerant pressure shall not exceed safe high-side pressures, and the condenser discharge air temperature, measured 6 inches from the surface of the coil, shall be less than 45 °F above the condenser inlet air temperature. The appropriate solar load as recommended in the APTA "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System," shall be used. There shall be no passengers on board, and the doors and windows shall be closed. The air conditioning system shall meet these performance requirements using R134a or 407c.

TS 55. Controls and Temperature Uniformity

The HVAC system excluding the driver's heater/defroster shall be centrally controlled with an advanced electronic/diagnostic control system with provisions for extracting/reading data. The system shall be compliant with J1939 Communication Protocol for receiving and broadcasting of data.

Hot engine coolant water shall be delivered to the HVAC system driver's defroster/heater and other heater cores by means of an auxiliary coolant pump, sized for the required flow, which is brushless and seal-less having a minimum maintenance free service life for both the brushless motor and the pump of at least 40,000 hours at full power.

If provided, outside openings for air intake shall be located to ensure cleanliness of air entering the climate control system, particularly with respect to exhaust emissions from the bus and adjacent traffic. All intake openings shall be baffled to prevent entry of water.

Manual Mode Selection of Climate Control System

After manual selection and/or activation of climate control system operation mode, all interior climate control system requirements for the selected mode shall be attained automatically to within $\pm (2)^{\circ}\text{F}$ of specified temperature control set-point.

Manually Adjustable Temperature Control Set Point

The climate control system shall have the provision to allow the driver to adjust the temperature control set-point at a minimum of between 68 and 72°F. From then on, all interior climate control system requirements shall be attained automatically, unless re-adjusted by driver.

The driver shall have full control over the defroster and driver's heater. The driver shall be able to adjust the temperature in the driver's area through air distribution and fans. The interior climate control system shall switch automatically to the ventilating mode if the refrigerant compressor or condenser fan fails.

Interior temperature distribution shall be uniform to the extent practicable to prevent hot and/or cold spots. After stabilization with doors closed, the temperatures between any two points in the passenger compartment in the same vertical plane, and six to 72 inches above the floor, shall not vary by more than five (5) °F with doors closed. The interior temperatures, measured at the same height above the floor, shall not vary more than \pm five (5) °F from the front to the rear from the average temperature determined in accordance with APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System." Variations of greater than \pm five (5) °F will be allowed for limited, localized areas provided the majority of the measured temperatures fall within the specified requirement.

TS 55.1 Auxiliary Heater

No auxiliary heater.

TS 56. Air Flow

TS 56.1 Passenger Area

The cooling mode of the interior climate control system shall introduce air into the bus at or near the ceiling height at a minimum rate of 25 cubic feet per minute (cfm) per passenger based on the standard configuration bus carrying a number of passengers equal to 150 percent of the seated load. Airflow shall be evenly distributed throughout the bus, with air velocity not exceeding 100 feet per minute on any passenger. The ventilating mode shall provide air at a minimum flow rate of 20 cfm per passenger. Air vents shall direct air flow away from open windows, if provided.

Airflow may be reduced to 15 cfm per passenger (150 percent of seated load), when operating in the heating mode. The fans shall not activate until the heating element has warmed sufficiently to ensure at least 70 °F air outlet temperature. The heating air outlet temperature shall not exceed 120 °F under any normal operating conditions.

Heater circulating pump shall be brushless and seal-less.

The climate control blower motors and fan shall be designed such that their operation complies with the interior noise level requirements.

TS 56.2 Driver's Area

The bus interior climate control system shall deliver at least 100 cfm of air to the driver's area when operating in the ventilating and cooling modes. Adjustable nozzles shall permit variable distribution or shutdown of the airflow. Airflow in the heating mode shall be reduced proportionally to the reduction of airflow into the passenger area. The windshield defroster unit shall meet the requirements of SAE Recommended Practice J381, "Windshield Defrosting Systems Performance Requirements," and shall have the capability of diverting heated air to the driver's feet and legs. The defroster or interior climate control system shall maintain visibility through the driver's side window.

TS 56.3 Controls for the Climate Control System (CCS)

The controls for the driver's compartment for heating, ventilation and cooling systems shall be integrated and shall meet the following requirements:

- The heat/defrost system fan shall be controlled by a separate switch that has an “Off” position and at least two positions for speed control.
- A manually operated or electronically modulated control valve shall control the coolant flow through the heater core.
- If a cable-operated manual control valve is used, the cable length shall be kept to a minimum to reduce cable seizing. Heater water control valves shall be “positive” type, when closed. The method of operating remote valves shall be subject to LACMTA approval during proposal period.

TS 56.4 Driver’s Compartment Requirements

A separate heating, ventilation and defroster system for the driver’s area shall be provided and shall be controlled by the driver. The system shall meet the following requirements:

- The heater and defroster system shall provide heating for the driver and heated air to completely defrost and defog the windshield, driver’s side window, and the front door glasses in all operating conditions. Fan(s) shall be able to draw air from the bus body interior and/or the exterior through a control device and pass it through the heater core to the defroster system and over the driver’s feet. A minimum capacity of 100 cfm shall be provided. The driver shall have complete control of the heat and fresh airflow for the driver’s area.
- The defroster supply outlets shall be located at the lower edge of the windshield. These outlets shall be durable and shall be free of sharp edges that can catch clothes during normal daily cleaning. The system shall be such that foreign objects such as coins or tickets cannot fall into the defroster air outlets. Adjustable ball vents or louvers shall be provided at the left of the driver’s position to allow direction of air onto the side window in order to maintain visibility.

A ventilation system shall be provided to ensure driver comfort and shall be capable of providing fresh air. Vents shall be controllable by the driver from the normal driving position. Decals shall be provided, indicating “operating instructions” and “fresh air” and “recirculating air” positions. When closed, vents shall be sealed to prevent the migration of water or air into the bus.

TS 56.5 Driver’s Cooling

A separate booster fan unit shall provide 100 cfm of air to the driver’s area through directionally adjustable nozzles and an infinitely variable fan control, both of which shall be located above the driver.

TS 57. Air Filtration

Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.2 requirement for five percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service.

More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation. Moisture drains from air intake openings shall be located so that they will not be subject to clogging from road dirt.

TS 58. Roof Ventilators

At least one roof ventilator shall be provided in the roof of the bus.

Each ventilator shall be easily opened and closed manually. Ventilators with lever type release handles are not permitted. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq. inches and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than four inches, or with all four edges raised simultaneously to a height of no less than 3.5 inches. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator(s) shall be sealed to prevent entry of water when closed.

TS 59. Maintainability

Manually controlled shut-off valves in the refrigerant lines shall allow isolation of the compressor and dehydrator filter for service. To the extent practicable, self-sealing couplings utilizing O-ring seals shall be used to break and seal the refrigerant lines during removal of major components, such as the refrigerant compressor.

The condenser shall be located to efficiently transfer heat to the atmosphere and shall not ingest air warmed above the ambient temperature by the bus mechanical equipment, or to discharge air into any other system of the bus. The location of the condenser shall preclude its obstruction by wheel splash, road dirt or debris. HVAC components located within six inches of floor level shall be constructed to resist damage and corrosion. The condenser and evaporator fan motors shall be easy to replace in a maximum of one man-hour using simple hand tools. Fan motor replacement shall not require removal of fan housing or air ducting.

TS 60. Entrance/Exit Area Heating

No requirements for entrance/exit area heating.

TS 61. Floor-Level Heating

TS 61.1 Transit Bus

No requirements for floor-level heating.

TS 61.2 Commuter Bus

Not applicable

EXTERIOR PANELS, FINISHES AND EXTERIOR LIGHTING (TS 62-TS 73)

TS 62. Design

The bus shall have a clean, smooth, simple design, primarily derived from bus performance requirements and passenger service criteria. With the exception of required VIN information, exterior manufacturer's emblem plate or decals shall not be installed unless approved by the LACMTA. The exterior and body features, including grilles and louvers, shall be shaped to facilitate cleaning by automatic bus washers without snagging washer brushes. Water and dirt shall not be retained in or on any bus body feature to freeze or bleed out onto the bus after leaving the washer. The body and windows shall be sealed to prevent leaking of air, dust or water under normal operating conditions and during cleaning in automatic bus washers for the service life of the bus.

Exterior panels shall be sufficiently stiff to minimize vibration, drumming or flexing while the bus is in service. When panels are lapped, the upper and forward panels shall act as a watershed. However, if entry of moisture into the interior of the vehicle is prevented by other means, then rear cap panels may be lapped otherwise. The windows, hatches and doors shall be able to be sealed. Accumulation of spray and splash generated by the bus's wheels shall be minimized on windows and mirrors.

TS 62.1 Materials

Body materials shall be selected and the body fabricated to reduce maintenance, extend durability and provide consistency of appearance throughout the service life of the bus. Detailing shall be kept simple, and add-on devices and trim shall be minimized and integrated into the basic design.

The total structure shall be designed for maximum; strength, reliability, and durability, while maintaining minimum weight. The overall structure shall be designed to prevent the penetration of fluids, including lubricants, into the structure of the bus. All exposed surfaces shall be uniform in appearance with no unevenness or random irregularities in finish, including seam areas.

TS 62.2 Roof-Mounted Equipment (Transit Bus)

The bus roof shall be coated with “anti-slip” paint applied to areas that will accommodate safe access for routine inspections of the fuel cylinders.

TS 62.3 Curb Feelers

The bus shall be equipped with one curb feeler located at front door area. Curb feeler sample shall be provided by the LACMTA upon request. Installation of curb feeler shall be subject to LACMTA approval at the Pilot Bus.

TS 63. Pedestrian Safety

Exterior protrusions along the side and front of the bus greater than ½ inch and within 80 inches of the ground shall have a radius no less than the amount of the protrusion. The exterior rearview mirrors, cameras and required lights and reflectors are exempt from the protrusion requirement. Grilles, doors, bumpers and other features on the sides and rear of the bus shall be designed to minimize toeholds or handholds.

Exterior protrusions shall not cause a line-of-sight blockage for the driver.

TS 64. Repair and Replacement

TS 64.1 Side Body Panels (Transit Bus)

Structural elements supporting exterior body panels shall allow side body panels below the windows to be repaired in lengths not greater than 12.5 feet. Exterior panels shall not be installed or retained with visible rivets or fasteners unless specifically approved by LACMTA. Exterior panels that function as service and access doors shall be similar in construction, being made of aluminum, fiberglass, or stainless steel. All body panels, including those with louvers or ventilation openings, shall be designed to prevent persons from gaining a hand or foot hold if attempting to climb the exterior of the bus.

TS 64.2 Side Body Panels (Commuter Bus)

Not applicable.

TS 65. Rain Gutters

Rain gutters shall be provided to prevent water flowing from the roof onto the full length of both curb and street sides of the bus. When the bus is decelerated, the gutters shall not drain onto the windshield, driver’s side window, passenger windows or door boarding area. Gutter cross section shall be no less than 0.25 square inches.

TS 66. License Plate Provisions

Provisions shall be made to mount standard-size U.S. license plates per SAE J686 on the front and rear of the bus. These provisions shall direct-mount or recess the license plates so that they can be cleaned by automatic bus-washing equipment without being caught by the brushes, subject to LACMTA approval in Pre-Production meetings. The rear license plate provision shall be illuminated per SAE J587. License plates shall be mounted on the center or to the left of center and shall not allow a toehold or handhold for unauthorized riders. Front license plate shall be mounted sufficiently to the left of the center to allow clearance for Metro installed bicycle rack banners.

TS 66.1 Rub Rails

No requirement for rub rails.

TS 67. Fender Skirts

Features to minimize water spray from the bus in wet conditions shall be included in wheel housing design. Any fender skirts shall be easily replaceable. They shall be flexible if they extend beyond the allowable body width. Wheels and tires shall be removable with the fender skirts in place.

TS 68. Wheel Covers (Transit Bus)

Wheel covers not required.

TS 68.1 Splash Aprons

Standard Splash Aprons

Splash aprons, composed of ¼ inch minimum composition or rubberized fabric, shall be installed behind and/or in front of wheels as needed to reduce road splash and protect underfloor components. The splash aprons shall extend downward to within six inches off the road surface at static conditions. Apron widths shall be no less than tire widths. Splash aprons shall be bolted to the bus understructure. Splash aprons and their attachments shall be inherently weaker than the structure to which they are attached. The flexible portions of the splash aprons shall not be included in the road clearance measurements. Splash apron shall be installed as necessary to protect the wheelchair loading device from road splash. Other splash aprons shall be installed where necessary to protect bus equipment.

TS 69. Service Compartments and Access Doors

TS 69.1 Access Doors (Transit Bus)

Hinged doors shall be used for the engine compartment and for all auxiliary equipment compartments. Access openings shall be sized for easy performance of tasks within the compartment, including tool operating space. Access doors shall be provided at the front of the bus, only if needed, to service and/or replace the front windshield defroster unit, windshield wiper units, brake application valve, steering gear box, throttle pedal assembly, and associated pressure and electrical switches, airline fittings, and electrical connections. Access doors shall be of rugged construction and shall maintain mechanical integrity and function under normal operations throughout the service life of the bus.

The use of expanded metal for side and rear service doors is prohibited. All access doors shall be aluminum, fiberglass, or stainless steel. They shall close flush with the body surface. All doors shall be hinged at the top or on the forward edge and shall be prevented from coming loose or opening during transit service or in bus washing operations. All access doors shall be retained in the open position by props or counterbalancing with over-center or gas-filled springs with safety props and shall be easily operable by one person. Springs and hinges shall be corrosion resistant. Latch handles shall be flush with, or recessed behind, the body contour and shall be sized to provide an adequate grip for opening. Access doors, when opened, shall not restrict access for servicing other components or systems. Gas springs used for the engine access door shall be designed to operate in temperatures encountered within the engine compartment. In the event of a spring failure, an adequate mechanical locking device shall be provided at a minimum for the engine and air conditioner access doors which is capable of retaining a minimum of 200 percent of the door weight when in the open position. The locking device shall be identified by a distinctive yellow or orange color and be simple to operate by one person when closing the door. Access doors shall hinge up and out of the way to within 30 to 45 degrees of the side of the bus. The fuel fill/charge port door shall be hinged at the top and shall open fully up against the side of the bus subject to LACMTA approval in Pre-Production meetings. Pantographic door mechanisms and barn type doors for engine and A/C system access doors are not acceptable. Large access doors shall be opened and closed by one person including the 5th-percentile female. These doors, when opened, shall not restrict access for servicing other components or systems.

If precluded by design, the manufacturer shall provide door design information specifying how the requirements are met.

TS 69.2 Access Doors (Commuter Bus)

Not applicable.

TS 69.3 Access Door Latch/Locks

Requirement for Latches on Access Doors

Access doors larger than 100 sq. inches in area shall be equipped with corrosion-resistant flush-mounted latches or locks except for coolant and fuel fill or battery-switch access doors. All such access doors that require a tool to open shall be standardized throughout the vehicle and will require a nominal 5/16-inch square male tool to open or lock. The locks shall be standardized so that only one tool is required to open all major access doors on the bus. It is required that locking devices lock clockwise and unlock counter clockwise.

Other Locks and Latches

A key switch shall be provided to lock the front door. The switch shall be located behind an exterior access door near the front curb side of the bus a minimum of 45 inches above the ground. The access door shall be hinged to allow the door to open completely to view and aid inserting the switch key. Access to the switch shall not be obstructed by the bicycle rack in the stowed position. The switch shall use a LACMTA standard key. A sample key will be provided by the LACMTA following the Pre-Production meetings.

The Door Lock system shall be controlled by the bus multiplex system. When the Master Run Switch is in the "Off" position and the Park Brake is applied, the door key switch shall close and lock the front door. If left unattended with the front door locked, the front door lock system shall go to sleep with the bus multiplex system and door shall remain locked. If there is a loss of battery power when the door is locked the door shall remain in the closed unpowered position. When the Operator unlocks the front door with the key, the door shall automatically open and the bus multiplex system shall wake up.

TS 70. Bumpers

TS 70.1 Location

Bumpers shall provide impact protection for the front and rear of the bus with the top of the bumper being 27 inches, ± 2 inches, above the ground. Bumper height shall be such that when one bus is parked behind another, a portion of the bumper faces will contact each other.

TS 70.2 Front Bumper

No part of the bus, including the bumper, shall be damaged as a result of a 5mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's longitudinal centerline. The bumper shall return to its pre-impact shape within 10 minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4,000 pounds parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30-degree angle to the longitudinal centerline of the bus. The energy absorption system of the bumper shall be independent of every power system of the bus and shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than seven inches.

TS 70.3 Rear Bumper

No part of the bus, including the bumper, shall be damaged as a result of a two mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within 10 minutes of the impact. When using a yard tug with a smooth, flat plate bumper two feet wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to five mph, over pavement discontinuities up to one inch high, and at accelerations up to two mph/sec. The rear bumper shall protect the bus, when impacted anywhere along its width by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4,000 pounds, at four mph parallel to or up to a 30-degree angle to, the longitudinal centerline of the bus. The rear bumper shall be shaped to preclude

unauthorized riders standing on the bumper. The bumper shall not require service or maintenance in normal operation during the service life of the bus. The bumper may increase the overall bus length specified by no more than six inches.

TS 70.4 Bumper Material

Bumper material shall be corrosion-resistant black polyurethane type material and withstand repeated impacts of the specified loads without sustaining damage. Visible surfaces shall be semi-gloss black. These bumper qualities shall be sustained throughout the service life of the bus.

TS 70.5 Bicycle Rack

A front mounted fold-up three-position black bicycle rack shall be provided to conform to amended Section 35400 of California Vehicle Code that took effect in September 2014. The installed bicycle rack shall not interfere with towing the bus. California Code Title 13 requires that bike racks be installed with a way for the Operator to determine whenever the bike rack is deployed.

TS 71. Finish and Color

TS 71.1 Appearance

Contractor shall utilize the LACMTA's existing local color scheme in its exterior paint design, (see Technical Specification Attachment 1-Metro Local Exterior and Interior Fleet Standards for reference). Exterior colors shall be applied over a white base color. The manufacturer shall submit for LACMTA's approval, a drawing showing painting layout including striping bends and breaks during Pre-Production meetings. Drawing shall show location of bends as dimensioned from a convenient reference point. The Pilot Bus shall be painted according to this color scheme for approval by the LACMTA prior to application to the remainder of the buses.

Contractor shall submit to LACMTA all material safety data sheet (MSDS) for all exterior and interior finishing, coatings, adhesives, sealants and paints. Paints and coatings including finishes and sealants shall not contain lead or asbestos.

All exterior surfaces shall be smooth and free of wrinkles and dents. Exterior surfaces to be painted shall be properly prepared as required by the paint system supplier prior to application of paint to assure a proper bond between the basic surface and successive coats of original paint for the service life of the bus. Drilled holes and cutouts in exterior surfaces shall be made prior to cleaning, priming and painting, where possible, to prevent corrosion. The bus shall be completely painted in such a manner that replacement of exterior lights, windows, mirrors and other items that are applied to the exterior of the bus shall not leave paint outline. Body filler materials may be used for surface dressing, but not for repair of damaged or improperly fitted panels.

Paint shall be applied smoothly and evenly with the finished surface free of visible dirt and the following other imperfections:

- Blisters or bubbles appearing in the topcoat film.
- Chips, scratches, or gouges of the surface finish.
- Cracks in the paint film.
- Craters where paint failed to cover due to surface contamination.
- Overspray.
- Peeling.
- Runs or sags from excessive flow and failure to adhere uniformly to the surface.
- Chemical stains and water spots.
- Dry patch due to incorrect mixing of paint activators.
- Buffing swirls.

All exterior finished surfaces shall be impervious to diesel fuel, gasoline and commercial cleaning agents. Finished surfaces shall resist damage by controlled applications of commonly used graffiti-removing chemicals. The interior of both passenger doors shall be primed with suitable acid-resistant paint.

Proper adhesion between the basic surface and successive coats of the original paint shall be measured using an Elcometer adhesion tester as outlined in ASTM D4541-85. Adhesion shall be a minimum 300 foot.-pounds. The bus manufacturer shall supply test samples of the exterior surface for each step of the painting process that may be subject to adhesion testing per ASTM G4541-87 and ASTM D4145-85. ASTM D4541-93 may be used for inspection testing during assembly of the vehicle.

High Gloss External Paint Finish Quality

Painted surfaces shall have an average 90 gloss as measured in ASTM E97-92, "Standard Test Method For Directional Reflectance" and an orange peel rating of five or more on the Advanced Coating Technologies, Inc., orange peel standard panels set #APR 14941 or LACMTA accepted wave scan equipment. Exterior painted surfaces shall have a minimum of 0.5-mil thick primer coat and a minimum 2.5-mil thick finish coat. Mil thickness shall conform to paint manufacturer's specifications.

TS 72. Decals, Numbering and Signing

Contractor shall furnish and apply all decals. Final size and locations shall be approved by LACMTA. Signs shall be durable and fade, chip, and peel-resistant. All "screened" markings shall be coated with a protective abrasion resistant film that resists damage from cleaning chemicals, graffiti, and sunlight. The Contractor shall provide LACMTA with scaled electronic format drawings of the bus interior and exterior on DVD, compatible with AutoCAD, Adobe Illustrator or other LACMTA approved file format. LACMTA shall utilize these drawings to illustrate the locations of all exterior and interior bus decals to be available at the first Pre-Production meeting or upon request. Contractor shall furnish any other markings necessary for identification of windows, hatches, etc., in both English and Spanish. Roof decals should be applied so that the bottom of the numbers point toward the street side. (Refer to Section TS 88.4 for Tables 18-19.)

TS 72.1 Passenger Information

A total of two information "Take One" boxes and one minimum "Take Twelve" unit shall be supplied (Refer to Section TS 88.1 for Approved Products). "Take One" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the minimum "Take Twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval in Pre-Production meetings.

TS 73. Exterior Lighting

Exterior lighting and reflectors shall comply, as applicable, with Part 393, Subpart B of the FMCSA and FMVSS 108. All exterior lights shall be designed to prevent entry and accumulation of moisture or dust. Commercially available LED-type lamps shall be utilized at all exterior lamp locations. Lamps, lenses and fixtures shall be interchangeable to the extent practicable. Two hazard lamps at the rear of the bus shall be visible from behind when the engine service doors are opened. Light lenses shall be designed and located to prevent damage when running the vehicle through an automatic bus washer. Front marker (clearance) lights along with lights located on the roof and sides of the bus shall have protective shields or be of the flush mount type to protect the lens against minor impacts, and be installed in such a manner to prevent water leakage through the roof or side panels. Separate from any marker lights required by FMVSS, LED clearance lamps shall be provided on the roof surface at each bus corner to delineate bus height in accordance with Title 13 of the California Administrative Code Section 641. These four corner clearance lamps shall be lighted when the master switch is in the "Night Run" position.

Standard Lamps

All LED lamps shall be standard installation of the OEM. The entire assembly shall be specifically coated to protect the light from chemical and abrasion degradation.

Potted Lamps

LED lamps shall be potted type and designed to last the life of the bus.

Lamp Size

LED lamps used for tail, brake and turn signal lamps shall be a minimum of seven inches in diameter.

TS 73.1 Backup Light/Alarm

Visible and audible warnings shall inform following vehicles or pedestrians of reverse operation. Visible reverse operation warning shall conform to SAE Standard J593. Audible reverse operation warning shall conform to SAE Recommended Practice J994 Type C or D.

TS 73.2 Doorway Lighting

Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than one foot-candle for a distance of three feet outward from the outboard edge of the door threshold with a passenger standing in the threshold. The lights must be positioned overhead and shall be shielded to protect passengers' eyes from glare.

Lighting for the ramp areas shall be designed to meet Title 13 and ADA and FMVSS 404 standards. Lighting shall be provided to effectively illuminate the ramp area. Light shall be controlled by the ramp master switch on the driver's dash and shall automatically illuminate when this switch is in the "On" position. The lighting design shall minimize the effect of glare on passengers entering the bus through the wheelchair ramp door. During ramp operation, the street surface shall be illuminated to a minimum of six candlepower a distance of three feet beyond the external dimensions of the ramp platform once deployed.

TS 73.3 Turn Signals

Standard Turn Signals

Turn-signal lights shall be provided on the front, rear, curb and street sides of the bus in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable. Two LED seven-inch diameter amber turn/hazard warning lights, one on each side of engine compartment, shall be furnished.

Forward and rear facing supplemental LED cornering lights shall be provided on the curb side of bus only. With the master switch in the "Night Run" position, the cornering lights shall illuminate the street surfaces no less than three feet outward of the body only when activated by right-hand turn signal at 15 mph or less.

Cornering lights shall illuminate the street surfaces for 15 seconds when the doors close and the master switch is in "Night Run" position to assist an operator determine whether or not the areas by the doors are clear of people.

Wraparound Front Turn Signals

Front turn signals shall be of wrap-around design or shall be designed to be visible from the front and the near side of the bus.

TS 73.4 Headlights

Headlamps shall be designed for replacement of bulb without removing the headlamp bezel.

Standard Installation

Standard OEM headlight installation shall be provided in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.

Daytime Running Lights

Headlamps shall not incorporate a daytime running light feature.

LED/Halogen

Low beam headlamps shall be LED. High beam headlamps shall be halogen or LED. Lenses shall be resistant to hazing and yellowing, and have proper hardness to resist surface scratches and stone chips, subject to LACMTA approval during proposal period.

TS 73.5 Brake Lights

TS 73.5.1 Transit Bus

Brake lights shall be provided in accordance with FMVSS 108 and Part 393, Subpart B of the FMCSA as applicable.

High and Center Mount Red Brake Lamp

Bus shall include red, high and center mount brake lamp(s) along the backside of the bus in addition to the lower brake lamps required under FMVSS 108. The high and center mount brake lamp(s) shall illuminate steady with brake application. Two LED seven-inch diameter sealed tail lights or 2-inch by eighteen-inch LED strip lights shall be mounted on each side of the engine closure door or rear end panels, so that the lights are not affected by engine heat (Refer to Section TS 88.1 for Approved Products). The (red) stop/tail lights shall be mounted directly above the (amber) directional signal lights. Two additional LED (red) stop lights shall be located above the engine compartment door on the centerline of the bus. If stop and tail lights are not visible from the rear when engine door is in the open position, two LED four-inch diameter amber hazard warning lights, one on each side of engine compartment, shall be furnished and activated by the turn signals. Each light shall be replaceable as an individual unit. Plastic lenses shall be protected with a high performance scratch and chemical resistant coating to prevent deterioration.

TS 73.5.2 Commuter Bus

Not applicable.

TS 73.6 Service Area Lighting (Interior and Exterior)

LED lamps with a minimum 264 lumens each shall be provided in the engine and all other compartments where service may be required to generally illuminate the area for night emergency repairs or adjustments. These service areas shall include, but not be limited to, PLC compartment(s), battery box(es), the engine compartment, the communication box, junction/apparatus panels and passenger door operator compartments. Lighting shall be adequate to light the space of the service areas to levels needed to complete typical emergency repairs and adjustments. The service area lamps shall be suitable for the environment in which they are mounted. A minimum of five lamps shall be provided for engine compartment illumination. A common automotive electric lighter accessory socket shall be provided on, or adjacent to, the rear control panel to power 12-volt portable service lights and diagnostic computers, subject to LACMTA approval in Pre-Production meetings.

Engine compartment lamps shall be controlled by a switch mounted near the rear start controls. All other service area lamps shall be controlled by switches mounted on or convenient to the lamp assemblies. Power to the service area lighting shall be programmable. Power shall latch on with activation of the switch and shall be automatically discontinued (timed out) after 60 minutes to prevent damage caused by inadvertently leaving the service area lighting switch in the "On" position after repairs are made.

INTERIOR PANELS AND FINISHES (TS 74-TS 77)

TS 74. General Requirements

Materials shall be selected on the basis of maintenance, durability, appearance, safety, flammability and tactile qualities. Materials shall be strong enough to resist everyday abuse and be vandalism and corrosion resistant. The interior shall be light colored, well lighted, simple, modern, and free from superficial design motifs. There shall be no sharp depressions or inaccessible areas, and it shall be easy to clean and maintain. Trim and attachment details shall be kept simple and unobtrusive. Interior trim shall be secured to avoid resonant vibrations under normal operational conditions.

Interior surfaces more than 10 inches below the lower edge of the side windows or windshield shall be shaped so that objects placed on them fall to the floor when the bus is parked on a level surface. With the exception of the Operators' area and dash, the entire interior shall be cleanable with a hose that utilizes a liquid soap attachment. Interior shall accommodate periodic usage of commercially available cleaning agents, solvents and other chemicals for graffiti cleaning and pest control. Any components and other electrical components within close proximity to these surfaces shall also be resistant to this cleaning method.

Additional anti-graffiti/vandalism treatments shall be applied to interior surfaces, subject to LACMTA approval during proposal period, to allow easy cleaning and removal of markings, adhesives, paint, scribing and etching on surfaces.

Interior surfaces, where possible, to be stainless steel or other vandalism resistant material.

TS 75. Interior Panels

Panels shall be easily replaceable and tamper-resistant. They shall be reinforced, as necessary, to resist vibration, denting, vandalism and other rigors of transit bus service. Individual trim panels and parts shall be interchangeable to the extent practicable.

Interior panel required to meet FMVSS 302.

Interior panels installed behind the exit door, (except for ceiling), shall be textured stainless steel only. Panels in other areas of the bus shall be stainless or other material as determined to best match appearance with the rear section of the bus subject to LACMTA approval during proposal period.

Fire Resistance

Materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision.

TS 75.1 Driver Area Barrier

TS 75.1.1 Transit Bus

A barrier or bulkhead between the driver and the street-side front passenger seat shall be provided. The barrier shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. Location and shape must permit full seat travel and reclining possibilities that can accommodate the shoulders of a 95th-percentile male. The partition shall have a side return and stanchion to prevent passenger from reaching the driver by standing behind the driver's seat. The lower area between the seat and enclosure must be accessible to the driver. The partition must be strong enough in conjunction with entire partition assembly for mounting of such equipment as flare kits, fire extinguishers (1.2 kg), microcomputer, public address amplifier, etc. Dark or black enclosures are preferred behind the driver's head. The enclosure should be isolated for noise control.

Wheel-Well-to-Ceiling Configuration of Driver's Barrier

The driver's barrier shall extend from the top of the wheel well to the ceiling the level of the seated driver and shall fit close to the bus side windows and wall to prevent passengers from reaching the driver or the driver's personal effects.

Driver's Area Barrier Door

A driver door of a ruggedized design intended for use in a transit bus environment shall be provided. It shall be a split door design. Upper and lower doors shall be opened or closed independently of each other. LACMTA may consider a single door with sliding glass. Each door, when closed, shall have a mechanism to latch from inside the operator compartment. Provision shall be made for emergency responders to gain access to a latched operator compartment. Door panels shall be standardized so that they are interchangeable from bus to bus. The door must allow access to all panels, dash and destination sign without requiring removal of the door.

The clear see-through AS2 polycarbonate panel or laminated safety glass in the driver door shall have no speaker holes. The clear panel shall resist clouding and discoloration by ultraviolet rays and by use of the cleaners currently in use at LACMTA.

The driver door shall minimize glare and reflections in the windshield directly in front of the barrier from interior lighting during night operation. It shall be installed in compliance with Driver Provisions, Controls and Instrumentation specified in TS 46 and any applicable ADA or safety standards.

The driver door shall not block boarding passengers from viewing the live display video monitor that is mounted above the driver's seat.

The driver door shall be supported by tapping plates in bus frame structure in order for the door to blend in with bus interior decor.

The farebox handrail and driver's paddle clipboard shall be designed and positioned so that the driver door will automatically latch upon closing without interfering with full farebox function while allowing mounting the farebox OCU, RAM dual pivot arm and driver's paddle clipboard in a manner that is ergonomic to an operator in the driver's seat.

With the bus on level ground, upper and lower doors, when open but not secured to the side, shall stay put where they are left, neither opening nor closing, without application of an external force. When closed, these doors shall not adversely impact the ingress and egress of passengers including those in a wheelchair or other mobility assistive device (i.e. fully ADA compliant). When fully open and secured, these doors shall be designed to minimize the impact on the ingress and egress of passengers including those in a wheelchair or other mobility assistive device.

The entire drive door assembly shall be replaceable in 30 minutes or less. The see-through panel in the barrier shall be replaced in 15 minutes or less using simple hand tools. Door hinges shall be a quick-release type to allow easy, rapid removal of the door panels.

TS 75.1.2 Commuter Bus

Not applicable.

TS 75.2 Modesty Panels

Sturdy divider panels constructed of durable, unpainted, stainless steel complementing the interior shall be provided to act as both a physical and visual barrier for seated passengers in front of each leading row of forward facing seats.

Design and installation of modesty panels located in front of forward-facing seats shall include a handhold or grab handle along its top edge. These dividers shall be mounted on the sidewall and shall project toward the

aisle no farther than passenger knee projection in longitudinal seats or the aisle side of the transverse seats. Modesty panels shall extend from at least the window opening of the side windows, and those forward of transverse seats shall extend downward to one and 1.5 inches above the floor. Panels forward of longitudinal seats shall extend to below the level of the seat cushion. Dividers positioned at the doorways shall provide no less than a 2.5 inches clearance between the modesty panel and a fully open, inward opening door, or the path of a deploying flip-out ramp to protect passengers from being pinched. Modesty panels installed at doorways shall be equipped with grab rails if passengers assist are not provided by other means.

The modesty panel and its mounting shall withstand a static force of 250 pounds applied to a four x four inch area in the center of the panel without permanent visible deformation.

At the rear door area a clear non-glass panel, with multiple layer protective film installed on both sides, from above the modesty panel to the top of the daylight opening and attached to the stanchion.

Modesty panels shall be bolted or riveted to handrails or installed in U-channels with self-locking nuts and securely attached to stanchion and body side. Modesty panels located at the forward edge of the upper floor area shall be attached along the top to handrails for added stiffness. Panels shall be attached to bottom extruded anodized aluminum rails for stiffness.

TS 75.3 Front End

The entire front end of the bus shall be sealed to prevent debris accumulation behind the dash and to prevent the driver's feet from kicking or fouling wiring and other equipment. The front end shall be free of protrusions that are hazardous to passengers standing at the front of the standee line area of the bus during rapid decelerations. Paneling across the front of the bus and any trim around the driver's compartment shall be formed metal or composite material. Composite dash panels shall be reinforced as necessary, vandal-resistant and replaceable. All colored, painted and plated parts forward of the driver's barrier shall be finished with a surface that reduces glare. Any mounted equipment must have provision to support the weight of equipment.

TS 75.4 Rear Bulkhead

The rear bulkhead and all rear interior surfaces, including air return grille, access doors and covers, with the exception of bus ceiling and enclosures adjacent to ceiling, shall be embossed stainless steel with "leather grain" finish. Ceiling and enclosures adjacent to ceiling shall be made of durable, corrosion resistant, easily cleanable material subject to LACMTA approval. Surfaces, other than ceiling, not made of stainless material shall be uniform in color and match lighting panels to the extent possible. Finish shall permit easy removal of paint, grease, fingerprints, and ink. They shall be designed and reinforced, as necessary, to resist vibration, denting, vandalism, and other rigors encountered in LACMTA service. The rear bulkhead paneling shall be contoured to fit the ceiling, side walls and seat backs so that any litter or trash will tend to fall to the floor or seating surface when the bus is on a level surface. Any air vents in this area shall be louvered to reduce airflow noise and to reduce the probability of trash or litter being thrown or drawn through the grille. If it is necessary to remove the panel to service components located on the rear bulkhead, the panel shall be hinged or shall be able to be easily removed and replaced. Grilles where access to or adjustment of equipment is required shall be heavy-duty and designed to minimize damage and limit unauthorized access. Unless otherwise specified, all wiring harnesses in the engine compartment shall terminate there for ease of replacement. Wire harnesses going through the bulkhead shall have a junction at the bulkhead.

TS 75.5 Headlining

Ceiling panels shall be made of durable, corrosion resistant, easily cleanable material subject to LACMTA approval during proposal period. Headlining shall be supported to prevent buckling, drumming or flexing and shall be secured without loose edges. Headlining materials shall be treated or insulated to prevent marks due to condensation where panels are in contact with metal members. Moldings and trim strips, as required to make the edges tamperproof, shall be stainless steel, aluminum or plastic, colored to complement the ceiling material. Headlining panels covering operational equipment mounted above the ceiling shall have an access panel installed to permit access to the equipment. Antenna access panel may be hinged or removable using

captive tamper proof screws. Individual head lining panels shall be easily replaceable by one mechanic using simple hand tools in a maximum of 30 minutes not including stanchion removal.

TS 75.6 Fastening

Interior panels shall be attached so that there are no exposed unfinished or rough edges or rough surfaces. Fasteners should be corrosion resistant. Panels and fasteners shall not be easily removable by passengers. Exposed interior fasteners should be minimized, and where required shall be tamper-resistant.

TS 75.7 Insulation

Any insulation material used between the inner and outer panels shall minimize the entry and/or retention of moisture. Insulation properties shall be unimpaired during the service life of the bus. The insulation material shall be non-hygroscopic, non-asbestos, and resistant to fungus and breeding of insects. Any insulation material used shall not absorb or retain oils or water and shall be designed to prevent casual damage that may occur during maintenance operations.

The combination of inner and outer panels on the sides, roof, wheel wells and ends of the bus, and any material used between these panels, shall provide a thermal insulation sufficient to meet the interior temperature requirements. The bus body shall be thoroughly sealed so that the driver or passengers cannot feel drafts during normal operations with the passenger doors closed.

FTA Docket 90-A

All insulation materials, except for insulation entirely enclosed from the passenger compartment, shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision.

TS 75.8 Floor Covering

All interior floor areas shall be covered with a combination of gray colored smooth and ribbed slip resistant rubber or equivalent floor covering bonded to the subfloor that remains effective in all weather conditions with 12-year unconditional warranty, subject to LACMTA approval. The floor covering, as well as transitions of flooring materials from the main floor area and to the step areas shall be smooth and present no tripping hazards. The floor covering shall closely fit the sidewall cove or extend to the top of the cove. Floor covering applied to wheel housing may be separate pieces. To the extent practical, the center strip may be two-piece and shall extend from the rear seat between the aisle seats to the front standee line.

The floor covering in the entry area shall be ribs aligned transversely (perpendicular to the entrance door), and longitudinally (in line with the aisle), and shall be joined together smoothly. The integrally molded yellow standee line shall be integrally molded yellow at least two inches ($\pm 1/8$ inch) wide and shall have a consistent dimension across the bus aisle in line with the operator's barrier.

The floor covering in the passenger area shall match the flooring in the entry area. The center strip shall be ribs aligned with the aisle. At the rear door a separate ribbed strip as wide as the door opening shall extend from the center strip to the door with ribs aligned transversely (perpendicular to the door). The floor under the seats shall be covered with smooth surface flooring material. The floor covering shall closely fit the sidewall cove or extend to the top of the cove. The wheel housings may be separate pieces. The wheelchair parking area floor shall be covered with blue smooth flooring material that extends into adjacent senior seating areas.

Interior step treads (if required) shall be covered with ribbed flooring material or other non-slip flooring material. The first step shall be yellow, and the second (if needed) shall have two inches wide yellow nosing the full width of the tread, which is fully blended, into the tread material. Sides of the steps shall be the same color as the yellow nosing or rest of the floor, and fully sealed to prevent peeling, tripping hazards, and water intrusion. The edge of any interior steps shall have minimal overhang. Special coating for the step tread section may be acceptable subject to LACMTA approval during the Pre-Production meeting.

TS 75.9 Interior Lighting

Commercially available LED-type lamps shall be utilized at all interior lamp locations. The light source shall be located to minimize windshield glare, with distribution of the light focused primarily on the passengers' reading plane while casting sufficient light onto the advertising display. The lighting system may be designed to form part of or the entire air distribution duct. The lighting system shall meet FCC Part 18; Class A regulation for EMI conducted and radiated emissions.

TS 75.10 Passenger

An overhead LED lighting system shall provide general illumination in the passenger compartment. The lens material shall be translucent polycarbonate. Lenses shall be designed to effectively "mask" the light source. Lenses shall be sealed to inhibit incursion of dust and insects yet be easily removable for service. Access panels shall be provided to allow servicing of components located behind light panels. The entire light fixture shall be hinged to provide easy access to bus wiring and equipment mounted behind the light fixture. The fixture lens cover shall be easy to remove and clean and shall be retained by vandal resistant threaded screws.

Automatically Dimming First Row Lights

The first light on each side (behind the driver and the front door) is normally turned on only when the front door is opened, in "Night Run" and "Night Park" As soon as the door closes, these lights shall go out. These lights shall be turned on at any time if the switch is in the "On" position. Access to the wiring interconnects shall not require removing the fixture from the bus structure.

Dimming Second Row Lights

To help eliminate windshield reflection on suburban roads where street lighting is at a low level, the second light on each side, when "Night Run" or "Night Park" is selected, shall be controlled by the switch; off in "Off" and dimmed in "Normal." These lights shall be turned fully on at any time if the switch is in the "On" position.

The interior lighting design shall be subject to LACMTA approval during proposal period.

TS 75.11 Driver's Area

The driver's area shall have a light to provide general illumination, and it shall illuminate the half of the steering wheel nearest the driver to a minimum level of five foot-candles. This light shall be controlled by a switch that is convenient to the operator. The Operator's light shall be off when the Master Run Switch is in the "Off" position.

TS 75.12 Seating Areas (Transit Bus)

The interior lighting system shall provide a minimum 15 foot-candle illumination on a one square foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be seven-foot-candles.

TS 75.13 Seating Areas (Commuter Bus)

Not applicable.

TS 75.14 Vestibules/Doors (Transit Bus)

Floor surface in the aisles shall be a minimum of 10 foot-candles, and the vestibule area a minimum of four foot-candles with the front doors open and a minimum of two foot-candles with the front doors closed. The front entrance area and curb lights (if needed) shall illuminate when the front door is open and master run switch is in the "lights" positions. Rear exit area and curb lights shall illuminate when the rear door is unlocked.

TS 75.15 Vestibules/Doors (Commuter Bus)

Not applicable.

TS 75.16 Step Lighting

Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of four (4) foot-candles and shall illuminate in all engine run positions. The step lighting shall be low-profile to minimize tripping and snagging hazards for passengers and shall be shielded as necessary to protect passengers' eyes from glare.

Front and rear passenger door areas shall be lighted to meet ADA requirements.

When the Master Switch is in the "Night Run" position, the front and rear door area lights shall be on when the doors are open and off when the doors are closed.

TS 75.17 Ramp Lighting (Transit Bus)

Exterior and interior ramp lighting shall comply with CFR Part 49, Section 38.31.

Lights shall be provided at the doorway equipped with the wheelchair access system to floodlight the loading area.

Lighting for the ramp areas shall be designed to meet Title 13 and ADA and FMVSS 404 standards. Lighting shall be provided to effectively illuminate the ramp area. The light shall be wired through the ramp master toggle switch on the driver's dash and shall automatically illuminate when this switch is in the "On" position. The lighting design shall minimize the effect of glare on passengers entering the bus through the wheelchair ramp door. During ramp operation, the street surface shall be illuminated to a minimum of six candlepower a distance of three feet beyond the external dimensions of the ramp platform once deployed.

TS 75.18 Turntable Lighting (Articulated Bus)

Not applicable.

TS 75.19 Farebox Lighting

TS 75.19.1 Transit Bus

A light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. The light shall illuminate the top of the fare box and the surrounding floor area to a minimum of 15 foot-candles. This light will automatically come on whenever the front doors are opened and the run switch is in the "Night Run" or "Night Park" position. A by-pass switch shall be provided on the Operator's side console to keep the fare box light on when activated.

TS 75.19.2 Commuter Bus

Not applicable.

TS 76. Fare Collection

Space and structural provisions shall be made for installation of 41-inch GFI Genfare Odyssey Validation farebox and shall be as far forward as practicable. Location of the fare collection device shall not restrict traffic in the vestibule, including wheelchairs if a front door loading device is used, and shall allow the driver to easily reach the farebox controls and to view the fare register. The farebox shall not restrict access to the driver area, shall not restrict operation of driver controls and shall not — either by itself or in combination with stanchions, transfer mounting, cutting and punching equipment, or route destination signs — restrict the driver's field-of-view per SAE Recommended Practice J1050. The location and mounting of the fare collection device shall allow use, without restriction, by passengers. The farebox location shall permit accessibility to the vault for easy manual removal or attachment of suction devices. Meters and counters on the farebox shall be readable on a daily basis. The floor under the farebox shall be reinforced as necessary to provide a sturdy mounting platform and to prevent shaking of the farebox.

Adjacent to the farebox area and within easy reach of the Operator, Contractor shall provide a small clipboard approximately 4.5 inches by 5.5 inches to hold the operator schedule, (paddle).

The Contractor shall provide and install GFI Genfare Odyssey Validation farebox base plate, power leads and ITS interface cable, subject to LACMTA approval in Pre-Production meetings.

Note: Proposers are to contact GFI Genfare directly to determine correct part numbers, harness length requirements, etc. The under floor reinforcement shall be of adequate strength to anchor the farebox using GFI installation kit D22581-0005 or equivalent. Reinforcement plate shall include permanently attached nuts to secure the farebox base plate to the floor.

A circuit breaker protected, 20-amp, 24-Volt DC battery circuit, shall be provided and powered through the battery connect switches. This power circuit shall include a grounded lead. A one-inch inside diameter waterproof conduit shall be provided from the ITS enclosure to the farebox base plate mounting location, through the bus floor, to protect the power leads and ITS interface cable, subject to LACMTA approval in Pre-Production meetings. Farebox end of conduit shall protrude above the floor at a minimum 1/2 inch to prevent moisture from entering the conduit.

TS 77. Interior Access Panels and Doors (Transit Bus)

Access for maintenance and replacement of equipment shall be provided by panels and doors that appear to be an integral part of the interior. Removal of fixtures or equipment unrelated to the repair task to gain access shall be precluded or used only subject to LACMTA approval in Pre-Production meetings. Access doors shall be hinged with gas props or over-center springs, where practical, to hold the doors out of the mechanic's way, subject to LACMTA approval during pre-production meetings. All overhead doors shall be hinged at the top and shall be prevented from coming loose or opening during transit service or in bus cleaning operations. Access doors, when opened, shall not restrict access for servicing other components or systems. Retention of all interior access panels shall be with tamper proof screws. Panel fasteners shall be standardized so that only one tool is required to service all special fasteners within the Bus subject to LACMTA approval in Pre-Production meetings. All fasteners that retain access panels, excluding wheel well housing, and floor access panels, shall be captive in the cover. Removable light panels are not considered access panels unless specifically approved by LACMTA. Access doors in the Operators' area forward of the standee line (including the front door actuator compartment) shall be secured with hand screws or latches and shall prevent entry of mechanism lubricant into the Bus interior.

TS 77.1 Floor Panels

Access openings in the floor shall be sealed to prevent entry of fumes and water into the bus interior. Flooring material at or around access openings shall be flush with the floor and shall be edge-bound with stainless steel or another material that is acceptable to the LACMTA to prevent the edges from coming loose. Access openings shall be asymmetrical so that reinstalled flooring shall be properly aligned. Fasteners shall tighten flush with the floor.

The number of special fastener tools required for panel and access door fasteners shall be minimized.

PASSENGER ACCOMMODATIONS (TS 78-TS 82)

TS 78. Passenger Seating

TS 78.1 Arrangements and Seat Style (Transit Bus)

The passenger seating arrangement in the bus shall be such that seating capacity is maximized with a minimum of 38 seats, and in compliance to the following requirements:

Note: The LACMTA recognizes that ramp location, foot room, hip-to-knee room, doorway type, width, seat construction, floor level type, seat spacing requirements, ramp or lift, number of wheelchair positions, etc. ultimately affect seating capacity and layout.

Forward-Facing Seat Configuration

Passenger seats shall be arranged in a transverse, forward-facing configuration, except at the wheel housings and turntable, if applicable, where aisle-facing seats may be arranged as appropriate with due regard for passenger access and comfort. Other areas where aisle-facing seats may be provided are at wheelchair securement areas and platforms (such as for fuel tank storage space). The first forward facing seats at the curbside and street side shall be designated as reserved seating for the senior, the blind and a person on a cane or crutch. All reserved seating shall use seat inserts covered with Blue Chips fabric.

Rear Seats

The rear seat assembly shall accommodate four or five passengers as needed to meet the minimum seating requirement. A maximum of three of the rear seat(s) shall be hinged to fully open for easy access to the engine compartment. The hinged seats shall latch in the closed position and be supported by a convenient prop in the open position.

USB Ports

The Type A USB device charging ports shall be provided for all seat locations. For transverse seats there shall be a dual port USB connector at double passenger seat locations, and a single port USB connector at the single passenger seat locations, mounted along the seat rails. At the rear settee there shall be a dual USB connector on each end of the settee positions along the seat rails. At the wheelchair flip up seat locations, a dual USB connector shall be positioned such that it is easily accessible with the seat in either wheelchair or seating position. On any fixed longitudinal seats, a single port USB connector per seat shall be located on the seat rail adjacent to the seat. The exact locations of the charging ports shall be reviewed and approved by LACMTA during Proposal period. The USB connectors shall include spring loaded access doors that provide dust and water resistance to IP 64 rating. The ports shall be powered only when engine is running and shall provide five volts at two amps minimum power.

TS 78.2 Rearward Facing Seats (Transit Bus)

Rearward facing seats not allowed.

TS 78.3 Turntable Seating (Articulated Bus)

Not applicable.

TS 78.4 Padded Inserts/Cushioned Seats (Transit Bus)

Non-Padded Inserts

The passenger seats shall be equipped with vandal-resistant non-padded inserts throughout the bus.

Non-Padded Seat Configuration

Seats inserts shall be securely attached and shall be detachable by means of a simple release mechanism so that they are easily removable by the maintenance staff but not by passengers. To the extent practicable, seat inserts shall be interchangeable throughout the bus. Materials shall have high resistance to tearing, flexing and wetting.

TS 78.5 Seat Back Fitness

Back Insert Seat Configuration

The seat back insert thickness shall not exceed one inch in the knee room area.

TS 78.6 Drain Hole in Seats

The bottom insert shall be fitted with a riveted drain hole.

TS 78.7 Arrangements and Seat Style (Commuter Bus)

Not applicable.

TS 78.8 Hip-to-Knee Room

Hip-to-knee room measured from the center of the seating position, from the front of one seat back horizontally across the highest part of the seat to vertical surface immediately in front, shall be a minimum of 26 inches. At all seating positions in paired transverse seats immediately behind other seating positions, hip-to-knee room shall be no less than 26 inches.

TS 78.9 Foot Room

Foot room, measured at the floor forward from a point vertically below the front of the seat cushion, shall be no less than 14 inches. Seats immediately behind the wheel housings and modesty panels may have foot room reduced.

TS 78.10 Aisles (Transit Bus)

The aisle between the seats shall be no less than 20 inches wide at seated passenger hip height. Seat backs shall be shaped to increase this dimension to no less than 24 inches at 32 inches above the floor (standing passenger hip height).

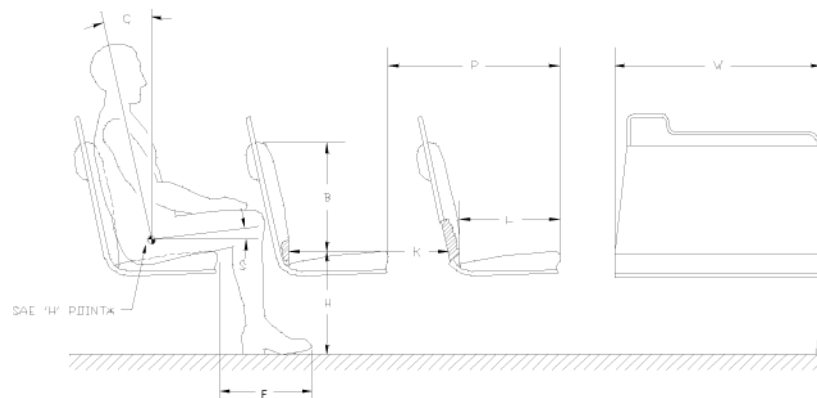
TS 78.11 Aisles (Commuter Bus)

Not applicable.

TS 78.12 Dimensions (Transit Bus)

FIGURE 7

Seating Dimensions and Standard Configuration



Seat dimensions for the various seating arrangements shall have the dimensions as follows (Refer to Figure 7):

- The width, W, of the two-passenger transverse seat shall be a minimum 35 inches.
- The length, L, shall be 17 inches, ± 1 inch.
- The seat back height, B, shall be a minimum of 15 inches.
- The seat height, H, shall be 17 inches, \pm one inch for the rear lounge (or settee) and longitudinal seats, and seats located above raised areas for storage of under-floor components, a cushion height of up to 18 inches, \pm two inches, will be allowed. This shall also be allowed for limited transverse seats, but only with the expressed approval of the LACMTA during proposal period.
- Foot room = F.
- The seat cushion slope, S, shall be between five and 11 degrees.

- The seat back slope, C, shall be between eight and 17 degrees.
- Hip to knee room = K.
- The pitch, P, is shown as reference only.

TS 78.13 Structure and Design (Transit Bus)

The passenger seat frame and its supporting structure shall be constructed and mounted so that space under the seat is maximized and is completely free of obstructions to facilitate cleaning.

Seats, structures and restraints around the securement area should not infringe into the mobility device envelope or maneuverability.

The transverse seat structure shall be fully cantilevered from the sidewall with sufficient strength for the intended service. The lowest part of the seat assembly that is within 12 inches of the aisle shall be at least 10 inches above the floor.

In locations at which cantilevered installation is precluded by design and/or structure, other seat mounting may be allowed.

All transverse objects — including seat backs, modesty panels, and longitudinal seats — in front of forward-facing seats shall not impart a compressive load in excess of 1,000 pounds onto the femur of passengers ranging in size from a 5th-percentile female to a 95th-percentile male during a 10g deceleration of the bus. This deceleration shall peak at 0.05 to 0.015 seconds from initiation. Permanent deformation of the seat resulting from two 95th-percentile males striking the seat back during this 10g deceleration shall not exceed two inches, measured at the aisle side of the seat frame at height H. The seat back should not deflect more than 14 inches, measured at the top of the seat back, in a controlled manner to minimize passenger injury. Structural failure of any part of the seat or sidewall shall not introduce a laceration hazard.

The seat assembly shall withstand static vertical forces of 500 pounds applied to the top of the seat cushion in each seating position with less than ¼-inch permanent deformation in the seat or its mountings. The seat assembly shall withstand static horizontal forces of 500 pounds evenly distributed along the top of the seat back with less than ¼-inch permanent deformation in the seat or its mountings. The seat backs at the aisle position and at the window position shall withstand repeated impacts of two 40-pound sandbags without visible deterioration. One sandbag shall strike the front 40,000 times and the other sandbag shall strike the rear 40,000 times. Each sandbag shall be suspended on a 36-inch pendulum and shall strike the seat back 10,000 times each from distances of 6, 8, 10, and 12 inches. Seats at both seating positions shall withstand 4,000 vertical drops of a 40-pound sandbag without visible deterioration. The sandbag shall be dropped 1,000 times each from heights of 6, 8, 10 and 12 inches. Seat cushions shall withstand 100,000 randomly positioned 3.5-inch drops of a squirming, 150 pounds, smooth-surfaced, buttocks-shaped striker with only minimal wear on the seat covering and no failures to seat structure or cushion suspension components.

The back of each transverse seat shall incorporate a handhold no less than ⅞ inch in diameter for standees and seat access/egress. The handhold shall not be a safety hazard during severe decelerations. The handhold shall extend above the seat back near the aisle so that standees shall have a convenient vertical assist, no less than four inches long that may be grasped with the full hand. This handhold shall not cause a standee using this assist to interfere with a seated 50th-percentile male passenger. The handhold shall also be usable by a 5th-percentile female, as well as by larger passengers, to assist with seat access/egress for either transverse seating position. The upper rear portion of the seat back and the seat back handhold immediately forward of transverse seats shall be padded and/or constructed of energy absorbing materials. During a 10g deceleration of the bus, the HIC number (as defined by SAE Standard J211a) shall not exceed 400 for passengers ranging in size from a 5th percentile female through a 95th percentile male.

The seat back handhold may be deleted from seats that do not have another transverse seat directly behind and where a vertical assist is provided.

Longitudinal seats shall be the same general design as transverse seats but without seat back handholds. Longitudinal seats may be mounted on the wheelhouses. Armrests shall be included on the ends of each set of longitudinal seats except on the forward end of a seat set that is immediately to the rear of a transverse seat, the driver's barrier, or a modesty panel, when these fixtures perform the function of restraining passengers from sliding forward off the seat. Armrests are not required on longitudinal seats located in the wheelchair parking area that fold up when the armrest on the adjacent fixed longitudinal seat is within 3.5 inches of the end of the seat cushion. Soft padded arm rests shall not be utilized. Armrests shall not be included in the design of forward facing seats. Armrests shall be located from seven to nine inches above the seat cushion surface. The area between the armrest and the seat cushion shall be closed by a barrier or panel. The top and sides of the armrests shall have a minimum width of one inch and shall be free from sharp protrusions that form a safety hazard.

Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 pounds applied anywhere along their length with less than ¼-inch permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 pounds with less than ¼-inch permanent deformation and without visible deterioration.

TS 78.14 Structure and Design (Commuter Bus)

Not applicable.

TS 78.15 Construction and Materials (Transit Bus)

Passenger seats and supporting structure shall be stainless steel. Complete seat assemblies shall be interchangeable to the extent practical. Seats panels shall be brushed (180 grit polish) stainless steel and shall be attached to the seat frame with tamperproof fasteners. Surface texture shall be consistent throughout the seat material, with no visually exposed portion painted. All visually exposed metal of the standard seat structure including mounting brackets and other components shall be stainless steel.

The seats shall be contoured for individuality, lateral support, and maximum comfort and shall fit the framework to reduce exposed edges. Objects within any portion of the head or chest impact zone such as handholds and seat backs shall not have sharp corners or edges less than ¼-inch radius.

Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners and is subject to LACMTA approval in Pre-Production meetings. To the extent practical, seat inserts shall be interchangeable throughout the bus. Each seat insert shall be easily replaceable in less than one minute using simple hand tools and shall be demonstrated not to fail for a minimum of ten insert changes. The fabric material shall have high resistance to tearing, flexing, and wetting and the coloring shall be consistent throughout the seat material, with no visually exposed portion painted. Any exposed metal touching the sides or the floor of the bus shall be stainless steel. The seat, pads and cushions shall be contoured for individuality, lateral support and maximum comfort and shall fit the framework to reduce exposed edges.

The minimum radius of any part of the seat back, handhold or modesty panel in the head or chest impact zone shall be a nominal ¼-inch. The seat back and seat back handhold immediately forward of transverse seats shall be constructed of energy-absorbing materials to provide passenger protection and, in a severe crash, allow the passenger to deform the seating materials in the impact areas. Complete seat assemblies shall be interchangeable to the extent practicable.

Refer to Section TS 88.1 for seat fabric.

TS 78.16 Construction and Materials (Commuter Bus)

Not applicable.

TS 79. Passenger Assists (Transit Bus)

Passenger assists in the form of full grip, vertical stanchions or handholds shall be provided for the safety of standees and for ingress/egress. Passenger assists shall be convenient in location, shape, and size for both the 95th-percentile male and the 5th-percentile female standee. Starting from the entrance door and moving anywhere in the bus and out the exit door, a vertical assist shall be provided on the aisle side of each forward facing aisle seating position. The vertical assists on the first forward facing reserved seats at the curbside and street side shall include an easily cleaned tactile feedback surface for passengers, such as knurling. All handholds and stanchions at front doorway, around farebox, and at interior steps for bi-level designs shall be yellow PVC coated, yellow powder coated or yellow nylon coated. Coating shall be 3-mil minimum thickness. Six overhead grey grab straps are to be provided on each side of the wheelchair areas. Vertical assists shall additionally be provided toward the center of three and four passenger aisle facing seats attached to seat frame and overhead assist. Wheel housings not equipped with seats or equipment enclosure shall have a horizontal assist mounted on the top portion of the housing no more than seven inches higher than the wheel well housing.

The forward-most vertical stanchions on either side of the aisle immediately behind the driver's area shall be stainless steel finish.

TS 79.1 Assists (Transit Bus)

Excluding those mounted on the seats and doors, the assists shall have a cross-sectional diameter between 1¼ and 1.5 inches or shall provide an equivalent gripping surface with no corner radii less than ¼ inch. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. All passenger assists shall permit a full hand grip with no less than 1.5 inches of knuckle clearance around the assist. Passenger assists shall be designed to minimize catching or snagging of clothes or personal items and shall be capable of passing the NHTSA Drawstring Test.

A crash resulting in a one- foot intrusion shall not produce sharp edges, loose rails, or other potentially dangerous conditions associated with a lack of structural integrity of the assists.

Any joints in the assist structure shall be underneath supporting brackets and securely clamped to prevent passengers from moving or twisting the assists. Seat handholds may be of the same construction and finish as the seat frame. Door mounted passenger assists shall be of anodized aluminum, stainless steel or powder-coated metal. Connecting tees and angles may be powder-coated metal castings or molded plastic. Assists shall withstand a force of 300 pounds applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation. Assists shall be provided on both sides of passenger doors to provide safe ingress and egress. All passenger assist components, including brackets, clamps, screw heads and other fasteners used on the passenger assists shall be designed to eliminate pinching, snagging and cutting hazards and shall be free from burrs or rough edges.

TS 79.2 Front Doorway

Front doors, or the entry area, shall be fitted with ADA-compliant assists and shall be no less than 0.75 inch in width. Assists shall be as far outward as practicable, but shall be located no farther inboard than six inches from the outside edge of the entrance step and shall be easily grasped by a 5th-percentile female boarding from street level. Door assists shall be functionally continuous with the horizontal front passenger assist and the vertical assist and the assists on the wheel housing or on the front modesty panel.

TS 79.3 Vestibule (Transit Bus)

The aisle side of the driver's barrier, the wheel housings, and when applicable the modesty panels shall be fitted with vertical passenger assists that are functionally continuous with the overhead assist and that extend to within 36 inches of the floor. These assists shall have sufficient clearance from the barrier to prevent inadvertent wedging of a passenger's arm.

A horizontal passenger assist shall be located across the front of the bus and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration. Without restricting the vestibule space, the assist shall provide support for a boarding passenger from the front door through the fare collection procedure. Passengers shall be able to lean against the assist for security while paying fares. The assist shall be no less than 36 inches above the floor. The assists at the front of the bus shall be arranged to permit a 5th-percentile female passenger to easily reach from the door assist, to the front assist, to vertical assists on the driver's barrier, wheel housings or front modesty panel. The front assist should not impede wheelchair boarding and provide adequate clearance and access to the farebox during vaulting and maintenance.

TS 79.4 Rear Doorway(s) (Transit Bus)

Vertical assists that are functionally continuous with the overhead assist shall be provided at the aisle side of the transverse seat immediately forward of the rear door and on the aisle side of the rear door modesty panel(s). Passenger assists shall be provided on modesty panels that are functionally continuous with the rear door assists. Rear doors, or the exit area, shall be fitted with assists having a cross-sectional diameter between 1¼ and 1.5 inches or providing an equivalent gripping surface with no corner radii less than ¼ inch, and shall provide at least 1.5 inches of knuckle clearance between the assists and their mounting. The assists shall be designed to permit a 5th-percentile female to easily move from one assist to another during the entire exiting process. The assists shall be located no farther inboard than six inches from the outside edge of the rear doorway step.

TS 79.5 Overhead (Transit Bus)

Except forward of the standee line and at the rear door, a continuous, full grip, overhead assist shall be provided. The assist shall be convenient to standees anywhere in the Bus and shall be located over the center of the aisle seating position of the forward facing seats. The assist shall be no less than 70 inches above the floor and shall terminate at the rear bulkhead or curve up to the ceiling with a minimum six-inch radius.

Grab straps shall be vinyl fabric. A minimum of six grab straps or other extensions as necessary shall be provided for overhead sections above each wheelchair securement area for the use by passengers that cannot reach to 70 inches.

Overhead assists shall simultaneously support 150 pounds on any 12-inch length. No more than five percent of the full grip feature shall be lost due to assist supports.

TS 79.6 Longitudinal Seat Assists (Transit Bus)

Longitudinal seats shall have vertical assists located between every other designated seating position, except for seats that fold/flip up to accommodate wheelchair securement. Assists shall extend from near the leading edge of the seat and shall be functionally continuous with the overhead assist. Assists shall be staggered across the aisle from each other where practicable and shall be no more than 52 inches apart or functionally continuous for a 5th percentile female passenger. A vertical assist or grab rail shall be provided convenient to the outer rear settee seats if they are immediately behind an aisle facing seat subject to LACMTA approval in Pre-Production meetings.

TS 79.7 Wheel Housing Barriers/Assists (Transit Bus)

Unless passenger seating is provided on top of wheel housing, passenger assists shall be mounted around the exposed sides of the wheel housings no more than seven inches higher than the wheel well housing, (and propulsion compartments if applicable), which shall also be designed to prevent passengers from sitting on wheel housings. Such passenger assists shall also effectively retain items, such as bags and luggage, placed on top of wheel housing.

TS 80. Passenger Doors

TS 80.1 Transit Bus

Doors shall be fully electrically powered.

Doorways will be provided in the locations and styles as follows. Passenger doors and doorways shall comply with ADA requirements.

All passenger door components, except door panels and glazing, must come from one single manufacture, subject to LACMTA approval during proposal period.

TABLE 11
Door Locations and Styles

Front Door						
Location	Slide Glide	Double (Two-Piece Pantograph		Single (One-Piece Pantograph)	Outside Sliding Plug	
Forward of the front wheels and under direct observation of the driver.	X					
Rear Door(s)						
Location	Slide Glide	Outward Opening Swing With Manual Emergency Reset	Outward Opening Swing With Auto Emergency Reset	Double (Two-Piece Pantograph	Single (One-Piece Pantograph)	Outside Sliding Plug
Alternative 1: Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.	X					X

TS 80.1.1 Front Door

Door shall be forward of the front wheels and under direct observation of the driver.

TS 80.1.2 Rear Door(s)

Curbside doorway centerline located rearward of the point midway between the front door centerline and the rearmost seat back.

TS 80.2 Commuter Bus

TS 80.2.1 Front door

Not applicable.

TS 80.3 Materials and Construction

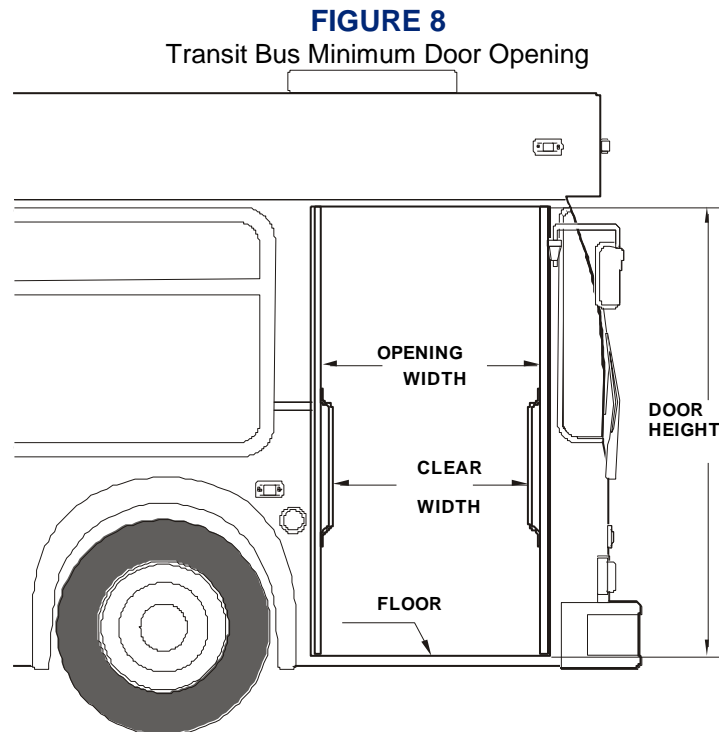
Structure of the doors, their attachments, inside and outside trim panels and any mechanism exposed to the elements shall be durable and corrosion-resistant. Pantographic type passenger rear doors are not acceptable. Door panel construction shall be of corrosion-resistant metal or reinforced non-metallic composite materials. When fully opened, the doors shall provide a firm support and shall not be damaged if used as an assist by passengers during ingress or egress. Door edges shall be sealed to prevent infiltration of exterior moisture,

noise, dirt and air elements from entering the passenger compartment, to the maximum extent possible based on door types.

The closing edge of each door panel shall have no less than two inches of soft weather stripping. The doors, when closed, shall be effectively sealed, and the hard surfaces of the doors shall be at least four inches apart. The combined weather seal and window glazing elements of the front door shall not exceed 10 degrees of binocular obstruction of the driver's view through the closed door. The lower section of the rear door shall be solid and constructed of the same material as the door. The interior rear door surface below the door glass shall be protected by a replaceable stainless steel or aluminum "Kick Panel" that is easily replaceable with simple hand tools.

TS 80.4 Dimensions

TS 80.4.1 Transit Bus



When open, the doors shall leave an opening no less than 76 inches in height.

31¾-inch Minimum Doorway Clear Width

Front door clear width shall be a minimum of 31¾ inches with the doors fully opened.

Rear door opening clear width shall be a minimum of 24 inches with the doors fully opened.

TS 80.4.2 Commuter Bus

Not applicable.

TS 80.5 Door Glazing

The upper section of both front and rear doors shall be glazed for no less than 45 percent of the respective door opening area of each section. The lower section of the front door shall be glazed for no less than 25 percent of the door opening area of the section.

Door glazing shall be easily replaceable.

Zip type glazing rubber or quick change glazing exterior frame.

The front door glazing material shall have a minimum of 3/16-inch nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 Safety Glazing Materials and the Recommended Practices defined in SAE J673. Tinting shall be blue or green to match the windshield.

The rear door panel glazing material shall have a nominal ¼-inch thick tempered glass conforming to the requirements of ANSI Z26.1 Test Grouping 2 and the Recommended Practices defined in SAE J673.

TS 80.6 Door Projection (Transit Bus)

TS 80.6.1 Exterior

The exterior projection of the front doors beyond the side of the bus shall be minimized and shall not block the line of sight of the rear exit door via the curb side mirror when the doors are fully open. The exterior projection of both doors shall be minimized and shall not exceed 13 inches during the opening or closing cycles or when doors are fully opened.

TS 80.6.2 Interior

Projection inside the bus shall not exceed 21 inches, cause an obstruction of the rear door mirror, or cause a hazard for standees.

TS 80.7 Door Height Above Pavement

It shall be possible to open and close either passenger door when the bus loaded to gross vehicle weight rating is not knelt and parked with the tires touching an eight-inch high curb on a street sloping toward the curb so that the street side wheels are five inches higher than the right side wheels.

When the bus is at operating level, opened doors shall be 14 to 16 inches above the ground.

TS 80.8 Closing Force

Closing door edge speed shall not exceed 12 inches per second, and opening door speed shall not exceed 19 inches per second. Power doors shall not slam closed under any circumstance, even if the door is obstructed during the closing cycle. If a door is obstructed during the closing cycle, the pressure exerted on the obstruction shall not increase once initial contact has been made.

Doors closed by a return spring or counterweight-type device shall be equipped with an obstruction-sensing device that, at a minimum, alerts the driver if an obstruction is detected between the closing doors. Doors closed by a return spring or counterweight type device, when unlocked, shall be capable of being pushed to the point where the door starts to open with a force not to exceed 25 pounds applied to the center edge of the forward door panel.

Whether or not the obstruction sensing system is present or functional, it shall be possible to withdraw a 1.5 inches diameter cylinder from between the center edges of a closed and locked door with an outward force not greater than 35 pounds.

The door system shall be designed in accordance with Title 13 of the California Administrative Code Section 1267.

TS 80.8.1 Rear Door Closing Force (Transit Bus)

Power-close rear doors shall be equipped with an obstruction-sensing system such that if an obstruction is within the path of the closing doors, the doors will stop and/or reverse direction prior to imparting a 10-pound

force on one sq. inch of that obstruction. A contactless obstruction sensing system shall also be employed, and it shall be capable of discriminating between the normal doorway environment and passengers or other obstructions within the doorway, and of altering the zones of detection based upon the operating state of the door system.

TS 80.9 Actuators

Doors shall open or close completely in 1.5 to 3 seconds from the time of control actuation and shall be subject to the closing force requirements.

Door actuators shall be adjustable so that the door opening and closing speeds can be independently adjustable to satisfy the above requirements. Actuators and the complex door mechanism shall be concealed from passengers but shall be easily accessible for servicing.

Door actuators and associated linkages shall maximize door holding forces in the fully open and fully closed positions to provide firm, non-rattling, non-fluttering door panels while minimizing the force exerted by the doors on an obstruction midway between the fully open and closed positions.

The rear door actuator(s) shall be under the control of the vehicle operator and shall open and close in response to the position of the driver's door control.

Doors that employ a "swing" or pantograph geometry and/or are closed by a return spring or counterweight-type device shall be equipped with a positive mechanical holding device that automatically engages and prevents the actuation mechanism from being back-driven from the fully closed position. The holding device shall be overcome only when the driver's door control is moved to an "Exit Door Enable" position and the vehicle is moving at a speed of less than 2 mph, or in the event of actuation of the emergency door release.

Locked doors shall require a force of more than 300 pounds to open manually. When the locked doors are manually forced to open, damage shall be limited to the bending of minor door linkage with no resulting damage to the doors, actuators or complex mechanism.

TS 80.9.1 Actuator (Commuter Bus)

Not applicable.

TS 80.9.2 Rear Door Interlocks (Transit Bus)

Refer to Section TS 38 "Interlocks" for door system interlock requirements.

TS 80.10 Emergency Operation

In the event of an emergency, it shall be possible to manually open doors designated as emergency exits from inside the bus using a force of no more than 25 pounds after actuating an unlocking device at the door. The unlocking device shall be clearly marked as an emergency-only device and shall require two distinct actions to actuate. The respective door emergency unlocking device shall be accessible from the doorway area. Activation of the emergency unlocking device shall cause the concurrent application of an interlock to stop the bus. The unlocking device shall be easily reset by the Operator without special tools or opening the door mechanism enclosure. Doors that are required to be classified as "Emergency Exits" shall meet the requirements of FMVSS 217.

In the event of power failure, the doors shall include a means of activating an unlocking device to allow entry from the outside of the bus using a special tool or key.

TS 80.11 Door Control

The door control shall be located in the Operator's area within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach." The driver's door control shall provide tactile

feedback to indicate commanded door position and resist inadvertent door actuation. Door control shall be located on street side

TS 80.12 Door Controller

TS 80.12.1 Transit Bus

Five-Position Driver's Door Controller

The control device shall be protected from moisture. Mounting and location of the door control device handle shall be designed so that it is within comfortable, easy arm's reach of the seated driver. The door control device handle shall be free from interference by other equipment and have adequate clearance so as not to create a pinching hazard.

Position of the door control handle shall result in the following operation of the front and rear doors:

- **Center position:** Front door closed, rear door(s) closed or set to lock.
- **First position forward:** Front door open, rear door(s) closed or set to lock.
- **Second position forward:** Front door open, rear door(s) open or set to open.
- **First position back:** Front door closed, rear door(s) open or set to open.
- **Second position back:** Front door open, rear door(s) open or set to open.

TS 80.12.2 Commuter Bus

Not applicable.

TS 80.13 Door Open/Close

Operator-Controlled Front and Rear Doors

Operation of, and power to, the passenger doors shall be completely controlled by the Operator.

When the Master Control Switch is turned to the "Off" position and the bus is stopped with the parking brake applied the front door shall automatically open. When the Operator reenters the bus and turns the Master Control Switch to any position other than "Off", the door shall remain open until the door control handle is cycled back in the "Close" position and the parking brake is released. The front and rear doors shall remain in commanded state position even if power is removed or lost.

TS 81. Accessibility Provisions

Space and body structural provisions shall be provided at the front door of the bus to accommodate a wheelchair loading system for the widest spectrum of passengers including children, adults, the elderly, and the physically disabled. Buses shall conform to all applicable ADA regulations.

TS 81.1 Loading Systems

Bus shall utilize a low-floor fully-electrically operated preferably self-leveling wheelchair ramp system subject to LACMTA approval during proposal period.

TS 81.2 Lift

Heavy-Duty Ramp System

The wheelchair ramp control system must be capable of communicating with, and receiving commands from, vehicle multiplex system.

TS 81.3 Loading System for 30- to 60-foot Low-Floor Bus

Front Door Location of Loading System, Flip-Out Design Ramp with 1: 6 Slopes

The wheelchair loading system shall be located at the front door, with the preferably self-leveling ramp being of a simple hinged, flip-out type design being capable of deploying to the ground at a maximum 1:6 continuous slope.

An automatically-controlled, power-operated, ramp system designed to maintain minimum slope possible and compliant to requirements defined in 49 CFR Part 38, Subpart B, §38.23c shall provide ingress and egress quickly, safely and comfortably, both in forward and rearward directions, for a passenger in a wheelchair from a level street or curb.

In the stored position of the ramp, no tripping hazards shall be present, and any resulting gaps shall be minimized. The controls shall be simple to operate with no complex phasing operations required, and the loading system operation shall be under the surveillance and complete control of the driver. The bus shall be prevented from moving during the loading or unloading cycle by a throttle and brake interlock system. The loading system shall be inhibited from stowing/deploying when a passenger is on the ramp. A passenger departing or boarding via the ramp shall be able to easily obtain support by grasping the passenger assist located on the doors or other assists provided for this purpose. The system shall be designed to protect the ramp from damage and people on the sidewalk from injury during the lowering/raising phases of operation.

The loading platform shall be covered with a replaceable or renewable nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading.

Deployment or storage of the ramp shall require no more than 15 seconds. The deployment function shall be capable of providing the minimum possible continuous slope by automatically aligning the inner and outer ramp surfaces. Each operation shall require continuous manual pressure to the momentary switch by the operator and shall not allow unintentional improper access system operation. The device shall function without failure or adjustment for 500 cycles or 5,000 miles in all-weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 35 pounds of force. When manually activated the ramp shall not create a hazard for user through unintended movement of the ramp.

TS 81.4 Loading System for Level Boarding on a 45- to 60-foot Low-Floor BRT

Not applicable.

TS 81.5 Wheelchair Accommodations

General

Two wheelchair passenger parking spaces shall be provided, per applicable ADA regulations. Location of spaces shall be as close to the wheelchair ramp or system as practical. Two securement devices or systems shall secure the wheelchair or mobility aids facing toward the front of the vehicle. Two mobility aids shall face rearward.

Forward Facing

Forward facing wheelchair securement and occupant restraint systems shall be the QPod or approved equal, subject to LACMTA approval during proposal period, consisting of the self-tensioning, self-locking features on retractors, without tightening knobs. The retractors shall have the maximum amount of 7,000 pound red webbing attached to the large Transit "J" hooks.

Note: If knobs are required for operation of the system being offered, it shall be indicated at time of bid submission.

Additional equipment, including passenger restraint seat belts and wheelchair securement devices complying with all applicable provisions of 49 CFR part 571, shall be provided for the two forward facing wheelchair passengers per ADA requirements, subject to LACMTA approval during proposal period.

Rear Facing

Additional wheelchair securement devices and seat belts complying with all applicable provisions of 49 CFR Part 571; shall be provided for the two rearward facing wheelchair passengers.

Optional Third and Fourth Wheelchair Accommodations

Pricing shall be submitted for optional additional third and fourth wheelchair parking spaces. The additional spaces shall be provided per applicable ADA regulations. Location of spaces shall be as close to the wheelchair ramp or system as practical. The additional securement devices or systems shall secure the wheelchair or mobility aids facing toward the front of the vehicle.

Forward facing wheelchair securement and occupant restraint systems shall be the QPod or approved equal, subject to LACMTA approval during proposal period, consisting of the self-tensioning, self-locking features on retractors, without tightening knobs. The retractors shall have the maximum amount of 7,000 pound red webbing attached to the large Transit "J" hooks.

Note: If knobs are required for operation of the system being offered, it shall be indicated at time of bid submission.

Additional equipment, including passenger restraint seat belts and wheelchair securement devices complying with all applicable provisions of 49 CFR Part 571, shall be provided for the two forward facing wheelchair passengers per ADA requirements, subject to LACMTA approval during proposal period.

TS 81.5.1 Forward Facing Accommodations

The occupant restraints shall consist of the aisle side female retractor to be Automatic Locking Retractor [ALR] and the male or wall side retractor shall be Emergency Locking Retractor [ELR], equipped with a pin connector mounted on the tongue for attachment of the shoulder belt female fitting. The shoulder belt retractor shall be Emergency Locking Retractor [ELR], and equipped with a female pin connector, to attach to the male lap belt pin connector to form a Type 2-A lap and shoulder belt combination.

The securement system shall comply with the requirements of the Americans with Disabilities Act [ADA]. The system components shall be certified as being in compliance with the Society of Automotive Engineers, SAE J2249, Wheelchair Tie-Downs and Occupant Restraint Systems for use in Motor Vehicles.

Front Tie-Downs

The front retractors shall include a ratcheting mechanism. The retractors should be sized to accommodate large wheelchairs and be able to stabilize chairs of all types.

Rear Tie-Downs

The two rear retractors shall be equipped with a remote release, which operates both retractors simultaneously.

The retractors shall be mounted to the barrier. The spacing between the two retractors should be sized to accommodate all common wheelchairs, regardless of size.

Remote Release, Paddle Handle

The paddle handle remote release shall be mounted in either the front face of the barrier assembly, near the aisle side or in the forward facing flip-up seat bottom, near the aisle side, depending on the seating configuration.

Retractor Guards

Kick plates or retractor guards shall be installed to guard the retractors from being damaged or depressed by passengers seated behind or adjacent to the wheelchair area.

Guards must be of adequate strength to prevent bending or distortion when used as passenger footrests.

The system shall incorporate storage positions for the wheelchair tie-downs that allow easy access by users and keep the belts clear of the floor.

Occupant Restraints

The aisle side female lap belt retractor of ALR type should be mounted adjacent to or preferable on the same mounting bolt as the aisle side tie-down retractor. The red release lever should be accessible to the operator if release is necessary.

The wall side, male retractor of ELR type, should be mounted adjacent to or preferable on the same mounting bolt as the wall side tie-down retractor. This will ensure that the occupant lap belts may pass through the space between the wheelchair arms and backrest or between the backrest and seat bottom and be allowed to bear directly on the bony structure of the occupant's body or pelvic area.

Occupant restraints shall NOT be mounted in such a manner that belts must pass over wheelchair armrests, side panels, seat backs, barriers, through "D" rings, or other devices that will prevent the belts from following the proper path from the retractor to the occupant.

Male Lap Belt Stowage

A stowage device for the male lap belt Anchorage Adaptor should be mounted on the bottom of the side facing flip-up seat, to attach the male lap belt buckle or tongue when not in use. It should be mounted so it is easily accessible to the wheelchair occupant and/or the Operator.

Shoulder Belt

The shoulder belt retractor of ELR type should be mounted directly to the restraint assembly.

User Instructions

A durable metal instruction plate, describing the operation of the wheelchair securement and occupant restraint systems, shall be placed in an obvious location within the wheelchair securement area.

TS 81.5.2 Rear Facing Accommodations

The securement system shall be placed as near to the accessible entrance as practicable and shall have a clear floor area of 30 inches by 48 inches. Such space shall adjoin, and may overlap, an access path. Not more than six inches of the required clear floor space may be accommodated for footrests under another seat provided there is a minimum of nine inches from the floor to the lowest part of the seat overhanging the space. Fold down seats may be incorporated to accommodate other passengers when a wheelchair or mobility device is not occupying the area.

The securement system shall secure common wheelchairs and mobility aids and shall either be automatic or easily deployed by a person familiar with the system and mobility aid and having average dexterity.

The padded barrier shall extend from a height of 38 inches from the vehicle floor to a height of 56 inches from the vehicle floor with a width of 18 inches, laterally centered immediately in back of the seated individual. Fabric covering on the padded barrier shall be blue, subject to LACMTA approval. The barrier need not be solid provided equivalent protection is afforded.

TS 81.6 Interior Circulation

Maneuvering room inside the bus shall accommodate easy travel for a passenger in a wheelchair from the loading device and from the designated securement area. It shall be designed so that no portion of the wheelchair protrudes into the aisle of the bus when parked in the designated parking space(s). When the positions are fully utilized, an aisle space of no less than 14 inches shall be maintained. As a guide, no width dimension should be less than 34 inches. Areas requiring 90-degree turns of wheelchairs should have a clearance arc dimension no less than 45 inches, and in the parking area where 180-degree turns are expected, space should be clear in a full 60-inches diameter circle. A vertical clearance of 12 inches above the floor surface should be provided on the outside of turning areas for wheelchair footrest.

TS 82. Wheelchair Lifts (Commuter Bus)

TS 82.1 Lift

Not applicable.

TS 82.2 Lift Door

Not applicable.

TS 82.3 Lift Width

Not applicable.

TS 82.4 Lighting Requirements

Not applicable.

TS 82.5 Securement System

Not applicable.

TS 82.6 Roof Ventilation/Escape Hatches

One roof ventilator with lanyard / tether shall be provided and designed to perform as escape hatches in the roof of the bus. The ventilator shall be easily opened and closed manually. Ventilator with lever type release handle is not permitted. When open with the bus in motion, this ventilator shall provide fresh air inside the bus. The ventilator shall cover an opening area no less than 425 sq. inches. and shall be capable of being positioned as a scoop with either the leading or trailing edge open no less than four) inches, or with all four edges raised simultaneously to a height of no less than 3.5 inches. An escape hatch shall be incorporated into the roof ventilator. Roof ventilator shall be sealed to prevent entry of water when closed.

SIGNAGE AND COMMUNICATION (TS 83-TS 87)

TS 83. Destination Signs

An automatic electronic bright white LED destination sign system shall be furnished on the front, on the curbside near the front door, on the right-front windshield area and on the rear of the bus. The destination signs on the front and front curbside shall be bright white high definition. Display areas of destination signs shall be clearly visible in direct sunlight and/or at night. Sign system shall provide optimum visibility of the message display units for passengers and shall meet applicable ADA requirements.

The destination sign compartments shall meet the following minimum requirements:

- Compartments shall be designed to prevent condensation and entry of moisture and dirt.
- Compartments shall be designed to prevent fogging of both compartment window and glazing on unit itself.

- Access shall be provided to allow cleaning of inside compartment window and unit glazing, subject to LACMTA approval in Pre-Production meetings.
- Front window exterior display area shall be sized to allow full visibility of the front destination sign.

Destination signs shall be installed in such a manner as to facilitate easy access and replacement of the entire sign assembly, or components. Components such as electronic control modules shall be replaceable from inside the Bus. Where possible, parts shall be commercially available.

All signs shall be controlled via a single human-machine interface (HMI). In the absence of a single mobile data terminal (MDT), the HMI shall be conveniently located for the bus driver within reach of the seated driver.

The HMI shall include an Ethernet port. Alternatively, the designation sign devices shall be 802.11 Wi-Fi compliant.

Optional Full Color Destination Signs

Pricing for optional full color signs in; Front, Side, Rear and Run Number locations, shall be submitted on Price Form PF-1, Schedule of Optional Vehicle Configuration. The signs shall be capable of utilizing the full color spectrum for displaying characters and background with adjustable resolution to provide optimum clarity for passengers reading the messages. The color signs shall meet all sections of TS 83 requirements for white signs where applicable.

Front Destination Sign

The front destination sign shall have no less than 4,800 pixels, 24 rows by 200 columns, with a message display area of not less than 8.01 inches high by not less than 64.6 inches wide.

Side Destination Sign

Side display area shall have no less than 1,568 pixels, 14 rows by 112 columns with a message display area of not less than 4.3 inches high by not less than 41.6 inches wide. The sign located near the front door shall not block the driver's critical horizontal line of sight.

Rear Route Number Sign

The route number display area shall have no less than 768 pixels, 16 rows by 48 columns with a message display area of not less than 6.1 inches high by not less than 17.0 inches wide. The rear route number sign shall be located a minimum of 90 inches above ground on the curb side rear corner of the Bus.

Destination Sign Control

Power to the sign system shall be controlled by the Bus "Master Run" switch. Sign system shall be operable in all switch positions except "Off".

Destination messages, route designations, and public relations messages shall be independently selectable via the Operator's Control Unit (OCU) which shall include a display monitor. The OCU shall communicate to the main processor board via a standard RS 485 serial bus and SAE J1708. Software shall be capable of programming 10,000 message lines. The number of public relations messages shall be limited only by the remaining number of message lines not used for destination purposes. The three-digit destination code shall accept all hexadecimal numbers (i.e. 0-9, A, B, C, D, E, & F).

The rear route number sign shall be controlled by the same OCU that operates the destination signs. The OCU display monitor readout shall show the exact information displayed on the destination signs and route number sign.

Sign displays shall have alternating message capability with programmable blanking time between message lines as may be required. Variable blanking times shall be programmable between 0.5 to 25 seconds in duration. Each line message or blanking time for each message shall be individually programmable. The

message display units shall incorporate an automatic blanking feature that will cause the display area to blank within 30 seconds of the bus master power switch being turned "Off".

An emergency message shall be initiated by the closure, or opening, of a dry contact switch or relay. The emergency message shall be displayed on the exterior of the bus only. The OCU shall not display the emergency message. The destination sign shall automatically resume normal operation only after battery power to the destination sign system is removed and restored through the battery disconnect switch.

Destination Sign Programming

The electronic sign system shall be programmable via an integral connector located in the front destination sign area. Software shall be furnished for programming the sign system via an IBM compatible lap-top computer. Software shall be capable of providing a high degree of flexibility to create, or select preprogrammed, fonts and graphic displays. The sign shall have the capability of being programmed in the field using a PC or field programmer. Message program information shall be transferable to and/or from the field programmer device, via a USB 2.0 or better.

The LACMTA shall provide the Contractor with a complete listing of destination sign readings for initial sign programming by the manufacturer.

Run Number Sign

A three-character electronic run number display shall be provided at a LACMTA approved location in the right front windshield. All three character spaces shall have the capability to display 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 and X readings.

TS 84. Passenger Information and Advertising (Transit Bus)

TS 84.1 Interior Displays

Provisions shall be made on the rear of the driver's barrier or equipment box located on the wheel well for a frame to retain information such as routes and schedules.

A total of two information "Take One" boxes and one minimum "Take Twelve" unit shall be supplied. The "Take One" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the "Take Twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval in Pre-Production meetings.

Advertising media 11 inches high and 0.09 inch thick shall be retained near the juncture of the bus ceiling and sidewall. The retainers may be concave and shall support the media without adhesives. The media shall be illuminated by the interior light system.

TS 84.2 Exterior Displays

Not applicable.

TS 85. Passenger Stop Request/Exit Signal

TS 85.1 Transit Bus

A "Stop Requested" message shall be displayed on AVA message sign in yellow or amber LED when the passenger "Stop Requested" signal system is activated. The "Stop Requested" message shall remain visible until one or both passenger doors are opened. The message shall be visible to the seated passengers. A switch to deactivate the signal system shall be provided on the Operator's control panel.

A minimum of 12 wireless stop request signal buttons utilizing a yellow housing shall be evenly distributed in the passenger cabin to be functionally accessible to all seated passengers subject to LACMTA approval in Pre-Production meetings. The buttons shall not incorporate internal battery power to operate and shall include, as part of the system, a means to easily troubleshoot failures. Of those, one each stop request button shall be

located after the standee line above the front wheel wells on the vertical stanchion and on the ITS enclosure. Stop Request buttons in the ADA and senior seating areas shall be located 45 inches above the floor. Two additional Stop Request buttons shall be placed in senior seating area.

TS 85.2 Commuter Bus

Not applicable.

TS 85.3 Signal Chime

TS 85.3.1 Transit Bus

A single "Stop Requested" chime shall sound when the system is first activated. A double chime shall sound anytime the system is activated from wheelchair passenger areas.

Buttons for exit signals located in the wheelchair and senior passenger areas shall be no higher than four feet above the floor. Instructions shall be provided to clearly indicate function and operation of the exit signals.

TS 85.3.2 Commuter Bus

Not applicable.

TS 86. Communications

An equipment enclosure shall be provided to accommodate installation of LACMTA provided equipment, such as the LACMTA's radio system and future ITS equipment. The ITS enclosure shall include a minimum of four modular slide out trays which are easily removable and can be repositioned to accommodate changes in equipment position as needed. The existing ATMS radio requires a clear space above the bottom slide out tray with a minimum of 15 inches high, 19.5 inches wide, and 25 inches deep. The clear space above the second and third slide out trays shall be sized to accommodate Contractor supplied DVR and other equipment. Unless otherwise specified, additional ITS equipment provided and installed by the Contractor shall also be installed within the ITS enclosure. The enclosure shall be located directly behind the Operator's area on the street side wheel housing.

The ITS enclosure shall be as large as practical to facilitate future expansion of ITS equipment. The ITS enclosure shall be splash-proof and properly ventilated when the service door is secured. Slide out trays shall incorporate heavy-duty slide or roller mechanism to support a minimum of 150 pounds of loading and shall be able to withstand the normal shock and vibration, (under full load) experienced in LACMTA revenue service, without damage to the locks, slide or roller mechanisms. Slide out trays shall have locking mechanisms which automatically lock the trays in the stored and extended positions. Once a tray is locked, slides shall not have any horizontal play. L-shaped aluminum plate shall be mounted on the bottom tray to secure ITS equipment. LACMTA shall provide sample slide out trays with L-shaped plate during Pre-Production meetings.

Service light(s) with suitable switch shall be provided within the enclosure, subject to LACMTA approval in Pre-Production meetings. The Contractor shall provide 12-volt power outlet in the ITS Compartment.

Communication System Integration

All bus subsystems shall be integrated to the maximum extent feasible with Metro's existing on-board communication systems. This may include using J1708 and J1939 CAN-Bus vehicle network, Wi-Fi and cell modem(s), Bluetooth, or Metro's ATMS voice and data radio VHF communication system. Sub-systems should avoid using designs that require the use of new, stand alone, dedicated and/or proprietary communication networks. Sub-systems should also avoid using fee based subscription services for communication or data processing. Other factors being equal, preference will be given to subsystems that take advantage of existing Metro vehicle communication infrastructure and management systems.

All on-board systems that use a date/time stamp for incident or fault code tracking should be designed to automatically synchronize with other on-board systems through a recognized communication standard such as

SAE J1939, and/or be synchronized to the recognized standard for time synchronization (such as "GPS" time). To the extent practical, when a GPS reference is used, the various systems shall share a common antenna or signal.

TS 86.1 Camera Surveillance System

An automatic digital video recording system shall be provided powered directly from batteries, bypassing the Master Battery Disconnect Switch(es), to operate (record images) at all times with the Master Control Switch in any position except "Off". The system shall operate up to one hour (independently programmable) after the Master Switch is turned off. The system shall be self-initiating and operate at any time, with the Master switch in any position, including "Off", if triggered by the activation of the Bus SAS. When triggered, the system shall tag images (write protect) to prevent overwrite.

All cameras must automatically adjust to light changes to capture images that have sufficient clarity at night, with bus lights on and off. A day-to-night demonstration shall be required to establish camera performance and final placement for optimum views and clarity. The LACMTA shall witness the demonstration and approve the final placement of the cameras. This demonstration must be successfully completed prior to approval of the Pilot Bus(es).

The types (part numbers), of cameras shall be minimized with a single camera type for interior, and a single camera type for exterior of Bus. Exceptions to this requirement shall be considered on a case-by-case basis during Pre-Production meetings.

Interior Cameras

The camera housing shall be vandal resistant but allow access for routine servicing. Field of view of the cameras shall be adjusted with a 60 degree vertical and 60 degree horizontal without relocating the camera. Each camera shall be IP type color images. Front interior camera(s) at front door passenger boarding area shall record audio subject to LACMTA approval during Pre-Production meetings.

Cameras shall be placed for best recording of the following five areas:

- a) Forward 1/3 of passenger area, view of front vestibule, farebox transactions and field-of-view to include Operator and image of bus number located on Operator's barrier.
- b) Front door, passenger boarding.
- c) Rear door, passenger exiting.
- d) Middle 1/3 passenger area.
- e) Rear 1/3 passenger seating area starting from behind rear door with a primary emphasis on the rearmost seats.

Interior Camera Monitors

A video monitoring system including two, color, LCD video monitors with a minimum 15 inch diagonal dimension and all necessary brackets, cabling and other equipment needed for installation shall be provided to allow passengers easy viewing of video images captured by existing interior bus cameras. Monitors and equipment shall be installed in compliance with Driver Provisions, Controls and Instrumentation (Refer to Sections TS 46 -TS 48) and any applicable ADA or safety standards.

The first monitor shall be mounted above the driver's area facing the entrance door and display a live video feed of the passengers boarding the bus.

The second monitor shall be mounted in passenger area of the bus facing the rear of the bus and display a live video feed of the passengers riding on the bus including those in wheelchair securement areas.

The monitors shall be of a ruggedized design intended for use in a transit bus environment including suitable protection from overvoltage and spikes generated from jump starts, shorts, etc. Monitors and equipment shall

not be installed in a manner or located such that the performance or life of the components or system will be shortened when operating within the design operating profile.

Monitors shall include a replaceable shield or durable film over the monitor screens to protect them from vandalism. This sacrificial layer shall be replaceable in 5e minutes or less using simple hand tools.

Monitor enclosures and screens shall not be affected by periodic cleaning using commercially available cleaning agents, solvents and other chemicals used for removal of graffiti.

Exterior Cameras

Cameras shall be IP type, rated for water spray and submersion, (IP65 and IP67), housed in impact resistant, moisture resistant, low profile housings which do not protrude more than 2.5 inches from the bus body. If used, a cover placed over the camera lens shall be glass. Curbside camera housings shall be ruggedized to protect from impacts with trees and other objects encountered during routine service. This shall include a supplemental metal shield if necessary to meet this requirement. The camera circuitry and lens shall be easily replaceable from inside the bus or by removing the housing from outside the bus using common hand tools. Camera positions and adjustment are subject to LACMTA approval at Pilot Bus. Reusable waterproof seals to prevent water damage to the camera and circuitry shall be provided which will not require the use of additional sealant such as silicon after servicing the camera. The system shall be designed or configured such that the failure of any individual camera will not affect operation of the remaining cameras.

Cameras shall be placed for best recording of the following four areas:

- a) Forward looking through windshield (Accident Surveillance)
- b) The curb side area of the bus, (including exit door), and street from 10 feet beyond front bumper to 10 feet beyond rear bumper
- c) Street side area of the bus and street from ten feet beyond the front bumper to 10 feet beyond the rear bumper
- d) Rear camera shall view the ground behind the bus from the bumper to approximately 25 feet back when gear select is placed in "Reverse" position.

Forward Accident Surveillance Camera

The forward looking surveillance camera shall be positioned to obtain images of the exterior front of the bus and forward approximately 100 feet of roadway to record images in the event of an accident.

Camera Monitor

Dash mounted monitor for viewing of selected camera images when; gear selector is placed in "Reverse" or passenger doors are open. Monitor shall be user configurable and capable of simultaneous display of images from multiple cameras. Final monitor configuration is subject to LACMTA approval during Pre-Production meetings

Central Processor

The video security system central processor shall be packaged in a suitable ventilated, shock mounted and splash resistant enclosure keyed to LACMTA standards, located within the ITS enclosure, subject to LACMTA approval in Pre-Production meetings. Images shall be stored by the system on a removable mobile rated hard drive provided with a security lock typical to the existing LACMTA base station.

Images stored on the hard drive shall be organized for automatic transmittal via a digital modem. The hard drive shall have capacity to store a minimum of 240 images per second for 30 continuous days (18 hours per day) before automatic overwrite occurs.

The DVR shall be capable of recording in multiple formats including JPEG and in H.264 compression with up to D1 resolution to avoid loss of detail on zoomed images. The DVR must be able to switch record rate,

compression and resolution seamlessly without loss of video during transition. System shall be capable of accepting both analog NTSC and high definition wide dynamic range IP cameras.

All image requests and subsequent downloaded files shall have the capability to be stored on a hard drive. The hard drive shall be easily removed and video files viewed at a separate location equipped with the same drive mechanism.

System Management Tool

Central Processor shall utilize GPS data to synchronize system time and tag video files with location coordinates allowing files to be searched on a geographic location basis using the System Management Tool. Camera Surveillance System shall utilize a WLAN compatible with wireless networks in use at LACMTA divisions and shall incorporate a system management tool for; wireless download of video files in a timely manner, software upgrades, camera checks, configuration changes and health reports as required. Final configuration is subject to LACMTA approval in Pre-Production meetings.

System management tool shall be a virtual implementation and provide expansion capability including compatibility with existing video management applications at LACMTA.

In addition, System Management Tool shall:

- Be configured to run in Master-Slave mode under Virtual Box.
- Provide the ability to replicate user accounts and passwords from Master to Slave.
- Include provisions for future application authentication to Metro Microsoft Active Directory.
- Allow user management at Master server and all Slave servers with inherent accounts from Master.
- Backup the restore virtual image via the host operating system to last backup state.
- Support Metro Enterprise backup and archive management tools such as IBM Tivoli.
- Support use of Metro's MS Windows 2008 R2 approval image on host servers with Metro domain and security policies.
- Allow NAS storage at remote sites.
- Include OS and application security and patch management process.
- Be optimized for hardware utilization in shared computing resources with Orbital DIS.

Given the current Metro wireless specification, Camera Surveillance System shall be able to wirelessly download 30 minutes of video in less than 30 minutes.

WLAN shall also be capable of transmitting encrypted video images or files on a real-time basis to a laptop PC held by law enforcement personnel adjacent to or behind the bus. DVR status and event data shall also be made available through J1708/1587 interface to ATMS VAN. DVR shall be individually programmable to record each camera sequentially.

The system management tool for use at up to 13 LACMTA operating divisions shall be provided, subject to LACMTA approval in Pre-production meetings.

Enhanced Video Recording System Option

Pricing for optional features to enhance the video recording system shall be provided on Price Form PF-1, Schedule of Optional Vehicle Configuration. The features shall include items listed below along with any other enhancements that Contractor believes would improve functionality and ease of use for the video recording system.

- Ability of video system to analyze and discern events such as wheelchair passengers and generate report information with summary data such as wheelchair passenger count and boarding/alighting locations, subject to LACMTA approval.
- The ability to utilize the dash mounted display for diagnostic work or configuration changes on the DVR.
- Incorporation of a 360 degree camera(s) for better surveillance of bus interior.

TS 86.2 Public Address System

Contractor shall install a public address (PA) system which enables the Operator to perform audible announcements. A switch shall be provided to allow the Operator to select announcements either inside, outside, or both. The location of the gooseneck microphone is subject to LACMTA approval in Pre-Production meetings.

PA Amplifier

The PA amplifier shall be supplied in the ITS compartment convenient for adjustments (Refer to Section TS 88.1 Approved Equals). The amplifier shall be supplied with a 12-volt DC switched service. The amplifying system shall be balanced such that no adjustment of volume is necessary when switching from inside to outside. The system shall automatically mute when not in use.

Gooseneck Microphone

A microphone shall be mounted on a heavy-duty black anti-glare gooseneck with quick release input jack. The gooseneck microphone shall be mounted in a position to allow the operators' to comfortably speak without using their hands. The microphone, when deployed, shall remain stable in its' position and be easily adjusted by the Operator to reach approximately four inches from their mouth, in all normal seat adjustment positions. A strain relief (p-clip or equal) shall be installed near the base as needed to prevent a gooseneck failure when the microphone is pulled to its adjustment limit. A padded bracket shall be provided to support the gooseneck when not in use.

TS 86.2.1 Speakers

Interior and exterior speakers shall be of sufficient capacity to ensure that they are not damaged when full amplified power is applied. Inside speakers shall broadcast, in a clear tone, announcements that are clearly perceived from all seat positions at approximately the same volume level. Speakers shall be located in the light panel/HVAC duct to deter vandalism. The speakers shall not be mounted directly on the surface of the ceiling panels. A weather-proof speaker(s) shall be provided outside the bus so that announcements can be clearly heard by passengers standing near the door equipped with the wheelchair access. Interior loudspeakers shall be installed with proper phasing. Total impedance seen at the input connecting end shall be 4 to 8 Ohms. Mounting shall be accomplished with riv-nuts and machine screws.

Speaker wires from each individual speaker (inside and outside) shall terminate in the ITS enclosure.

TS 86.3 Automatic Passenger Counter (APC)

Provisions and necessary cables for installation of door sensors and analyzer(s) for IRMA-Matrix with J1708 infrared APC system; including software integration, testing, first article acceptance and any other items necessary for proper operation shall be provided, subject to LACMTA approval in Pre-Production meetings.

TS 86.4 Radio Handset and Control System

Make Ready Provisions

The Contractor shall provide "Make Ready Provisions" that will accommodate post-delivery installation of LACMTA provided equipment such as radio and future Intelligent Transportation System (ITS) equipment. Detail design of the ITS Make Ready Provisions shall be finalized during Pre-Production meetings and Pilot Bus build. Make Ready Provisions shall be approved by the LACMTA prior to start of production. The provisions shall include specified equipment, (such as antennas and preinstalled cabling), space for LACMTA provided ITS equipment, power supply circuits, conduit system, and structural mounting provisions.

The following devices are to be included in the LACMTA's ITS system for installation by the LACMTA after delivery of the bus:

- a) Voice Radio.
- b) Data Radio.

- e) AVA System Processor (Part of In Vehicle Unit (IVU)).
- d) Automatic Passenger Counting (APC) Processor.
- e) Automatic Passenger Counting (APC) Door Sensors.
- f) J1708 Vehicle Area Network Controller (Part of IVU)
- g) Driver Control Module (DCM).
- h) Automatic Vehicle Locator (AVL) Processor (Part of IVU).

TS 86.4.1 Drivers Speaker

Not applicable.

TS 86.4.2 Handset

Contractor will supply and install a handset for driver use. (Refer to Section TS 88.1 Approved Equals).

TS 86.4.3 Driver Control Module (DCM)

Space and mounting provisions shall be provided for an ATMS Driver Control Module (DCM) (Orbital Sciences 111240-1DCM). The DCM installation provisions shall appear as an integral part of the operator area design. The location of the DCM shall provide the Operator with a free and unobstructed view of the DCM controls/display and be within easy reach of the Operator. The DCM shall be positioned to minimize glare and maximize readability in all lighting conditions and Operator seat positions.

Provisions for the DCM shall accommodate the following specifications:

TABLE 12
DCM Specifications

Property	Specification
Maximum height:	8 inches
Maximum width:	8.7 inches
Maximum depth:	3.1 inches
Housing:	Splash proof and UV resistant
Shock tolerance:	18g for 3 ms
Vibration tolerance:	4g peak rms @ 5 to 150 Hz

Contractor shall install a driver display unit as close to the driver's instrument panel as possible.

TS 86.4.4 Emergency Alarm

Contractor shall install an emergency alarm that is accessible to the driver but hidden from view. The guarded Silent Alarm System (SAS) switch shall be mounted on control panel located to the left of seated Operator, (Refer to Section TS 88.1 Approved Equals). The four-corner clearance lamps shall flash when the SAS is activated. Two 16ga leads, (color to be determined during Pre-Production meetings), shall be wired to the normally closed SAS switch terminals and routed to the ITS Equipment enclosure. SAS switch location and lead wire routing is subject to LACMTA approval in Pre-Production meetings.

TS 86.5 ITS Provisions Power Supply

The ITS enclosure shall be provided with protected power buss circuits for the future LACMTA installed ITS equipment. These power requirements are in addition to Contractor provided equipment power requirements. Each power buss will include mounting provisions for up to six individual manual resetting circuit breakers for branch circuits feeding equipment located within the enclosure.

TABLE 13
ITS Power Provisions

Source	Volt	Circuit	Quantity
Through Battery Disconnect Switch(es)	12	20-amp, DC	1
	24	20-amp, DC	1
	Gnd	Return for 20 amp circuits	1
Ignition	12	10-amp, DC multiplex controlled circuit.	2
	24	10-amp, DC multiplex controlled circuit.	2
	Gnd	Return for switched circuits	2

TS 86.6 ITS Provisions Conduits

A system of pre-installed “ITS conduits” will be provided to assist with future installation and replacement of wiring and cabling associated with the LACMTA’s ITS equipment listed in TS 86.4. ITS Conduits, in conjunction with existing bus wire ways, will be required where future LACMTA installation and replacement of cabling is not practical due to obstructions from items such as interior paneling, bus structure or other assemblies. In general, conduits exposed to the interior of the bus shall be water tight and have a minimum 1.5 inch inside diameter and be routed to permit pulling cables, including connectors, through the conduits using a preinstalled “pull wire”. Conduits will be terminated at the ITS enclosure using suitable reusable water tight fittings. Conduit installation shall follow best commercial practices with regard to drip loops and routing to avoid moisture problems.

Conduits, in conjunction with existing bus wire ways, shall permit interconnection of ITS sub-systems and devices as follows:

TABLE 14
ITS Conduits

From	Termination
Antenna, Data Radio Transceiver	ITS Enclosure
Antenna, GPS Receiver	ITS Enclosure
Antenna, Voice Radio Transceiver	ITS Enclosure
Antenna, Wireless LAN	ITS Enclosure
Antenna, Two spare positions	ITS Enclosure
APC Door Sensors, Front Door	ITS Enclosure
APC Door Sensors, Rear Door	ITS Enclosure
Engine Control Processor	ITS Enclosure
Exterior Speaker	ITS Enclosure
Farebox	ITS Enclosure, 1” ID
Front Dash	ITS Enclosure
Head sign Compartment	Front Dash
Interior Information Sign, Front	ITS Enclosure
Interior Information Sign, Rear	ITS Enclosure
Interior Speakers	ITS Enclosure

Operator Control Unit, Operator Dash	ITS Enclosure
PLC Compartment	ITS Enclosure
Radio Control Head	ITS Enclosure, 2 ¼ " ID
Security System Processor	ITS Enclosure
Transmission Control Processor	ITS Enclosure
Upper Center Windshield	ITS Enclosure, 1-1/2" ID

TS 86.7 Provisions, Automated Vehicle Announcement (AVA) System

Structural provisions and necessary cables shall be provided in the ceiling to install two AVA signs constructed to withstand the heavy-duty environmental and service conditions found in transit operations. The front sign shall be located near the standee line. The rear double-sided sign shall be positioned adjacent to the exit door and forward of the interior steps.

Both the front and rear double-sided signs shall be installed by Contractor.

TS 86.8 ITS Provisions, Wireless Local Area Network (WLAN)

WLAN antenna, including five leads; two Cellular, two Wi-Fi and one GPS and an additional Wi-Fi antenna inside the bus for passenger. Sierra Wireless, InMotion MG90 or an approved equal wireless router/switch and feedline shall be installed, subject to LACMTA approval in Pre-Production meetings. (Refer to Section TS 88.1 Approved Equals). Router shall include gateway activation and client license fees as well as preferred AS, AMM with 3-year and group 2 per gateway. Power for wireless router/switch shall be independently timed by the router to allow automatic turn-off one hour or more after bus is parked as a configurable feature of the router.

TS 86.9 ITS Provisions, Radio Antennas

Provide two Antenna Specialists (508 MHz and 900 MHz) radio antennas for voice and data radios. The antennas should have a feedline of RG-142 signal loss and physical quality specifications or better. The antennas shall be attached to the roof with antenna leads routed through 3/4-inch inside diameter conduits to the ITS enclosure. Antenna leads shall be type RG142 coaxial cable connected at the antenna by a soldered type N connector and 90-degree type N adapter with a minimum four-inch service loop. A type N soldered connector and a RG142 reducer shall be supplied for the radio connections in the ITS enclosure. The antenna mounting and lead termination shall be accessible from the Bus interior, subject to LACMTA approval in Pre-Production meetings. Antennas shall not be painted. (Refer to Section TS 88.1 Approved Equals).

TS 86.10 ITS Provisions, Global Positioning System (GPS)

A Global Positioning Satellite (GPS) Antenna and feedline shall be provided. The GPS Antenna shall be mounted on the centerline of the roof of the bus near the front, with a quick connector, within two feet from the antenna, for future replacement, subject to LACMTA approval in Pre-Production meetings. Refer to Section TS 88.1 Approved Equals.

TS 86.11 ITS Provisions, Incident Based Surveillance System (IBSS)

Complete mounting provisions, modules and necessary cables for the most current LACMTA IBSS, (SmartDrive), shall be provided running from the center windshield area to the ITS enclosure, permitting installation of EDR and completion of system by the bus manufacturer. All modules including SmartDrive SR3 for EDR shall be supplied by Contractor through existing SmartDrive Contract for installation by Bus manufacturer. Battery and ignition power and a separate J1939 communication connection shall be supplied in the ITS enclosure, subject to LACMTA approval in Pre-Production meetings.

TS 87. Event Data Recorder (EDR)

EDR shall be installed on the bus. The unit shall be installed as low as possible. The EDR shall be able to communicate over the J1939 CAN line and shall be equipped with three-axis accelerometer. The system shall be capable of recording available fault codes including DM1 messages. Settings are to be finalized with the LACMTA during Pre-Production. The EDR shall broadcast via the J1939 data communication link severe impact events to the vehicle monitoring system and also trigger an event in the camera system. The EDR shall also tag an event from a signal received over the J1939 CAN line from the silent alarm switch signal and the camera event button and in turn broadcast these events to the vehicle monitoring system. The EDR shall also record the following operational data:

- Head lights on or off.
- Turn signals and hazard lights on or off.
- Ignition on or off.
- Low air pressure warning.
- Whether moving in forward or reverse or idling.
- Parking brake is on or off.
- Retarder switch on or off
- Brakes – Stopping Distance
- Vehicle Acceleration/Deceleration
- HVAC operating information
- Entrance and Exit Doors operating information.

TS 88. Appendix

TS 88.1 Approved Equals

The following table lists products which have been approved for the bus procurement. The list only contains products which are of interest to the LACMTA and is not intended to be a comprehensive listing of every product which is required for the manufacture of the subject buses. Product categories not listed are left to the discretion of the Contractor so long as the product complies with the specifications. Product specification information is for reference only and may not reflect the latest or future improvements by manufacturers. Any change, revision, or substitution of specified products requires approval of the LACMTA. To add to or revise this list, Contractor must submit a written request per the Specification by the due date found in the RFP for approved equals.

TABLE 15
Approved Products

PRODUCT	MANUFACTURER	PRODUCT SPECIFICATION
Air Coupling	AMFLO	CP1, CP2, C1, C2
Air Coupling	Tru Flate	12-124, 13-124, 12-134, 13-134
Air Coupling	Parker	2C, 3C, B12, B13
Amplifier, PA	Motorola Solutions Inc.	120039-2
Antenna, Data Radio	Antenna Specialty Co.	ASPRC-572MOT, 508 MHz
Antenna, GPS	ACS Transport	120076-4
Antenna, Voice Radio	Antenna Specialty Co.	ASPG931MOT, 900 MHz
Antenna, WLAN	Mobile Mark	RM3-2400
Drain Plug, Dry Brake	FEMCO	As needed
Farebox – Reference only	GFI Odyssey	C24003-0501FB
Farebox Baseplate	GFI Odyssey	D22581-0003

PRODUCT	MANUFACTURER	PRODUCT SPECIFICATION
Fluid, Rear Axle		Full Synthetic
Fluid, Transmission		Full Synthetic
Fuel Receptacle, fast fill	OPW	CL50
Fuel Receptacle, slow fill	OPW	LB36
Jumper Receptacle-24 Volt	Whitaker	3298
Microphone	REI	
Radio Handset	Motorola	P/N12004-8
Registration Holder	Truck-Lite	97960
Seat Insert Fabric	Holdsworth	Sunrise/Sunset
Seat Insert Fabric	LaFranch King's Plus Fabric	Sunrise/Sunset
Seat Insert Fabric		Blue
Silent Alarm Switch	Microswitch	Part No. 4TL 1-3 with spring loaded black
Take-One Box	Beemak Plastic	BP-750-CT
Minimum Take-Twelve Box	Transit Information Products	407160
Trip Recorder (Replaces Hubodometer)	FleetWatch	JX55
Wireless Router (Wi-Fi System)	Sierra Wireless	InMotion, MG90
Wireless Router AMM	Sierra Wireless	9010230
Wireless Router Gateway activation	Sierra Wireless	IMTSER524
Wireless Router Client License	Sierra Wireless	9010208

TS 88.2 Maintainability Requirements

Mean Time to Fix

Maintenance requirements stated in mean time to fix (MTTF) are established below in Table 16. Unless otherwise indicated, these figures represent the total elapsed labor time (hours/minutes) required to complete the maintenance task by one mechanic. The figures do not include time required to prepare the bus such as bringing the bus to the hoist, raising it, etc.

The Contractor shall be required to demonstrate these maintenance tasks using the information as contained in the Service and Parts manuals. The demonstrations shall be conducted on the Pilot Bus and may occur at LACMTA facilities. Should a failure of a demonstration occur, the Manufacturer may be required to modify its bus design or service manual information as necessary and re-demonstrate the procedure on the Pilot Bus. The purpose of these demonstrations is to validate the maintenance manual, special tool requirements, and MTTF.

TABLE 16
MTTF

SERVICE TASK	MTTF (hrs./min.)
INSPECTION:	
6,000 Mile Inspection	7.5 hr.
Daily Inspections	10 min.
Brake Inspection	15 min.

SERVICE TASK	MTTF (hrs./min.)
REMOVE AND REPLACE:	
A/C Blower Motor	1 hr.
A/C Condenser Motor	1 hr.
Alternator	2 hr.
Access for Door Motor Adjustment	< 2 min.
Air Compressor	2 hr.
Air Dryer Desiccant	15 min.
Batteries Set	45 min.
Brake Application Valve	1 hr.
Engine/Transmission PPA (2 mechanics)	6 hr.
Engine ECM	2 hr.
Exterior Mirror Glass	< 5 min.
Headlining Panels, Interior individual (less handrails)	< 30 min.
Power Steering Gear Box Assembly	2 hr.
PPA mounts, complete set	2 hr.
Radiator (2 mechanics)	3 hr.
Seat Insert	< 1 min.
Shocks, Each	45 min.
Starter	1.5 hr
Transmission unit	8 hr.
Wheel Change, Front	45 min.
Wheel Change, Rear Dual	60 min.
Window glazing, Passenger	60 min.
Window guard, Passenger and Door	6 min.
Wiper Motor	20 min.
Operators Seat	30 min.
Electronic Unit (Regulator, PLC Module, Relay, Fuse, etc.)	15 min.
Lamps, Passenger Lights	15 min.

Mean Miles Between Failures

Table 17 lists minimum design goals for mean miles between failures (MMBF) on critical areas of bus.

TABLE 17
MMBF Goals

Type	Description	Design Goal
Class 1:	Physical Safety	Mean distance greater than 1,000,000 miles
Class 2:	Road Call	Mean distance greater than 10,000 miles
Class 2:	Stalling	Mean distance greater than 50,000 miles
	Interlock, F/R Doors	

	No Start	
	SEL/CEL	
	Diagnostic Light	
	Electrical failure	
	Stalling	
	Low Air	
	Suspension	
	HVAC	
	Charging System	
	Pneumatic System	
Class 2:	ADA- Ramp, Securement	Mean distance greater than 75,000 miles

TS 88.3 Technical Contract Deliverables

Contractor shall provide a table of contract deliverables, documentation and/or demonstrations as scheduled in the Contract documents during the proposal period. See Table 20 attachment for reference on technical submittal items.

Test Procedures

Contractor shall submit an overall test procedure for each design qualification and conformance/acceptance testing for approval to LACMTA at least 30 days prior to the scheduled date of the test. The Contractor shall provide all equipment and instrumentation required to conduct the tests. Along with the title referencing the specification requirement, the test procedure shall include at a minimum the following:

- Test objective
- Description of the type of report to be submitted
- Success/failure criteria
- Sequence of testing
- Equipment/instrumentation list with calibration dates
- Description of test setup including necessary diagrams
- Test methodology
- Procedure for data evaluation

The report shall be submitted within 30 days after completion of testing and shall follow industry standard format for submittal of technical papers. The reports shall include analysis along with necessary; photographs, charts and measured/accumulated data to support conclusions. Reports shall include a statement certifying compliance to specification requirements along with a list of any deficiencies.

TS 88.4 Decals/Signs

TABLE 18a
Exterior – Metro Local (Poppy)

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
A	3	Vehicle ID_4.5" White	CS0130	N/A
B	1	CNG Large_7.75"	CS0140	1-11/16" x 7-3/4"

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
C	1	SHUT OFF VALVE_1"(H)	CS0144	N/A
D	2	Battery Disconnect	CS55486	6-1/2" x 6-1/2"
E	4	Jack Points_3.75"(H)	CS5489	2" x 3-3/4"
F	2	Metro Local_7"(H)	CS0204	N/A
G	2	Nation's Largest Clean-Air Fleet_ 3.5" (H)	CS0131	N/A
H	2	Metro_17. 5"(H)	CS0185	N/A
I	2	Local_16.25"(H)	CS0196	N/A
J	2	CA LICENSE ID_1.5"(H)	CS0129	N/A
K	2	Metro Local_5.5" (H)	CS0202	N/A
L	1	Circle M_7.5"(H)	CS0133	N/A
M	1	Welcome Aboard_1",3/4"(H) Bienvenidos Exact Fare Please Tenga Pasaje Exacto Per Favor	CS0127	N/A
N	3	323.GO.METRO_7/8"(H) metro.net_11/16"(H)	CS0148	N/A
O	1	American Flag_Boarding	CS0125	6-3/4" x 3-1/2"
P	1	ISA Wheelchair	CS1000	6" x 6"
Q	1	ADA Kneeling Bus	CS0143	5-1/2" x 7"
R	2	Local_12"(H)	CS0198	N/A
S	1	Metro Local_1.5"(H)	CS0135	N/A
T	2	Circle M_4.5"(H)	CS0132	4-1/2" Dia.
U	1	Vehicle ID_2.625"(H)_White	CS0351	N/A
V	1	American Flag_Driver	CS0126	6-3/4" x 3-1/2"
W	1	Circle M_10"(H)	CS0134	10" Dia.
X	1	Danger-Do Not Turn In Front Of Bus_8.5"(H)	CS0146	N/A
Y	1	CNG Small_4"(H)	CS0141	6-1/2" x 4"

TABLE 18b
Exterior - Metro Rapid (Red)

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
A	3	Vehicle ID_4.5" White	CS0130	N/A
B	1	CNG Large_7.75"	CS0140	1-11/16" x 7-3/4"
C	1	SHUT OFF VALVE_1"(H)	CS0144	N/A
D	1	Battery Disconnect	CS55486	6-1/2" x 6-1/2"
E	4	Jack Points_3.75"(H)	CS5489	2" x 3-3/4"
F	2	Metro Rapid_7"(H)	CS0210	N/A
G	2	Nation's Largest Clean-Air Fleet_ 3.5" (H)	CS0131	N/A

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
H	2	Metro_17.5"(H)	CS0185	N/A
I	2	Rapid_16.25"(H)	CS0197	N/A
J	2	CA LICENSE ID_1.5"(H)	CS0129	N/A
K	2	Metro Rapid_5.5" (H)	CS0208	N/A
L	1	Circle M_7.5"(H)	CS0133	N/A
M	1	Welcome Aboard_1",3/4"(H) Bienvenidos Exact Fare Please Tenga Pasaje Exacto Per Favor	CS0127	N/A
N	3	323.GO.METRO_7/8"(H) metro.net_11/16"(H)	CS0148	N/A
O	1	American Flag Boarding	CS0125	6-3/4" x 3-1/2"
P	1	ISA Wheelchair	CS1000	6" x 6"
Q	1	ADA Kneeling Bus	CS0143	5-1/2" x 7"
R	2	Rapid_12"(H)	CS0199	N/A
S	1	Metro Rapid_1.5"(H)	CS0157	N/A
T	2	Circle M_4.5"(H)	CS0132	4-1/2" Dia.
U	1	Vehicle ID_2.625"(H)_White	CS0351	N/A
V	1	American Flag Driver	CS0126	6-3/4" x 3-1/2"
W	1	Circle M_10"(H)	CS0134	10" Dia.
X	1	Danger-Do Not Turn In Front Of Bus_8.5"(H)	CS0146	N/A
Y	1	CNG Small_4"(H)	CS0141	6-1/2" x 4"









TABLE 19a
Interior – Metro All





DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
A	4	Security Camera in Operation	CS5382	1'-0"x3-1/4"
B	2	Reserved for Seniors	CS5382	1'-7"x4"
C	3	Reserved for Mobility Devices	CS5401	1'-7"x4"
D	2	Please Remain in Securement	CS0230	10"x5-1/4"
E	3	Watch Your Step	CS5421	1'-4-1/4"x3"
F	1	Bus Maximum Height	CS0234	4-1/4"x2-1/8"
G	1	Bus Drivers Carry No Cash	CS5508	1'-1/4"x4-1/4"
H	1	PC640	CS5814	1'-4-3/4"x4-1/4"
I	1	Unnecessary Conversation	CS0155	4-1/4"x4-1/4"
J	1	Financial Responsibility	CS0162	3-3/4"x3-3/4"
K	1	Welcome to Metro	CS0152	5/8"x3-1/2"
L	1	Exit Rear Door	CS5505	11"x3-1/4"

DRAWING REFERENCE	QTY	DESCRIPTION	CS CATALOG #	DIMENSION
M	1	Reserved for Mobility Devices	CS5505	11"x3-1/4"
N	2	Caution Door Opens Automatically	CS5511	3-3/8"x7"

TABLE 19b
High Voltage – Metro ZE Bus

Note: Table 19b applies to zero emission bus decals. Location and quantity of these decals will vary depending on the individual bus configuration. Final layout will be determined during Pre-Production meetings.

Area	Description	Size - Inches	Location	Qty	Total
1. Lock Out Compartment		4 x 6	Inside the compartment - Next to the switch	1	AR
		4 x 6	Inside the compartment - Next to the switch	1	AR
2. Battery Compartment(s)		6 x 4	Inside the compartment - On the battery box	1	AR
		4 x 6	Inside the compartment - On the battery box	1	AR
	XXX VOLTS	1 x 4	Inside the compartment - On the battery box	1	AR
		2 x 3	On the battery enclosure door, visible from outside	1	AR
3. Automatic Start Equipment		2 x 4	On the equipment	1	AR
		2 x 4	On the compressor	1	AR
	XXX VOLTS AC 3 PHASE	1 x 6	On the equipment and control boxes	1	AR
	XXX VOLTS	1 x 4	On the equipment and control boxes	1	AR
4. Auxiliary Motor Controller(s)	XXX VOLTS AC 3 PHASE	1 x 6	On the control box(es) and motor(s)	1	AR
5. PPU and Hazardous Voltage Area(s)		2 x 3	On the enclosure door, visible from outside	1	AR

Area	Description	Size - Inches	Location	Qty	Total
		6 x 4	On the enclosure door, visible from inside	1	AR
	XXX VOLTS	1 x 4	Inside the compartment	1	AR
		4 x 6	On the enclosure door, visible from inside	1	AR
6. Charging Connector (Bus Side)		2 x 3	On the enclosure door, visible from inside	1	AR
7. Charging Connector (Station Side)		2 x 3	Next to each charging connector	1	AR

TS 88.5 References

SAE #	Title	Date Published
J10	Air Brake Reservoir Performance and Identification Requirements.	Dec 04, 2013
J211	Instrumentation for Impact Test—Part 2: Photographic Instrumentation	June 16, 2014
J287	Driver Hand Control Reach	March 11, 2016
J366	Exterior Sound Level for Heavy Trucks and Buses	Sept 12, 2011
J381	Windshield Defrosting Systems Test Procedure and Performance Requirements - Trucks, Buses, and Multipurpose Vehicles.	Jan 27, 2009
J534	Lubrication Fittings	Aug 11, 2015
J537	Storage Batteries	May 23, 2011
J541	Voltage Drop for Starting Motor Circuits	July 16, 2013
J587	License Plate Illumination Devices (Rear Registration Plate Illumination Devices)	Aug 21, 2012
J593	Backup Lamps (Reversing Lamps)	Aug 26, 2010
J673	Automotive Safety Glasses	July 6, 2015
J680	Location and Operation of Instruments and Controls in Motor Truck Cabs, Recommended Practice	Sep 1, 1988
J686	Motor Vehicle License Plates	Aug 7, 2012
J689	Curbstone Clearance, Approach, Departure, and Ramp Break over Angles—Passenger Car and Light Truck	Aug 26, 2009
J726	Air Cleaner Test Code	June 27, 2002
J833	Human Physical Dimensions	May 29, 2003
J844	Nonmetallic Air Brake System Tubing	Dec 19, 2012
J941	Motor Vehicle Drivers' Eye Locations	Mar 3, 2010
J994	Alarm—Backup—Electric Laboratory Performance Testing	Sept 17, 2014
J1050	Describing and Measuring the Driver's Field of View	Feb 13, 2009
J1113	Electromagnetic Compatibility Component Test Procedure Part 42, Conducted Transient Emissions	Dec 8, 2010
J1127	Low Voltage Battery Cable	Dec 3, 2015
J1128	Low Voltage Primary Cable	Dec 3, 2015
J1149	Metallic Air Brake System Tubing and Pipe	Oct 21, 2015
J1211	Handbook for Robustness Validation of Automotive Electronic Modules	Nov 19, 2012
J1292	Automobile and Motor Bus Wiring	Jan 1, 2008

J1308	Fan Guard for Off-Road Machines	Dec 17, 2013
J1455	Recommended Environmental Practices for Electronic Equipment Design in Heavy-Duty Vehicle Applications	Aug 24, 2012
J1587	Electronic Data Interchange Between Microcomputer Systems in Heavy-Duty Vehicle Applications, Recommended Practice	Jan 4, 2013
J1708	Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications	Dec 12, 2010
J1908	Electrical Grounding Practice	Jan 1, 1996
J1986	Balance Weight and Rim Flange Design Specifications, Test Procedures, and Performance Recommendations	March 18, 2016
J1939	Data Link Layer	March 3, 2016
J1995	Engine Power Test Code - Spark Ignition and Compression Ignition - Gross Power Rating, Standard;	Jan 10, 2014
J2249	Wheelchair Tiedown and Occupant Restraint Systems for Use in Motor Vehicles	Jan 29, 1999
J2402	Road Vehicles—Symbols for Controls, Indicators, and Tell-tales	Jan 7, 2010
J2711	Recommended Practice for Measuring Fuel Economy and Emissions of Hybrid-Electric and Conventional Heavy-Duty Vehicles	Sept 20, 2002
J2805	Measurement of Noise Emitted by Accelerating Road Vehicle	Nov 10, 2015
J2808	Lane Departure Warning Systems Minimum Performance Requirements	March 9, 2015

TS 88.6 Holders

FIGURE 9

Bad Order (B.O.) Card Holder

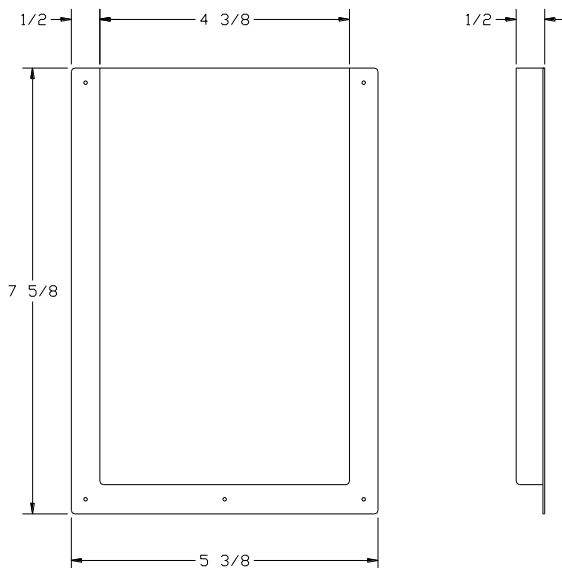


FIGURE 10

Typical Trash Bag Hooks



FIGURE 11
Metro Tow Device



Technical Contract Deliverables

Contractor shall provide a table of contract deliverables, documentation, samples and/or demonstrations as scheduled in the Contract documents. Table 20, provided as reference for Technical submittal items, is representative and not intended to be all inclusive.

TABLE 20
Contract Deliverable Items

Item	Section	Title	Deliverable	Schedule	Requirement
1	TS 4	Legal Requirements	Certification	Pre-production Meetings	The Contractor shall comply with all applicable federal, state and local regulations. These shall include but not be limited to ADA, as well as state and local accessibility, safety and security requirements. Local regulations are defined as those below the state level.
2	TS 5	Overall Requirements	Documentation	With Pilot Bus and First Article Bus	Contractor and LACMTA shall identify subcomponent vendors that shall submit installation/application approval documents , (including necessary documents and/or diagrams to verify configuration), with the completion of a Pilot Bus and First Article Bus.
3	TS 5.4	Maintenance and Inspection	Documents	Proposal Period	Contractor shall provide a list of all special tools and pricing required for maintaining this equipment. Said list shall be submitted as a supplement to Form PF-3 Schedule B of Prices Special Tools.
4	TS 5.6	Training	Documents	Proposal Period	The Contractor shall provide pricing for up to 1,000 Instructor class-room hours with the Bus order. For each Option order, Contractor shall also be required to provide Instructor training. The quantity of training hours shall be determined by the quantity of Option Buses ordered and shall be equal to five hours of training per Option bus up to a maximum of 500 instructor class-room hours for each Option order.
5	TS 5.6	Training, Base Order Buses	Documentation	30 days after pilot bus delivery	The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor at the time of pilot bus review.
6	TS 5.6	Training, Option Order Buses	Documentation	30 days prior to delivery of Option pilot bus	The LACMTA shall approve the proposed trainers and their qualifications, proposed subjects and scheduling of the classes conducted by the Contractor.
7	TS 5.6.1	Training Curriculum	Documents	30 days prior to delivery of pilot bus	The Contractor shall develop and submit a training curriculum using the most current version Microsoft Office Word and/or Power Point, subject to LACMTA approval.

Item	Section	Title	Deliverable	Schedule	Requirement
8	TS 5.6.2	Teaching Materials	Documents, materials	30 days prior to training	The Contractor shall provide to the LACMTA Maintenance Instruction Department visual and other teaching materials as needed during classroom instruction.
9	TS 5.6.3	Optional Training Aids	Documents	Proposal Period	The Contractor shall supply pricing for items a – k, special training aids, as listed below for use by LACMTA training staff. Pricing for these aids is to be provided to the LACMTA on Form PF-5-Schedule D of Prices Training Aids.
10	TS 5.6.3	Optional Training Aids, E-Learning/Interactive Training Media	Documents	Proposal Period	The Contractor shall provide pricing for 25 hours of CNG/Electric Bus interactive learning seat time on Form PF-5-Schedule D of Prices Training Aids. The media shall provide a high level of student interactivity, including but not limited to: questions review, component identification, tool use, circuit building, component testing. All content shall be navigated through an industry standard e-learning programs graphical user interface (GUI) subject to LACMTA approval.
11	TS 5.6.4	Manuals, Manual Review and Approval	Documents	After NTP	The Contractor will be required to participate in Manual Review and Approval process and attend one service manual review meeting held at the LACMTA shortly following LACMTA Notice to Proceed.
12	TS 5.6.4	Manuals, Draft Manuals, Manual Review and Approval	Documents	With pilot bus	The Contractor shall provide the LACMTA with: Ten draft hardcopies each of the Service, Parts and Operator's manuals plus a list of all proposed OEM Component Repair manuals, simultaneously to the shipping of the first Pilot Bus.
13	TS 5.6.4	Manuals, Draft Manuals, Parts Index	Hardcopy, Spreadsheet	60 days prior to production 60	A part number index shall be submitted for review at least 60 days prior to the scheduled ship date of the first production Bus.
14	TS 5.6.4	Manuals, Final Manuals	Documents	90 days after start of production	Ten final hardcopy sets of Service and Parts manuals, shall be provided for each 100 Buses and twelve 12 total sets of Subsystem OEM manuals.
15	TS 5.6.4	Manuals, Final Manuals	Documents	90 days after start of production	Contractor shall supply a listing of diagnostic codes with final service manuals delivered that covers trouble shooting fault trees/codes related to the PPU.
16	TS 5.6.4	Manuals, Final Manuals	Documents	90 days after start of production	Final DVD editions of Service, Parts and Operator's manuals must be delivered within 90 days after the start date for production Buses.

Item	Section	Title	Deliverable	Schedule	Requirement
17	TS 5.6.4	Manuals, Component Repair/Service Section	Documents	90 days after start of production	Fourteen sets of Repair Manuals necessary to rebuild all Contractor supplied Units including: PPU, transmission/electric drive, HVAC system, starter, alternator, air compressor, etc., shall be provided.
18	TS 5.6.4	Manuals, Component Repair/Service Section	Hardware	90 days after start of production	Each set shall be organized and mounted onto a suitable table top holding rack subject to LACMTA approval
19	TS 5.6.4	Manuals, Price List	Hardcopy, Spreadsheet	90 days after start of production and updated annually	Ten copies of the current price list shall be provided separately as a supplement to the final parts manuals. Price lists shall be updated at least annually and provided for the life of the Bus as they are updated.
20	5.6.5	Special Equipment, Option, Special Service Equipment	Documents	Proposal Period	The LACMTA is aware that diagnostic equipment and/or software has been developed or is being developed by many of the OEMs to assist in the maintenance of the Buses. Proposer is required to submit a list of recommended special equipment, software and/or diagnostic tools deemed necessary to provide state-of-the-art service for the bus systems. Depending on the type of available equipment and/or software, the LACMTA may wish to obtain complete sets of such Special Service Equipment and/or software, plus any additional tools identified by the OEM manufacturer required to diagnose, calibrate, or remove-and-replace, all equipment provided with this Bus order.
21	TS 5.6.6	Diagnostic Laptop PC Specifications	Laptops	Delivery of first production bus	Because of the time delay between the procurement process and receipt of computer equipment, the final laptop computer configuration shall be subject to approval by the LACMTA at delivery...
22	TS 5.6.8	In-Process and As-Built Drawings	Scale Drawings	30 days prior to production	The Contractor shall, no later than 30 days prior to commencing production, supply the LACMTA with two sets of hardcopy scale drawings suitable for conducting repairs on every area of the vehicle, including all major systems and sub-system installations. Electrical and air schematics shall also be provided. In addition, the Contractor shall provide a description of the electronic configuration, layout and functionality of the Bus including communication paths and power distribution.
23	TS 5.6.8	In-Process and As-Built Drawings	Scale Drawings	60 days after final bus delivery	Five sets of Conforming drawings shall be delivered to the LACMTA within 60 days after final Bus delivery.

Item	Section	Title	Deliverable	Schedule	Requirement
24	TS 5.7	Operating Environment	Test Documentation	Pre-Production Meetings	The bus shall achieve normal operation in ambient temperature ranges of 0° F to 120° F, at relative humidity between 5 percent and 100 percent, and at altitudes up to 3,000 feet above sea level. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 0 °F, above 120° F or at altitudes above 3,000 feet.
25	TS 5.8	Noise	Demonstration	Pilot Vehicle at Factory	The Contractor shall be required to demonstrate that vehicle-generated sound levels do not exceed the maximum interior and exterior values.
26	TS 5.8.1	Interior Noise	Test Documentation	Pilot Vehicle Prior to Production	The Contractor shall provide test documentation that vehicle has sufficient sound insulation to achieve 65 dBA or lower at any point inside the bus with an 80 dBA sound source at outside skin of the bus.
27	TS 5.9	Fire Safety	Certification	Pre-Production Meetings	Contractor must provide required certificates of compliance prior to manufacture of the Pilot Bus.
28	TS 5.10	Fire Suppression	Documentation	Proposal Period	The AFSS system shall meet or exceed the environmental requirements of SAE J1211.
29	TS 5.10	Fire Suppression	Documents	Proposal Period	At a minimum, the engine compartment, HVAC compartment, exhaust area and high current electrical areas (except the battery compartment) at rear of bus shall be equipped with an automatic fire sensing and suppression (AFSS) system product, subject to LACMTA approval during proposal period.
30	TS 5.10	Fire Suppression, AFSS Monitor Panel	Documenst	Pre-Production Meetings	The system shall have a supervision monitoring panel located above the operators' side console subject to LACMTA approval...
31	TS 5.10	Fire Suppression System, AFSS Agent	Documentation	Pre-Production Meetings	The agent shall be approved by Underwriters Laboratory or Factory Mutual Research Corporation and have no ozone depleting property and no global warming potential per USA EPA guidelines.
32	TS 5.10	Fire Suppression System (AFSS Cylinders)	Documentation	Pre-Production Meetings	The AFSS agent cylinders shall use DOT shippable linear actuators or electric solenoid valves (squibs are prohibited) attached to DOT certified bottles which do not require hydrostatic retest for a minimum of twelve (12) years. Cylinder(s) shall be compatible with suppression agents. Each cylinder shall have a pressure gauge with easy to read "Go-NoGo" type indicator which is visible when the cylinder(s) is installed on the Bus.

Item	Section	Title	Deliverable	Schedule	Requirement
33	TS 5.11	Gas Detection System (GDS)	Documents	Proposal Period	GDS system shall be provided to monitor the engine compartment and each separate fuel storage area(s) and shall automatically activate...
34	TS 5.11	Gas Detection System (GDS), GDS Monitor Panel	Documents	Pre-production Meetings	The system shall have a supervision monitoring panel located above the operators' side console area subject to LACMTA approval
35	TS 5.13	Water Leak Testing	Test	All buses	The roof, windows, windshields, and all doors of all Vehicles shall be water tested for a minimum of 30 continuous minutes in order that leaks may be detected and corrected. The HVAC shall be turned on only for the first 15 minutes of the test.
36	TS 5.14	Fasteners and Securements	Documentation, Samples	Proposal Period	Supports for all electrical cables, harnesses and bundles will be subject to LACMTA approval and shall be of premium quality.
37	TS 6	Physical Size	Test Documentation	Pilot Vehicle at Factory	Vehicles furnished under these specifications shall comply with physical size.
38	TS 7.	Vehicle Performance, Power Requirements	Documentation	Proposal Period	The propulsion system shall be sized to provide sufficient power to enable the bus to meet the defined acceleration, top speed, and gradability requirements, and operate all propulsion-driven accessories using actual road test or dynamometer results and computerized vehicle performance data.
39	TS 7	Vehicle Performance	Demonstration	Pilot Vehicle at Factory	The Contractor shall be required to demonstrate acceleration, top speed, and gradeability requirements.
40	TS 7.4.3	Operating Range, CNG	Documentation	Proposal Period	The Contractor shall provide sufficient fuel capacity to give the bus a 400 mile range before the low fuel warning light comes on. The Contractor shall provide the LACMTA with a technical analysis which supports the proposed CNG fuel system design compliance to the LACMTA's range of operation requirement including the proposed fuel capacity.
41	TS 7.4.4	Operation Range, Electric (Zero Emission)	Documenation	Proposal Period	The Contractor shall provide sufficient energy storage and charger charging systems to give the bus a cumulative 300 mile daily operating range before the low energy warning light comes on. The Contractor shall provide the LACMTA with a technical analysis which supports the proposed energy storage and charger systems design compliance to the MTA's range of operation requirement including the proposed energy storage system capacity.

Item	Section	Title	Deliverable	Schedule	Requirement
42	TS 9.	Engine	Meeting and Documentation	Pre-production Meetings	Prior to manufacturing the Pilot bus, the Contractor shall coordinate a technical review with the LACMTA and engine and transmission suppliers covering integration and installation design. As part of the technical review, the Contractor shall advise the LACMTA concerning engine and transmission features and control system options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality.
43	TS 9	Engine	Certificate	Prior to start of production	Prior to start of production, the Contractor shall provide documentation from the Subsuppliers, which supports their approval, that the engine and transmission installation, support system design, and components used specifically for the LACMTA's contract meet the OEM requirements and recommendations.
44	TS 9.1	Engine (CNG	Documentation	Pre-production Meetings	Oil filtration systems shall be approved by the engine and transmission OEM and be designed with by-pass circuits, as needed, in the event that a filter becomes plugged.
45	TS 9.1.1	Engine, Compartment Control Panel Gauges and Indicators	Documents	Proposal Period	The following mechanical, electrical dial gauges, or digital display, subject to LACMTA approval during proposal period, shall be mounted on, or adjacent to, the engine compartment control panel: <ul style="list-style-type: none"> • Oil Pressure Gauge, • Temperature Gauge, • Air Filter Restriction Gauge, • Voltage Gauge(s).
46	TS 9.2.2	Propulsion System Service	Documents, Drawings	Proposal Period	The propulsion system shall be arranged so that accessibility for all routine maintenance is ensured. No special tools, other than dollies and hoists, shall be required to remove the propulsion system or any subsystems.
47	TS 9.2.4	Energy Storage, Controller and Charging Systems	Documents, Drawings	Proposal Period	Energy storage shall be of a commercial design capable of operating in the LACMTA transit environment.
48	TS 9.2.5	Electric System Controller (ESC), Primary Power Unit (PPU)	Documents, Drawings	Proposal Period	The PPU shall have on-board diagnostic capabilities, able to monitor vital functions, store out-of-parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in operator's area and inside PPU compartment.

Item	Section	Title	Deliverable	Schedule	Requirement
49	TS 10.	Cooling Systems	Test or Certification	Pre-Production Meetings	The cooling systems shall be of sufficient size and designed to maintain fluids and engine intake air at safe, continuous operating temperatures during the most severe operations possible with the bus loaded to GVWR and with conditions as listed in Section TS 5.7 with a 10 percent minimum reserve capacity in accordance with engine and transmission manufacturer's cooling system requirements. The cooling system fan controls should sense the temperatures of the operating fluids and the intake air, and if either is above safe operating conditions the cooling fan should be engaged. The fan control system shall be designed with a fail-safe mode of "fan on." The cooling system shall provide functional service while operating in the design operating profile environment.
50	TS 10	Cooling Systems	Demonstration	Pilot Vehicle Delivery in LA	The cooling system shall be self purging requiring no special procedures to remove air from the system when coolant is installed or added.
51	TS 10.1	Engine Cooling	Documents	Pre-Production Meetings	Surge tank filler cap shall have a safety lock. A 1/4 inch NPT port shall be provided in a convenient location in the surge tank for the LACMTA's pressure testing equipment, subject to LACMTA approval..
52	TS 12	Retarder (Transit Bus), Retarder Disable Switch	Documents, Drawings	Pre-Production Meetings	The retarder disable switch shall be located behind the destination sign door, subject to LACMTA approval
53	TS 14.1	Service	Documents, Drawings	Proposal Period	No special tools, other than dollies and hoists, shall be required to remove the PPA/PPU Two LACMTA mechanics shall be able to remove, replace, and prepare the complete PPA/PPU assembly for service within a MTTF of 12-man hours.
54	TS 14.1	Service	Approval	Within 60 days after final bus delivery	The Contractor shall provide two suitable PPA/PPU dollies for each spare PPA/PPU purchased under this Contract.
55	TS 14.1	Service	Documents. Drawings	Pre-production Meetings	The PPA/PPU dollies shall be designed, subject to LACMTA approval in pre-production meetings...
56	TS 14.1	Service	Drawings	Last Vehicle Delivery	The Contractor shall provide the LACMTA with sufficient fabrication drawings needed to manufacture additional dollies.
57	TS 14.1	Service	Documents, Drawings	Pre-production Meetings	Belt drives that require manual tensioning shall be designed to facilitate easy service/maintenance, subject to LACMTA approval

Item	Section	Title	Deliverable	Schedule	Requirement
58	TS 14.1	Service	Certificate	Pre-production Meetings	Accessory drive belts shall be guarded in accordance with CAL OSHA article 45, Belt and Pulley Drives, Section 4070 "Guarding".
59	TS 14.1	Service, Engine Air Cleaner	Drawings	Proposal Period	The air filter shall be positioned for easy access and service, subject to LACMTA approval...
60	TS 15	Hydraulic Systems	Demonstration	Pilot Vehicle at Factory	Any hydraulically driven system shall be subject to LACMTA approval at the Pilot Bus.
61	TS 15	Hydraulic Systems	Demonstration	Pilot Vehicle at Factory	The hydraulic system (steering) shall be located to accommodate easy service. The hydraulic system filter shall be located in the return, low pressure, circuit to the oil reservoir, or internal to the oil reservoir, subject to LACMTA approval at the Pilot Bus.
62	TS 15.1	Fluid Lines	Documents, Drawings	Pre-production Meetings	Rigid and flexible lines shall be individually supported and readily accessible for inspection and service, including interior lines inside the bus,...
63	TS 18.1.2	Fuel Lines, CNG	Documentation	Pre-production Meetings	Fuel lines shall comply with NFPA-52. All tubing shall be a minimum of seamless Type 304 stainless steel (ASTM A269 or equivalent). Fuel lines shall be identifiable as fuel lines only. Fuel lines shall be bent using computer numeric machines (CNC) to assure consistency, no hand bending will be permitted. The bus manufacturer shall have a documented procedure for testing the high pressure line assembly
64	TS 18.1.2	Fuel Lines, CNG	Documentation	Pre-production Meetings	Hose support in-between the bus frame and the engine that exceed 12 inches is subject to LACMTA approval...
65	TS 18.2.2	Design and Construction, CNG, Fuel Containers/Cylinders	Documentation	Pre-production Meetings	Fuel cylinder construction shall be in accordance with DOT Standard 304, ANSI NGV2, latest revision, design and test criteria. Cylinder shall be designed for the lightest weight possible which does not require a hydrostatic re-qualification. Cylinders shall be certified for refueling pressures to 125 percent of working pressure during temperature compensated fueling.
66	TS 18.2.2	Design and Construction, CNG, Pressure Relief Devices (PRDs)	Documents, Drawings	Proposal Period	PRDs shall be vented to the roof area of the Bus with minimum protrusion above the roof line and shall be protected with a suitable cap which shall withstand daily bus wash activity, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
67	TS 18.2.2	Design and Construction, CNG, Valves	Documents, Drawings	Proposal Period	An additional minimum 1/2 inch valve shall be provided for draining the high pressure manifold and any fuel cylinder(s) through a service port. Type and location of the service port shall be subject to LACMTA approval...
68	TS 18.2.2	Design and Construction, CNG, Gauges	Documentation	Pre-production Meetings	Glycerin filled gauges which meet NFPA 52 requirements shall be located in the high and low pressure manifolds which shall indicate fuel system pressure.
69	TS 18.2.2	Design and Construction, CNG, Fuel Filler	Documents, Drawings	Proposal Period	The fuel filler shall be located 30 to 38 feet measure behind the centerline of the front door, subject to LACMTA approval...
70	TS 18.2.2	Design and Construction, CNG, Defueling System	Documents, Drawings	Proposal Period	The CNG defueling port shall be an NGV-3.1/CGA-12.3 certified receptacle subject to LACMTA approval...
71	TS 21	Altoona Testing	Documentation	Proposal or First Article Bus	A report clearly describing and explaining the failures and corrective actions taken to ensure any and all such failures will not occur shall be submitted to the LACMTA.
72	TS 23.2	Crashworthiness, (Transit Bus)	Certification	Pre-Award Audit	Contractor shall be required to provide FEA software analysis or other evidence of compliance with this section during the Pre-Award Audit.
73	TS 24.	Corrosion	Certification	Pre-production Meetings	Representative samples of all materials and connections shall withstand a two-week (336-hour) salt spray test in accordance with ASTM Procedure B-117 with no structural detrimental effects to normally visible surfaces and no weight loss of over 1 percent.
74	TS 24.	Corrosion	Documentation	Pre-production Meetings	The Contractor shall provide a copy of its proposed undercoating system program...
75	TS 25.	Towing	Demonstration	Pilot Vehicle Delivery in LA	Contractor shall provide fifteen (15) sets of any special towing equipment adapters, if required, so that the LACMTA is able to flat tow the Bus.
76	TS 25	Towing	Demonstration	Pilot Vehicle Delivery in LA	Contractor shall demonstrate compliance with these provisions using the Pilot Vehicle.
77	TS 25	Towing	Documents, Samples	Pre-production Meetings	All male fittings shall have an additional quarter turn manual shut off valve provided near the front bumper for use only during towing, subject to LACMTA approval
78	TS 25.	Towing	Demonstration	Pilot Vehicle Delivery in LA	Two rear recovery devices/tie downs shall permit lifting and towing of the bus for a short distance, such as in cases of an emergency, to allow access to provisions for front towing of bus.
79	TS 26.	Jacking	Demonstration	Pilot Vehicle Delivery in LA	Jacking and changing any one tire/wheel assembly shall be completed by one LACMTA mechanic.

Item	Section	Title	Deliverable	Schedule	Requirement
80	TS 27.	Hoisting	Demonstration	Pilot Vehicle Delivery in LA	The Contractor may be required to demonstrate compatibility with LACMTA hoists as part of the towing demonstration...
81	TS 27	Hoisting	Samples	Pre-production Meetings	A model or sample jacking plate shall be provided during Pre-Production meetings for approval by LACMTA.
82	TS 28.1	Floor, Design (Transit Bus)	Documents, Drawings	Proposal Period	Floor installation, repair, and replacement method shall be subject to LACMTA approval...
83	TS 28.5	Floor, Construction	Documentation	Proposal Period	The floor shall be constructed using composite flooring material approved by the LACMTA during proposal period.
84	TS 29.3	Farebox, Stanchions	Documents, Drawings	Proposal Period	Stanchions shall be located around the farebox in accordance with ADA requirements and subject to LACMTA approval...
85	TS 30.1	Wheel Housing, Design & Construction	Certification Documentation	Pre-production Meetings	<p>Wheel housings shall be constructed of corrosion-resistant and fire-resistant material. Sufficient clearance and air circulation shall be provided around the tires, wheels and brakes to prevent overheating when the bus is operated in revenue service.</p> <p>Wheel housings, as installed and trimmed, shall withstand impacts of a two- inch steel ball with at least 200 foot-pounds of energy without penetration.</p>
86	TS 31.3.3	Suspension, Lubrication, Standard Grease Fittings	Demonstration	Pilot Vehicle at Factory	All elements of steering, suspension and drive systems requiring scheduled lubrication shall be provided with grease fittings conforming to SAE Standard J534 (Zerk Fitting).
87	TS 31.3.4	Suspension, Springs and Shock Absorbers, Kneeling	Demonstration	Pilot Vehicle at Factory	<p>A kneeling system shall lower the entrance(s) of the bus a minimum of 2.75 in. during loading or unloading operations regardless of load up to GVWR, measured at the longitudinal centerline of the entrance door(s) by the driver.</p> <p>The bus shall kneel at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully kneeled position within 4.5 seconds. After kneeling, the bus shall rise within 3 seconds to a height permitting the bus to resume service and shall rise to the correct operating height within 7 seconds regardless of load up to GVWR. During the lowering and raising operation, the maximum vertical acceleration shall not exceed 0.2g, and the jerk shall not exceed 0.3g/second.</p>

Item	Section	Title	Deliverable	Schedule	Requirement
88	TS 31.3.4	Suspension, Springs and Shock Absorbers, Raising	Demonstration	Pilot Vehicle at Factory	The Bus shall incorporate a system controlled by the operator that permits the Bus to raise (to account for high curbs) 2.75 inches, measured from normal ride height at the center of the bottom front step regardless of passenger load up to GVWR. The Bus shall raise at a maximum rate of 1.25 inches per second at essentially a constant rate reaching fully raised position within 4.5 seconds. After rising the Bus shall recover (lower) within 3.5 seconds to a ride height permitting the Bus to resume service and shall fully recover to the correct operating ride height within 10 seconds. During the lowering operation, the maximum acceleration shall not exceed 0.2g and the jerk shall not exceed 0.3g/sec. measured on the front door step tread.
89	TS 32.2	Tires	Documentation	With Each Vehicle	Contractor shall provide the LACMTA with a record listing tires installed for each Bus delivered. The information shall include the LACMTA brand serial number and mounting location on the Bus. Contractor shall conform to tire manufacturer specifications for maximum road speed and duty cycle during Bus delivery.
90	TS 33.	Steering	Test Documentation, or Demonstration	Pilot Vehicle at Factory	Electrically driven hydraulic assisted, or electrically assisted steering shall be provided. The steering gear shall be an integral type with the number and length of flexible lines minimized or eliminated. Steering torque applied by the operator shall not exceed 10 foot-pounds with the front wheels straight ahead. Steering torque may increase to 70 foot-pounds when the wheels are approaching the steering stops. Steering effort shall be measured with the Bus at Seated Load Weight (SLW), stopped with the brakes released and the engine at normal idling speed on clean, dry, level, commercial asphalt pavement with the tires inflated to recommended pressure. Power steering failure shall not result in loss of steering control. While the Bus is in operation, the steering effort shall not exceed 55 pounds at the steering wheel rim and perceived free play in the steering system shall not materially increase as a result of power assist failure. Gearing shall require no more than seven turns of the steering wheel lock-to-lock.

Item	Section	Title	Deliverable	Schedule	Requirement
91	TS 33.3.3	Steering Wheel, Steering Column Tilt	Demonstration	Pilot Vehicle at Factory	Steering column shall be a tilt and telescopic model. The steering column shall have full tilt capability with an adjustment range of no less than 35 degrees and be easily adjustable by the driver. The mechanism for adjustments shall be designed for ease of use, durability, utilize detents to position and lock the steering column and not require tightening by hand to apply a clamping force.
92	TS 33.3.4	Steering Wheel Telescopic Adjustment	Demonstration	Pilot Vehicle at Factory	The steering wheel shall have full telescoping capability and have a minimum telescopic range of 2 inches but no more than 5 inches and a minimum low-end adjustment of 32 in., measured from the top of the steering wheel rim in the horizontal position, (zero degrees' slope), to the cab floor at the heel point.
93	TS 37.1	Service Brake	Certification, Test Documentation	Pre-Production Meetings	The entire service brake system, including ABS controls, friction material, shall meet applicable FMVSS standards. The entire brake system, including friction material, shall have overhaul or replacement life goal of at least 45,000 miles when operated under LACMTA service. Brakes shall be self-adjusting. Mechanical brake wear indicators, (visible brake sensors), shall utilize stainless steel exposed push rods.
94	TS 37.6	Parking/Emergency Brake, Air Brakes	Documents, Drawings	Pre-Production Meetings	The parking brake shall be actuated by a valve mounted convenient to the operator, subject to LACMTA approval...
95	TS 39.1	Pneumatic System, General	Documents, Samples	Pre-Production Meetings	A quarter turn manual shut-off valve with quick disconnect fitting shall be easily accessible and located in the engine compartment and shall supply air prior to the air dryer, subject to LACMTA approval...
96	TS 39.2	Pneumatic System, Air Compressor	Demonstration	Pilot Vehicle at Factory	The electrically-driven air compressor shall be sized (designed) to charge the entire air system on new buses from 0 psi to 120 psi in less than five minutes for a single unit and bus not exceeding the fast idle speed (~1000 rpm) setting of the engine.

Item	Section	Title	Deliverable	Schedule	Requirement
97	TS 39.2	Pneumatic System, Air Compressor	Documentation	Pilot Vehicle Prior To Production	The electrically-driven air compressor shall be designed to supply air operating under the Air System Design Operating Profile while remaining within the manufacturer's air compressor specifications. The discharge temperature (measured at the compressor outlet using a probe thermocouple) shall not exceed 360°F, excluding temperature spikes of durations less than two seconds and two percent of compressor charge time. Air compressor duty-cycle shall not exceed 30 percent in any 10 minute period under the Manhattan Operating Profile.
98	TS 39.4	Pneumatic System, Air Reservoirs	Documentation	Pre-production Meetings & Pilot Vehicle at Factory	All air reservoirs shall meet the requirements of FMVSS Standard 121 and SAE Standard J10 and shall be equipped with drain plugs and guarded or flush type drain valves below floor level. Major structural members shall protect these valves and any automatic moisture ejector valves from road hazards. Reservoirs shall be sloped toward the drain valve. All air reservoirs shall have drain valves mounted below floor level with lines routed to eliminate the possibility of water traps and/or freezing in the drain line. All air tanks shall have check valves at the inlet side for isolation.
99	TS 40	Electrical, Electronic and Data Communications, Overview	Approval	Prior to Pilot Bus completion	The Contractor shall coordinate a technical review with the LACMTA covering control system integration, installation, and design. As part of the technical review, the Contractor shall advise the LACMTA concerning control system features, options, and accessories, and shall conform, to the degree possible, to those already in use at the LACMTA in an effort to increase component and system commonality. The Contractor shall provide documentation including a description of control system operation and system schematics.
100	TS 40	Electrical, Electronic and Data Communications, Overview	Deliverable	Pilot Vehicle at Factory	A listing of the software part number and revision number and procedure for obtaining new releases shall be identified for each component which is software controlled.
101	TS 40.1	Electrical, Electronic and Data Communications, Modular Design	Demonstration	Pilot Vehicle at Factory	Replacement of the engine/propulsion compartment wiring harness(es) shall not require pulling wires through any bulkhead or removing any terminals from the wires.
102	TS 41	Environmental and Mounting Requirements	Test Documentation	Pilot Vehicle Prior To Production	The electrical system and its electronic components shall be capable of operating in the area of the vehicle in which they will be installed, as recommended in SAE J1455.

Item	Section	Title	Deliverable	Schedule	Requirement
103	TS 41	Environmental and Mounting Requirements	Certification	Pilot Vehicle Prior To Production	No vehicle component shall generate, or be affected by, electromagnetic interference or radio frequency interference (EMI/RFI) that can disturb the performance of electrical/electronic equipment as defined in SAE J1113 and UNECE Council Directive 95/54 (R 10).
104	TS 42.1.1	General Electrical Requirements, Low Voltage Batteries (24V)	Documents	Proposal Period	Batteries shall be a minimum of four absorbed glass mat thin plate pure lead technology group 31 series, heavy-duty, lead-acid, sealed top battery units for: a) engine starting (including fuel controls, electronic control units and ignition system), and b) other bus loads as needed, subject to LACMTA approval...
105	TS 42.1.1	General Electrical Requirements, Low-Voltage Batteries	Demonstration Test	Pilot Vehicle Prior To Production	Starting with a full charge, starting batteries shall have sufficient energy to provide adequate power after a minimum of five continuous days (Master Run switch "Off", Master Battery switch "On", all lights off, LACMTA installed ITS equipment operating) without charging or engine operation to then properly start the bus.
106	TS 42.1.3	General Electrical Requirements, Jump Start	Documents, Samples	Pre-Production Meetings	Female receptacles equipped with approximately one-foot 2/0 pigtail cables shall be provided. The receptacle(s) shall be located on the curbside rear corner of the Bus for convenient jumper cable connection, subject to LACMTA approval...
107	TS 42.1.7	General Electrical Requirements, Low-Voltage Generation and Distribution	Documentation	Pre-Production Meetings	The Contractor shall estimate the parasitic loads during the initial stage of the bus design and shall submit a draft report to LACMTA at the Pre-Production meetings.
108	TS 42.1.7	General Electrical Requirements, Low-Voltage Generation and Distribution	Documentation	Pilot Vehicle Prior To Production	The Contractor shall estimate the parasitic loads during the initial stage of the bus design and shall submit a draft report to LACMTA at the Pre-Production meetings. A final report shall be submitted during the Pilot Bus configuration audit.
109	TS 42.4	General Electrical Requirements, Electrical Components	Certification	Pre-Production Meetings	Location of electronic modules shall be reviewed for environmental suitability such as heat, water, vibrations, contamination from dust and debris, and other electrical equipment. The system including modules, external wire, connectors, and data Bus wiring shall be designed to operate under LACMTA's Design Operating Profile. All electrical components including relays and circuit breakers must remain unaffected while bus is operated in up to 15 inches of standing water.

Item	Section	Title	Deliverable	Schedule	Requirement
110	TS 43.1.3	General Electronic Requirements, Communications	Documents, Drawings	Proposal Period	Mounting and electrical provisions shall be provided to allow LACMTA installation of existing Fleetwatch JX-55 Vehicle Interface Module in the Operator's area, subject to LACMTA approval...
111	TS 45.2.1	Data Communications, Diagnostics, Fault Detection and Data Access	Documents, Drawings	Pre-Production Meetings	The communication port(s) shall be located in the Operator's area, Engine Compartment Control Panel, and ITS Enclosure area, subject to LACMTA approval...
112	TS 45.3.1	Multiplex Level, Data Access	Documents, Drawings	Pre-Production Meetings	Diagnostic and status information shall be made available via a communication port on the multiplex system. The location of the communication port shall be easily accessible inside or adjacent to the ITS Enclosure subject to LACMTA approval...
113	TS 46.1	Driver's Area Controls, General	Documentation	Pre-Production Meetings	Switches and controls shall be divided into basic groups and assigned to specific areas, (Refer to Table 9) in conformance with SAE Recommended Practice J680, Revised 1988, "Location and Operation of Instruments and Controls in Motor Truck Cabs," and be essentially within the hand reach envelope described in SAE Recommended Practice J287, "Driver Hand Control Reach.
114	TS 46.2	Driver's Area Controls, Glare	Inspection	Pilot Vehicle at Factory	The driver's work area shall be designed to minimize glare to the extent possible. Objects within and adjacent to this area shall be matte black or dark gray in color wherever possible to reduce the reflection of light onto the windshield. The use of polished metal and light-colored surfaces within and adjacent to the driver's area shall be avoided.
115	TS 46.8	Driver Foot Switches, Solid state Foot Switch Control	Documents, Drawings	Pre-Production Meetings	The inclined mounting surface shall be skid-resistant. All other controls, including high beam shall be in a location approved...
116	TS 47.1	Driver's Amenities, Coat Hanger	Documents, Samples	Pre-Production Meetings	A stainless steel, aluminum, or approved equal, coat hook shall be furnished and installed, subject to LACMTA approval.
117	TS 47.4	Repair Card Holder	Documents, Drawings	Pre-Production Meetings	A card holder shall be provided in the operators' area at a location accessible to mechanics standing in the front entry area with the passenger door open, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
118	TS 47.5	Safety Equipment	Documents, Drawings	Pre-Production Meetings	The following items shall be provided and installed within seven feet of the Operator's seat in a location that is easy reach, subject to LACMTA approval... a) DOT approved heavy-duty emergency reflector kit stored in a storage box. b) 5-pound (5 lb.) multipurpose fire extinguisher mounted with universal bracket.
119	TS 47.6	Bus Registration Holders	Documents, Drawings	Pre-Production Meetings	A Bus registration holder shall be installed above the operator near the ceiling, subject to LACMTA approval...
120	TS 47.7	Trash Hooks	Demonstration	Pilot Vehicle at Factory	Placement and selection of the hooks shall be reviewed on the Pilot Bus and are subject to LACMTA approval.
121	TS 49.1	Driver's Seat, Dimensions	Certification	Pre-pProduction Meetings	The driver's seat shall be comfortable and adjustable so that people ranging in size from a 95th-percentile male to a 5th-percentile female may operate the bus. The heavy-duty Operator's seat shall support Operators' in the orthopedically correct seating position.
122	TS 49.8.1	Exterior Mirrors	Documents, Drawings	Proposal Period	Mirrors shall be made of tempered plate glass or have safety backing to prevent shattering subject to approval...
123	TS 49.8.1	Exterior Mirrors	Documents, Drawings	Proposal Period	Adjustment of the mirrors shall be provided by two nubbin switches located to the left of the Operator, subject to LACMTA approval...
124	TS 49.8.1	Exterior Mirrors, Street Side Mirrors	Documents, Drawings	Proposal Period	Street side mirror shall be overhead mounted in a position to minimize potential contact with vehicles or cyclists, subject to LACMTA approval...
125	TS 49.8.2	Interior Mirrors	Documents, Drawings	Pre-Production Meetings	Mirrors shall be provided to permit the operator to observe passengers throughout the Bus, including entrances and exits, and directly in front of the bus during bicycle loading and unloading activities without leaving his seat and without shoulder movement, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
126	TS 51.	Windshield	Certification	Pre-Production Meetings	The windshield shall permit an operator's field of view as referenced in SAE Recommended Practice J1050. The vertically upward view shall be a minimum of 15 degrees, measured above the horizontal and excluding any shaded band. The vertically downward view shall permit detection of an object 3.5 feet high no more than two) feet in front of the bus. The horizontal view shall be a minimum of 90 degrees above the line of sight. Any binocular obscuration due to a center divider may be ignored when determining the 90-degree requirement, provided that the divider does not exceed a three-degree angle in the operator's field of view. Windshield pillars shall not exceed 10 degrees of binocular obscuration.
127	TS 51.	Windshield	Inspection	Prior to Pilot Vehicle Acceptance	The windshield shall be designed and installed to minimize external glare as well as reflections from inside the bus. Windshield shall be two-piece design
128	TS 52.	Driver's Side Window	Certification	Pre-production Meetings	The driver's side window glazing material shall have a ¼ in. nominal thickness laminated safety glass conforming with the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673. Light transmittance shall be maximum 75 percent on the glass area below 53 in. from the operator platform floor. On the top fixed over bottom slider configuration, the top fixed area above 53 inches may have a maximum one percent light transmittance.
129	TS 53.3	Side Windows, Configuration	Documents, Drawings	Proposal Period	Rearmost windows which are lower than shoulder height for seated passengers shall not be opened or equipped with emergency escape provisions, subject to LACMTA approval...
130	TS 53.4	Side Windows, Materials, Safety Glass Glazing Panels	Certification	Pre-production Meetings	Side windows glazing material shall have a minimum of 3/16 in. nominal thickness tempered safety glass. The material shall conform to the requirements of ANSI Z26.1-1996 Test Grouping 2 and the Recommended Practices defined in SAE J673. Windows on the bus sides and in the rear door shall be grey tint (13-50 percent) luminous transmittance as measured by ASTM D-1003), complementary to the bus exterior. The maximum solar energy transmittance shall not exceed 37 percent, as measured by ASTM E-424.

Item	Section	Title	Deliverable	Schedule	Requirement
131	TS 53.4	Side Windows, Materials, Anti-Vandalism Sacrificial Film	Certification	Proposal Period	All glazing material that is aft of the front standee line, and in front of the exit door, shall be equipped with an interior single layer 6 mil minimum laminated film. All glazing material that is aft of, and including, the exit door shall be equipped with an interior four layer laminated film. Both types of window film installations are subject to LACMTA approval...
132	TS 54	HVAC, Capacity and Performance	Test Documentation	Prior to Pilot Vehicle Acceptance	<p>The HVAC climate control system shall be modular design and capable of controlling the temperature and maintaining the humidity levels of the interior of the bus as defined in the following paragraphs.</p> <p>With the bus running at the design operating profile with corresponding door opening cycle, and carrying a number of passengers equal to 150 percent of the seated load, the HVAC system shall control the average passenger compartment temperature within a range between 65 ° and 80°F, while maintaining the relative humidity to a value of 50 percent or less. The system shall maintain these conditions while subjected to any outside ambient temperatures within a range of 10 ° to 95 °F and at any ambient relative humidity levels between 5 and 50 percent.</p> <p>System capacity testing, including pull-down/warm-up, stabilization and profile, shall be conducted in accordance to the APTA's "Recommended Instrumentation and Performance Testing for Transit Bus Air Conditioning System."</p>
133	TS 56.2	HVAC, Driver's Area	Test Documentation	Prior to Pilot Vehicle Acceptance	The windshield defroster unit shall meet the requirements of SAE Recommended Practice J381, "Windshield Defrosting Systems Performance Requirements," and shall have the capability of diverting heated air to the driver's feet and legs. The defroster or interior climate control system shall maintain visibility through the driver's side window.
134	TS 56.3	HVAC, Controls for the Climate Control System	Documents, Drawings	Proposal Period	Heater water control valves shall be "positive" type, when closed. The method of operating remote valves shall be subject to LACMTA approval...
135	TS 57	HVAC, Air Filtration	Certification	Pre-production Meetings	Air shall be filtered before discharge into the passenger compartment. The filter shall meet the ANSI/ASHRAE 52.2 requirement for 5 percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell. Air filters shall be easily removable for service.

Item	Section	Title	Deliverable	Schedule	Requirement
136	TS 62.3	Design, Curb Feelers	Sample	Upon Request	Curb feeler sample shall be provided to Contractor upon request.
137	TS 62.3	Design, Curb Feelers	Demonstration	Pilot Vehicle at Factory	Installation of curb feeler shall be subject to LACMTA approval...
138	TS 66	License Plate Provisions	Documents, Drawings	Pre-production Meetings	These provisions shall direct-mount or recess the license plates so that they can be cleaned by automatic bus-washing equipment without being caught by the brushes, subject to LACMTA approval...
139	TS 69.1	Service Compartments & Access Doors, Access Doors	Documents, Drawings	Pre-production Meetings	The fuel fill/charge port door shall be hinged at the top and shall open fully up against the side of the Bus subject to LACMTA approval...
140	TS 70.2	Bumpers, Front Bumper	Certification	Pre-production Meetings	No part of the bus, including the bumper, shall be damaged as a result of a five (5) mph impact of the bus at curb weight with a fixed, flat barrier perpendicular to the bus's longitudinal centerline. The bumper shall return to its pre-impact shape within ten minutes of the impact. The bumper shall protect the bus from damage as a result of 6.5 mph impacts at any point by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 310 loaded to 4,000 lbs parallel to the longitudinal centerline of the bus. It shall protect the bus from damage as a result of 5.5 mph impacts into the corners at a 30-degree angle to the longitudinal centerline of the bus.
141	TS 70.3	Bumpers, Rear Bumper	Certification	Pre-Production Meetings	No part of the bus, including the bumper, shall be damaged as a result of a two mph impact with a fixed, flat barrier perpendicular to the longitudinal centerline of the bus. The bumper shall return to its pre-impact shape within ten minutes of the impact. When using a yard tug with a smooth, flat plate bumper two feet wide contacting the horizontal centerline of the rear bumper, the bumper shall provide protection at speeds up to five mph, over pavement discontinuities up to one inch high, and at accelerations up to two mph/sec. The rear bumper shall protect the bus, when impacted anywhere along its width by the common carriage with contoured impact surface defined in Figure 2 of FMVSS 301 loaded to 4000 lbs, at four mph parallel to or up to a 30-degree angle to, the longitudinal centerline of the bus.
142	TS 70.5	Bicycle Rack	Documents, Drawings	Pre-Production Meetings	The installed bicycle rack shall not interfere with towing the Bus. California Code Title 13 requires that bike racks be installed with a way for the Operator to determine whenever the bike rack is deployed.

Item	Section	Title	Deliverable	Schedule	Requirement
143	TS 71.1	Finish and Color, Appearance	Documentation	Pre-production Meetings/Pilot Vehicle	Contractor shall utilize the LACMTA's existing local color scheme in its exterior paint design, (see Technical Specification Attachment 1-Metro Local Exterior and Interior Fleet Standards for reference). Exterior colors shall be applied over a white base color. The manufacturer shall submit for MTA's approval, a drawing showing painting layout including striping bends and breaks, during Pre-Production meetings. The Pilot Bus shall be painted according to this color scheme for approval by the LACMTA prior to application to the remainder of the buses..
144	TS 71.1	Finish and Color, Appearance	Documentation	With Each Vehicle	Exterior painted surfaces shall have a minimum of 0.5-mil thick primer coat and a minimum 2.5-mil thick finish coat. Mil thickness shall conform to paint manufacturer's specifications.
145	TS 72.1	Decals, Numbering and Signing, Passenger Information	Documents, Drawings	Pre-production Meetings	"Take One" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the minimum "Take Twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval...
146	TS 73.2	Exterior Lighting, Doorway Lighting	Test Documentation	Pilot Vehicle Prior to Production	Lamps at the front and rear passenger doorways shall comply with ADA requirements and shall activate only when the doors open. These lamps shall illuminate the street surface to a level of no less than one foot-candle for a distance of threefeet outward from the outboard edge of the door threshold with a passenger standing in the threshold. The lights must be positioned overhead and shall be shielded to protect passengers' eyes from glare.
147	TS 73.4	Exterior, Lighting, Headlights	Documents, Drawings	Proposal Period	Lenses shall be resistant to hazing and yellowing, and have proper hardness to resist surface scratches and stone chips, subject to LACMTA approval...
148	TS 74	Interior Panels & Finishes, General Requirements	Documents, Drawings	Proposal Period	Additional anti-graffiti/vandalism treatments shall be applied to interior surfaces, subject to LACMTA approval...
149	TS 75.	Interior Panels	Certification	Preproduction Meetings	Interior panel required to meet FMVSS 302. Materials shall comply with the Recommended Fire Safety Practices defined in FTA Docket 90-A, most recent revision.
150	TS 75	Interior Panels	Documents, Drawings	Proposal Period	Panels in other areas of the bus shall be stainless or other material as determined to best match appearance with the rear section of the bus subject to LACMTA approval...
151	TS 75.2	Interior Panels, Modesty Panel	Certification	Pilot Vehicle Prior To Production	The modesty panel and its mounting shall withstand a static force of 250 lbs applied to a four inch x four inch area in the center of the panel without permanent visible deformation.

Item	Section	Title	Deliverable	Schedule	Requirement
152	TS 75.2	Interior Panels, Modesty Panel	Inspection	Pilot Vehicle at Factory	At the rear door area a clear non-glass panel from above the modesty panel to the top of the daylight opening and attached to the stanchion.
153	TS 75.4	Interior Panels, Rear Bulkhead	Documents, Drawings	Proposal Period	Ceiling and enclosures adjacent to ceiling shall be made of durable, corrosion resistant, easily cleanable material subject to LACMTA approval...
154	TS 75.8	Interior Panels, Floor Covering	Certification	Preproduction Meetings & Pilot Vehicle at Factory	All interior floor areas shall be covered with a combination of gray color smooth and ribbed slip resistant rubber or equivalent floor covering that remains effective in all weather conditions with 12-year unconditional warranty, subject to LACMTA approval.
155	TS 75.8	Interior Panels, Floor Covering	Documents, Drawings	Proposal Period	The edge of any interior steps shall have minimal overhang. Special coating for the step tread section may be acceptable subject to LACMTA approval...
156	TS 75.9	Interior Panels, Interior Lighting	Documents, Drawings	Proposal Period	The lighting system shall meet FCC Part 18; Class A regulation for EMI conducted and radiated emissions. The interior lighting design shall be subject to LACMTA approval.
157	TS 75.12	Interior Panels, Seating Area(s) (Transit Bus)	Test Documentation	Pilot Vehicle Prior to Production	The interior lighting system shall provide a minimum 15 foot-candle illumination on a one square- foot plane at an angle of 45 degrees from horizontal, centered 33 inches above the floor and 24 inches in front of the seat back at each seat position. Allowable average light level for the rear bench seats shall be seven foot-candles.
158	TS 75.14	Interior Panels, Vestibules/Doors (Transit Bus)	Test Documentation	Pilot Vehicle Prior to Production	Floor surface in the aisles shall be a minimum of 10 foot-candles, and the vestibule area a minimum of four foot-candles with the front doors open and a minimum of two foot-candles with the front doors closed. The front entrance area and curb lights (if needed) shall illuminate when the front door is open and master run switch is in the "lights" positions. Rear exit area and curb lights shall illuminate when the rear door is unlocked
159	TS 75.16	Interior Panels, Step Lighting	Test Documentation	Pilot Vehicle Prior to Production	Step lighting for the intermediate steps between lower and upper floor levels shall be a minimum of four foot-candles and shall illuminate in all engine run positions.

Item	Section	Title	Deliverable	Schedule	Requirement
160	TS 75.17	Interior Panels, Ramp Lighting (Transit Bus)	Test Documentation	Pilot Vehicle Prior to Production	Exterior and interior ramp lighting shall comply with CFR Part 49, Section 38.31. Lights shall be provided at the doorway equipped with the wheelchair access system to floodlight the loading area. The light shall be wired through the ramp master toggle switch on the driver's dash and shall automatically illuminate when this switch is in the "On" position. During ramp operation, the street surface shall be illuminated to a minimum of six candlepower a distance of three (3) feet beyond the external dimensions of the ramp platform once deployed.
161	TS 75.19.1	Farebox Lighting, Transit Bus	Test Documentation	Pilot Vehicle Prior to Production	A light fixture shall be mounted in the ceiling above the farebox location. The fixture shall be capable of projecting a concentrated beam of light on the farebox. The light shall illuminate the top of the fare box and the surrounding floor area to a minimum of 15 foot-candles.
162	TS 76	Fare Collection	Documents, Drawings	Pre-Production Meetings	The Contractor shall provide and install GFI Genfare Odyssey Validation farebox base plate, power leads and ITS interface cable, subject to LACMTA approval...
163	TS 76	Fare Collection	Documents, Drawings	Pre-Production Meetings	A one-inch inside diameter waterproof conduit shall be provided from the ITS enclosure to the farebox base plate mounting location, through the Bus floor, to protect the power leads and ITS interface cable, subject to LACMTA approval...
164	TS 77	Interior Access Panels and Doors (Transit Bus)	Documents, Drawings	Pre-Production Meetings	Removal of fixtures or equipment unrelated to the repair task to gain access shall be precluded or used only subject to LACMTA approval...
165	TS 77	Interior Access Panels and Doors (Transit Bus)	Documents, Drawings	Pre-Production Meetings	Access doors shall be hinged with gas props or nover-center springs, where practical, to hold the doors out of the mechanic's way subject to LACMTA approval during pre-production meetings. All overhead doors shall be hinged at the top and shall be prevented from coming loose or opening during transit service or in bus cleaning operations. Panel fasteners shall be standardized so that only one tool is required to service all special fasteners within the Bus subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
166	TS 78.13	Passenger Seating, Structure and Design	Test Documentation	Pre-Production Meetings	Seat back handhold and armrests shall withstand static horizontal and vertical forces of 250 lbs applied anywhere along their length with less than ¼-inch permanent deformation. Seat back handhold and armrests shall withstand 25,000 impacts in each direction of a horizontal force of 125 lbs with less than ¼-inch permanent deformation and without visible deterioration.
167	TS 78.15	Passenger Seating, Construction and Materials	Documents, Drawings	Pre-Production Meetings	Selected materials shall minimize damage from vandalism and shall reduce cleaning time. The seats shall be attached to the frame with tamper-resistant fasteners and is subject to LACMTA approval...
168	TS 79.	Passenger Assists, (Transit Bus)	Demonstration	Pilot Vehicle at Factory	Passenger assists shall be convenient in location, shape, and size for both the 95th-percentile male and the 5th-percentile female standee.
169	TS 79.1	Assists (Transit Bus)	Certification & Test Documentation	Pre-Production Meetings	Passenger assists shall be capable of passing the NHTSA Drawstring Test. A crash resulting in a one- foot intrusion shall not produce sharp edges, loose rails, or other potentially dangerous conditions associated with a lack of structural integrity of the assists.
170	TS 79.1	Assists, (Transit Bus)	Test Documentation	Pre-Production Meetings	Assists shall withstand a force of 300 lbs applied over a 12-inch lineal dimension in any direction normal to the assist without permanent visible deformation.
171	TS 79.1	Assists, (Transit Bus)	Inspection	Pilot Vehicle at Factory	All passenger assists shall permit a full hand grip with no less than 1½ inches of knuckle clearance around the assist.
172	TS 79.3	Vestibule (Transit Bus)	Demonstration	Pilot Vehicle at Factory	The front assist should not impede wheelchair boarding and provide adequate clearance and access to the farebox during vaulting and maintenance.
173	TS 79.6	Longitudinal Seat Assists (Transit Bus)	Documents, Drawings	Pre-Production Meetings	A vertical assist or grabrail shall be provided convenient to the outer rear settee seats if they are immediately behind an aisle facing seat subject to LACMTA approval...
174	TS 80.1	Passenger Doors, Transit Bus	Documents, Drawings	Proposal Period	All passenger door components, except door panels and glazing, must come from one single manufacture, subject to LACMTA approval...
175	TS 81.1	Accessibility Provisions, Loading Systems	Documents, Drawings	Proposal Period	Bus shall utilize a low-floor fully electrically operated, preferably self-leveling wheelchair ramp system subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
176	TS 81.3	Accessibility Provisions, Lift	Test Documentation	Pre-Production & Pilot Vehicle Prior To Production	<p>The loading platform shall be covered with a replaceable or renewable nonskid material and shall be fitted with devices to prevent the wheelchair from rolling off the sides during loading or unloading.</p> <p>Deployment or storage of the ramp shall require no more than 15 seconds.</p> <p>Each operation shall require continues manual pressure to the momentary switch by the operator and shall not allow unintentional improper access system operation. The device shall function without failure or adjustment for 500 cycles or 5,000 miles in all-weather conditions on the design operating profile when activated once during the idle phase. A manual override system shall permit unloading a wheelchair and storing the device in the event of a primary power failure. The manual operation of the ramp shall not require more than 35 lbs of force.</p>
177	TS 81.5	Wheelchair Accommodations	Documents, Drawings	Proposal Period	Forward facing wheelchair securement and occupant restraint systems shall be the QPod or approved equal, subject to LACMTA approval...
178	TS 81.5.2	Wheelchair Accommodations, Rear Facing	Documents, Drawings	Pre-Production Meetings	Fabric covering on the padded barrier shall be blue, subject to LACMTA approval.
179	TS 83	Signage and Communication, Destination Signs	Documents, Drawings	Pre-Production Meetings	<p>The destination sign compartments shall meet the following minimum requirements.</p> <p>Compartments shall be designed to prevent condensation and entry of moisture and dirt.</p> <p>Compartments shall be designed to prevent fogging of both compartment window and glazing on unit itself.</p> <p>Access shall be provided to allow cleaning of inside compartment window and unit glazing, subject to LACMTA approval in Pre-Production meetings.</p> <p>Front window exterior display area shall be sized to allow full visibility of the front destination sign.</p>
180	TS 83.	Destination Signs, (Programming)	Deliverable	Pilot Vehicle Delivery in L.A.	Software shall be furnished for programming the sign system via an IBM compatible lap-top computer.

Item	Section	Title	Deliverable	Schedule	Requirement
181	TS 84.1	Passenger Information, Interior Displays	Documents, Drawings	Pre-Production Meetings	"Take one" boxes shall be mounted at both the front and rear doors in convenient locations for passengers and the minimum "take twelve" unit shall be located in a convenient location towards the front of the bus, subject to LACMTA approval...
182	TS 85.1	Passenger Stop Request/Exit Signal	Documents, Drawings	Pre-Production Meetings	A minimum of twelve stop request signal buttons utilizing a yellow housing shall be evenly distributed in the passenger cabin to be functionally accessible to all seated passengers subject to LACMTA approval...
183	TS 85.1	Passenger Stop Request/Exit Signal	Documents, Drawings	Proposal Period	Pricing for the installation of a wireless pushbutton switch system shall be provided on PF-1 Form, Schedule of Optional Vehicle Configuration.
184	TS 86	Communications	Documents, Drawings	Pre-Production Meetings	Service light(s) with suitable switch shall be provided within the enclosure, subject to LACMTA approval.
185	TS 86.1	Camera Surveillance System	Demonstration	Pilot Vehicle at Factory	A day-to-night demonstration shall be required to establish camera performance and final placement for optimum views and clarity. The LACMTA shall witness the demonstration and approve the final placement of the cameras. This demonstration must be successfully completed prior to approval of the pilot bus(s).
186	TS 86.1	Camera Surveillance System, Interior Cameras	Documents, Drawings	Pre-Production Meetings	Front interior camera(s) at front door passenger boarding area shall record audio subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
187	TS 86.1	Camera Surveillance System, Interior Cameras, Exterior Cameras	Documentation	Pilot Vehicle at Factory	<p>Cameras shall be placed for best recording of the following five (5) areas:</p> <ul style="list-style-type: none"> a) Forward 1/3 of passenger area, view of front vestibule, farebox transactions and field of view to include operator and image of bus number located on operator's barrier b) Front door, passenger boarding c) Rear door, passenger exiting d) Middle 1/3 passenger area e) Rear 1/3 passenger seating area starting from behind rear door with a primary emphasis on the rearmost seats. <p>Cameras shall be placed for best recording of the following four (4) areas:</p> <ul style="list-style-type: none"> a) Forward looking through windshield (Accident Surveillance) b) The curb side area of the Bus, (including exit door), and street from ten feet beyond front bumper to ten feet beyond rear bumper c) Street side area of the Bus and street from ten feet beyond the front bumper to ten feet beyond the rear bumper d) Rear camera shall view the ground behind the Bus from the bumper to approximately 25 feet back
188	TS 86.1	Exterior Cameras	Demonstration	Pilot Vehicle at Factory	Camera positions and adjustment are subject to LACMTA approval...
189	TS 86.1	Camera Monitor	Documentation	Pre-Production Meetings	Final monitor configuration is subject to LACMTA approval during pre-production meetings.
190	TS 86.1	Camera Surveillance System, Central Processor	Inspection	Pilot Vehicle at Factory	The video security system central processor shall be packaged in a suitable ventilated shock mounted and splash resistant enclosure keyed to LACMTA standards, located within the ITS enclosure, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
191	TS 86.1	System Management Tool	Documentation	Pre-Production Meetings	shall incorporate a system management tool for; wireless download of video files in a timely manner, software upgrades, camera checks, configuration changes and health reports as required. Final configuration is subject to LACMTA approval.
192	TS 86.1	System Management Tool	Documentation	Proposal Period	Pricing of the system management tool for use at up to 13 LACMTA operating divisions shall be provided to the LACMTA on Price Form PF-4, Schedule C of Prices of Diagnostic Test Equipment.
193	TS 86.1	Enhanced Video Recording System Option	Documentation	Proposal Period	Pricing for optional features to enhance the video recording system shall be provided on Price Form PF-1, Schedule of Optional Vehicle Configuration. Ability of video system to analyze and discern events such as wheelchair passengers and generate report information with summary data such as wheelchair passenger count and boarding/alighting locations. The ability to utilize the dash mounted display for diagnostic work or configuration changes on the DVR. Incorporation of a 360 degree camera(s) for better surveillance of bus interior.
194	TS 86.2	Public Address System	Documentation	Pre-Production Meetings	The location of the gooseneck microphone is subject to LACMTA approval in pre-production meetings.
195	TS 86.3	Automatic Passenger Counter (APC)	Documentation	Pre-Production Meetings	Provisions and necessary cables for installation of door sensors and analyzer(s) for IRMA-3 infrared APC system shall be provided subject to LACMTA approval.
196	TS 86.3	Automatic Passenger Counter (APC)	Documentation	Proposal Period	As an option, LACMTA may consider incorporating an installation of IRMA-Matrix infrared APC System. Pricing to include; installation, cabling, door sensors, analyzer(s), software, integration testing, first article acceptance and any other items necessary for proper operation shall be submitted on form PF-1, Schedule of Optional Vehicle Configuration.
197	TS 86.4.4	Emergency Alarm	Documentation	Pre-Production Meetings	SAS switch location and lead wire routing is subject to LACMTA approval...
198	TS 86.8	ITS Provisions, WLAN	Documentation	Pre Production Meetings	Sierra Wireless InMotion MG90 or an approved equal wireless router/switch and feedline shall be installed, subject to LACMTA approval...

Item	Section	Title	Deliverable	Schedule	Requirement
199	TS 86.9	ITS Provisions, Radio Antennas	Documentation	Pre-Production Meetings	The antenna mounting and lead termination shall be accessible from the Bus interior, subject to LACMTA approval...
200	TS 86.10	ITS Provisions, Global Positioning System (GPS)	Documentation	Pre-Production Meetings	The GPS Antenna shall be mounted on the centerline of the roof of the bus near the front, with a quick disconnect, within two feet from the antenna, for future replacement subject to LACMTA approval... See TS 88.1 Approved Equals.
201	TS 86.11	ITS Provisions, IBSS	Documentation	Pre-Production Meetings	Battery and ignition power and a separate J1939 communication connection shall be supplied in the ITS enclosure, subject to LACMTA approval...
202	TS 88.2	Maintainability Requirements	Demonstration	Pilot Vehicle at Factory and in LA	The Contractor shall be required to demonstrate these maintenance tasks using the information contained in the service and parts manuals.



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-048

Response Required: No

Date: March 14, 2019

File Nos.:

Action Item(s):

CDRL: n/a

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 13
PROCURE LINE ITEMS - SPECIAL TOOLS (PF-3); DIAGNOSTIC TEST
EQUIPMENT (PF-4); UPDATED PRICING FORMS**

Reference: ELMA-055, 057

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 13

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 13

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 13 to Contract No.: OP28367-000 is made effective on the 8th day of February 2019 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, and Contract Modification No. 12 dated January 17, 2019, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. MTA to procure specific line items under the Pricing Form PF-3 Special Tools and PF-4 Diagnostic Test Equipment.
2. Update the Pricing Forms PF1 to PF 5, as attached.

Modify Article IV COMPENSATION to read as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of \$199,324,170, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

Contract Options may be exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

2. Training Aids - Additionally, in consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor for line items under Pricing Form PF-5 Training Aids in the amount of \$349,646 inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions, CP- 2 (H).

- a. Ea. One complete running engine and transmission assembly, including cooling and fueling systems, mounted on a suitable roll around stand (TS 5.6.3.a)
 - b. Ea. Anti-Lock Brake Board (TS 5.6.3.f)
 - c. Ea. Electric Air Conditioning Training Simulator Module (TS 5.6. 3.g)
 - d. Ea. Video Security System (TS 5.6.3.i)
 - e. Ea. Multiplex Electrical Training Board (TS 5.6.3.k)
 - f. Ea. Voith DIWA.6 transmission training cutaway (TS 5.6.3.b)
3. Special Tools (PF-3) - In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Contractor will provide two (2) Complete Voith Special Service Tool Kits (P/N 3040093309) under Pricing Form PF-3. Contractor is providing this line item at no cost to Metro.
4. Diagnostic Test Equipment (PF-4) - In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor for the following line items under Pricing Form PF-4 Diagnostic Test Equipment in the amount of \$104,586, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions, CP- 2 (G).

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION</u>	<u>QTY.</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
a.	Ea.	Engine Diagnostic software, including necessary cables and connectors (TS 5.6.5)	20	\$1,170.00	\$23,400.00
b.	Ea.	Voith Transmission Diagnostic Tooling Kit (P/N 151.00400712) (TS 5.6.5)*	20	\$805.50	\$8,055.00*
c.	Ea.	ABS Diagnostic software, including necessary cables and connectors (TS 5.6.5)	20	\$1,370.00	\$27,400.00
d.	Ea.	Multiplex System PC software and connection kit	20	\$332.00	\$6,640.00
e.	Ea.	A/C Interface Software and Cable (TS 5.6.5)	20	\$585.00	\$11,700.00
f.	Ea.	Door System Diagnostic/ Programming Software, Tools & Equipment (TS 5.6.5)	20	\$905.00	\$18,100.00
		Total			\$95,295.00
		Tax (9.75%)			\$ 9,291.26
		Total Amount, including tax			\$104,586.00

* Ten (10) Voith Transmission Diagnostic Tool kits are being provided at no cost to MTA

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 13 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature

Tony Wayne
Type or Print Name

2/14/15
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By:


Wayne Okubo
Director, Contract Administration

Date

3/13/19

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 13

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

1.0 CONTRACT FOR 295 BUSES (BASE BUY)			Taxable		
No.	Qty.	Description of Item	Unit Price	Unit Price	Total Price
1	229	40' Low Floor CNG Buses (Base Buy) from PF-1A Values derived from PF-1A*:	\$596,199.46	\$615,939.30	\$141,050,100
	66	¹ 40' Low Floor CNG Buses (Base Buy) from PF-1A	\$595,805.53	\$615,545.53	\$40,626,005
1a	Lot	Manuals (Base Buy) (TS 5.6.4)	\$2,281.50	Lump Sum	\$23,400.00
1b	295	Vehicle Delivery Charge for Base Buy Value of all taxable delivery charges per bus**:		\$275.00	\$81,125.00
1c	229	Tax (Base Buy Production Bus 67 - 295)	9.75%	\$58,129.45	\$13,313,925
1d	66	Tax (Base Buy Production Bus 1-66)	9.75%	\$58,091.04	\$3,834,009
2	2	Pilot Buses Retrofit with Rear Axle Upgrade		\$8,600	\$17,201
2a		Tax	9.75%	\$838.55	\$1,677
3	Lot	Reserved			
4	Lot	Reserved			
5	Lot	Reserved			
6	Lot	Reserved			
7	Lot	Performance Bond (Base Buy)		Lump Sum	\$119,336.00
8	1,000	Total Training Hours for Base Buy***		\$175,000.00	
8a	900	Contractor (Proposer/Prime) Base Buy		\$175.00	\$157,500.00
8b	100	Subcontractor/Supplier Base Buy		\$175.00	\$17,500.00
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1		\$74,930.00	\$74,930.00
10a	15	Special Towing Equipment (TS 25)		\$386.00	\$5,790.00
10b		Tax	9.75%	\$37.64	\$564.53
11a	2	Rear Recovery Devices/Tie Downs (TS 25)		\$505.00	\$1,010.00
11b		Tax	9.75%	\$49.24	\$98.48
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation					
In U.S. Dollars Using Words:			ONE HUNDRED NINETY NINE MILLION THREE HUNDRED TWENTY FOUR THOUSAND ONE HUNDRED SEVENTY DOLLARS		
In U.S. Dollars Using Figures:				\$199,324,170	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 13

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

NOTE ¹ Unit Prices from Mod. No. 7 for Production Buses 1 - 65

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Training Hours for Base Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

2.0 CONTRACT FOR 150 UP TO 305 BUSES (OPTION BUY)

<u>No.</u>	<u>Qty.</u>	<u>Description of Item</u>	<u>Taxable</u>		
			<u>Unit Price</u>	<u>Unit Price</u>	<u>Total Price</u>
10	305	40' Low Floor CNG Buses (Option Buy) from PF-1A for 150 to 305 vehicles*	\$596,199.46	\$615,939.30	\$187,861,486.50
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$2,281.50	Lump Sum	\$23,400.00
10b	305	Vehicle Delivery Charge for Option Buy Value of all taxable delivery charges per bus**:	\$0.00	\$275.00	\$83,875.00
10c		Tax (Option Buy)	9.75%	\$58,129.45	\$17,731,762.94
11		Reserved		\$	\$
12	Lot	Performance Bond for Option Buy***		Lump Sum	\$123,421.00
13	500	Total Training Hours for Option Buy****		\$87,500.00	
13a	450	Contractor (Proposer/Prime) Option Buy		\$175.00	\$78,750.00
13b	50	Subcontractor/Supplier Option Buy		\$175.00	\$8,750.00
14		Reserved		\$	\$

2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation

In U.S. Dollars Using Words: **TWO-HUNDRED FIVE MILLION NINE HUNDRED ELEVEN THOUSAND FOUR HUNDRED FORTY FIVE DOLLARS**

In U.S. Dollars Using Figures: **\$205,911,445**

NOTE * Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** For proposal purposes only, Manuals and Bond prices are for all 305 bus Options exercised. Actual cost will depend on Option quantity ordered.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 13

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

3.0 OPTIONAL VEHICLE CONFIGURATION				
No.	Qty.	Description of Item	Unit Price	Total Price
15	1	3 ADA Securement Configuration TS 81.5 (Total 15a - 15d)		\$6,370.00
15a		Direct Materials/Equipment	\$5,750.00	
15b		Labor Installation Costs	\$620.00	
15c		Non Recurring Cost	\$0.00	
15d		Other Costs (Identify)	\$0.00	
16	1	4 ADA Securement Configuration TS 81.5 (Total 16a - 16d)		\$10,170.00
16a		Direct Materials/Equipment	\$9,150.00	
16b		Labor Installation Costs	\$1,020.00	
16c		Non Recurring Cost	\$0.00	
16d		Other Costs (Identify)	\$0.00	
17	600	Reserved****		
17a	295	Reserved		
17b	305	Reserved		
18	600	25-Year Certified CNG Tanks		\$522,000.00
18a	295	25 Yr Certified CNG Tanks for Base Buy	\$256,650.00	
18b	305	25 Yr Certified CNG Tanks for Option Buy for 150 up to 305 vehicles	\$265,350.00	
19	600	Complete Automatic Passenger Counter System TS 86.3 (Total 19a - 19h)		\$2,757,600.00
19a	295	Direct Materials/Equipment for Base Buy APC	\$4,136.00	
19b	295	Labor Installation Costs for Base Buy APC	\$460.00	
19c	295	Non Recurring Cost for Base Buy APC	\$	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 13

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

19d	295	Other Costs (Identify) for Base Buy APC		\$	
		Total for Base Buy APC	\$1,355,820.00	\$4,596.00	
19e	305	Direct Materials/Equipment for Option Buy APC for 150 up to 305 vehicles		\$4,136.00	
19f	305	Labor Installation Costs for Option Buy APC for 150 up to 305 vehicles		\$460.00	
19g	305	Non Recurring Cost for Option Buy APC for 150 up to 305 vehicles		\$	
19h	305	Other Costs (Identify) for Option Buy APC for 150 up to 305 vehicles		\$	
		Total for Option Buy APC for 150 up to 305 vehicles	\$1,401,780.00	\$4,596.00	
20	600	Enhanced 360 degree Camera System TS 86.1 (Total 20a - 20h)			\$579,000.00
20a	295	Direct Materials/Equipment for Base Buy Enhanced Camera System		\$869.00	
20b	295	Labor Installation Costs for Base Buy Enhanced Camera System		\$96.00	
20c	295	Non Recurring Cost for Base Buy Enhanced Camera System		\$	
20d	295	Other Costs (Identify) for Base Buy Enhanced Camera System		\$	
		Total for Base Buy Enhanced Camera System	\$284,675.00	\$965.00	
20e	305	Direct Materials/Equipment for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$869.00	
20f	305	Labor Installation Costs for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$96.00	
20g	305	Non Recurring Cost for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$	
20h	305	Other Costs (Identify) for Option Buy Enhanced Camera System for 150 up to 305 vehicles		\$	
		Total for Option Buy Enhanced Camera System for 150 up to 305 vehicles	\$294,325.00	\$965.00	
21	600	USB Ports for Passenger Charging Only			\$288,000.00
21a	295	USB Ports for Passenger Charging Only for Base Buy	\$141,600.00	\$480.00	
21b	305	USB Ports for Passenger Charging Only for Option Buy for 150 up to 305 vehicles	\$146,400.00	\$480.00	
22	600	Optional Wireless Stop Request Switches (Bus set)			\$291,000.00
22a	295	Optional Wireless Stop Request Switches (Bus set) for Base Buy	\$143,075.00	\$485.00	

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 13

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

22b	305	Optional Wireless Stop Request Switches (Bus set) for Option Buy for 150 up to 305 vehicles	\$147,925.00	\$485.00	
23	600	Optional Full Color Destination Sign Sets (TS 86.3)			\$2,070,000.00
23a	295	Optional Full Color Destination Sign Sets (TS 86.3) for Base Buy	\$1,017,750.00	\$3,450.00	
23b	305	Optional Full Color Destination Sign Sets (TS 86.3) for Option Buy for 150 up to 305 vehicles	\$1,052,250.00	\$3,450.00	
24	Lot	Spare Parts (From Schedule A, Form PF-2)			\$2,261,788.13
25	Lot	Special Tools (Schedule B Form PF-3)			\$16,731.60
26	Lot	Diagnostic Test Equipment (Schedule C, Form PF-4)			\$336,020.00
27	Lot	Training Aids (Schedule D, Form PF-5)			\$989,385.00
3.0 Total Price for OPTIONAL VEHICLE CONFIGURATION (Sum of Items "15 through 27") for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation.					
In U.S. Dollars Using Words:			TEN-MILLION ONE HUNDRED TWENTY EIGHT THOUSAND SIXTY FIVE DOLLARS		
			In U.S. Dollars Using Figures:		\$10,128,065

**** Proposer shall provide base Low Nox Engine for each bus with the following Emission Levels:
 ISLG engine is not the base engine requirement. Low Nox engine is the base requirement and therefore no longer an option.

Oxides of Nitrogen (NOx) Grams per brake horsepower-hour	Particulate Matter (PM) grams per brake horsepower hour
0.02	0.01

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1 (CNG - 40') - CONTRACT PRICE SUMMARY
Contract Modification No.: 13

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

4.0 CONTRACT FOR BASE BUY, OPTION BUY, AND OPTIONALVEHICLE CONFIGURATION			Total Price
No.	Qty.	Description of Item	
1.0		Total Price for CONTRACT for 295 Base Buy Buses to be the BASIS for Price Proposal evaluation	\$199,324,170
2.0		Total Price for CONTRACT for 150 Up to 305 Option Buy Buses to be the BASIS for Price Proposal evaluation	\$205,911,445
3.0		Total Price for OPTIONAL VEHICLE CONFIGURATION for OPTIONAL EQUIPMENT to be BASIS for Price Proposal evaluation	\$10,128,065
4.0		Total Price for CONTRACT for 295 Base Buy Buses, for 150 up to 305 Option Buy Buses, and Optional Vehicle Configuration for Optional Equipment combined to be the overall BASIS for Price Proposal evaluation	
In U.S. Dollars Using Words:			FOUR-HUNDRED FIFTEEN MILLION THREE HUNDRED SIXTY THREE THOUSAND SIX HUNDRED EIGHTY DOLLARS
			In U.S. Dollars Using Figures: \$415,363,680

(Signature of Person Executing Proposal)

Date

TONY WAYNE VICE PRESIDENT & GENERAL MANAGER

Type Name, Title

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40') SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO.: 13

Contractor: **ELDORADO NATIONAL (CALIFORNIA), INC**
Contract No.: **OP28367-000**

BASE BUY		
NO.	DESCRIPTION OF ITEM	
1	Purchased Subsystem Equipment (Items 1.1 through 1.99) **	
1.1	TS 9. Propulsion Power Assembly (PPA)***	\$18,372
1.2	TS 9. Engine	\$60,324
1.3	TS 10. Cooling System	\$12,650
1.4	TS 18. Fuel System	\$68,300
1.5	TS 19.2 Heat shield between catalytic converter and HVAC unit	\$332.55
1.6	TS 23.1 Hinge Rear Cross Seat Access to the bulkhead	\$65.66
1.7	TS 31. Suspension	\$19,950
1.8	TS 33. Steering System	\$4,950
1.9	TS 37. Brakes	\$3,260
1.10	TS 39. Pneumatic System	\$6,850
1.11	TS 42. Charging System	\$36,800
1.12	TS 44. Multiplex Control System	\$24,200
1.13	TS 54. HVAC Climate Control System	\$29,450
1.14	TS 75.2 Protective film on modesty panels	\$116.94
1.15	TS 76 Ethernet Cable to Farebox	\$38.38
1.16	TS 78. Passenger Seats	\$28,955
1.17	TS 80. Doors	\$14,830
1.18	TS 81. Accessibility Provisions	\$19,740
1.19	TS 86. Communications	\$3,244
1.20	TS 86.3 Ethernet Cables in ITS enclosure	\$310.91
1.21	TS 11 Transmission	\$14,261
1.22	TS 78.1 USB Passenger Charging Port	\$480
1.23	TS85.1 Wirelesss Stop Request Button	\$485
1.24	TS 86.3 Matrix APC	\$4,596
1.99	TS 34 Meritor Rear Axle Upgrade	\$1,040
	All other bus subsystem equipment not included above	\$241,944
TOTAL CNG BUS PRICE		
	Production Bus 1 - 66	* \$615,545.53
	Add Altro Flooring (Bus 67 - 295)	\$393.80
	Production Bus 67 - 295	\$615,939.30

*Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, line Item 1 - **Base Buy**)

- Notes:**
- ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
 - Price for line Item Nos. 1a-27 in the CONTRACT PRICE SUMMARY(Form PF-1) shall not be included in computing price of any of the line items
 - *** PPA unit price for line item 1.1 excludes prices for items 1.2 through 1.99

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-1A (CNG - 40') SUBSYSTEM EQUIPMENT
CONTRACT MODIFICATION NO.: 13

		OPTION BUY	
NO.	DESCRIPTION OF ITEM		
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **		
2.1	TS 9. Propulsion Power Assembly (PPA)***		\$18,372
2.2	TS 9. Engine		\$60,324
2.3	TS 10. Cooling System		\$12,650
2.4	TS 18. Fuel System		\$68,300
2.5	TS 19.2 Heat shield between catalytic converter and HVAC unit		\$332.55
2.6	TS 23.1 Hinge Rear Cross Seat Access to the bulkhead		\$65.66
2.7	TS 31. Suspension		\$19,950
2.8	TS 33. Steering System		\$4,950
2.9	TS 37. Brakes		\$3,260
2.10	TS 39. Pneumatic System		\$6,850
2.11	TS 42. Charging System		\$36,800
2.12	TS 44. Multiplex Control System		\$24,200
2.13	TS 54. HVAC Climate Control System		\$29,450
2.14	TS 75.2 Protective film on modesty panels		\$116.94
2.15	TS 76 Ethernet Cable to Farebox		\$38.38
2.16	TS 78. Passenger Seats		\$28,955
2.17	TS 80. Doors		\$14,830
2.18	TS 81. Accessibility Provisions		\$19,740
2.19	TS 86. Communications		\$3,244
2.20	TS 86.3 Ethernet Cables in ITS enclosure		\$310.91
2.21	TS 11 Transmission		\$14,261
2.22	TS 78.1 USB Passenger Charging Port		\$480
2.23	TS85.1 Wirelesss Stop Request Button		\$485
2.24	TS 86.3 Matrix APC		\$4,596
2.99	TS 34 Meritor Rear Axle Upgrade		\$1,040
	All other bus subsystem equipment not included above including flooring		\$242,338
TOTAL CNG BUS PRICE OPTION QUANTITY			* \$615,939.30

* Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, -line item 10 - Option Buy)

- Notes:** 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
2. Price for line Item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the li
3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99

<div style="border: 1px solid black; height: 30px; margin-bottom: 5px;"></div> (Signature of Person Executing Proposal) <div style="border: 1px solid black; padding: 2px;">TONY WAYNE /VICE PRESIDENT & GENERAL MANAGER</div> Type Name, Title	<div style="border: 1px solid black; height: 30px; margin-bottom: 5px;"></div> Date
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GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 13

CONTRACTOR: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
LOW NOX ENGINE					
1	Ea.	Propulsion Power Assembly (See Definition in SP-1)	3	\$86,270.00	\$258,810.00
2	Ea.	Air Compressor	5	\$6,760.00	\$33,800.00
3	Ea.	Turbo	3	\$1,982.00	\$5,946.00
4	Ea.	EGR Cooler	20	\$1,110.47	\$22,209.40
5	Ea.	EGR Valve	10	\$610.68	\$6,106.80
6	Ea.	Delta P Sensor	10	\$347.66	\$3,476.60
7	Ea.	Mass. Air Flow Sensor	10	\$1,067.56	\$10,675.60
8	Ea.	Oxygen Sensor	20	\$223.61	\$4,472.20
9	Ea.	Catalyst	5	\$3,574.95	\$17,874.75
10	Ea.	Cylinder Head	5	\$4,513.81	\$22,569.05
11	Ea.	Pistons Kits	60	\$325.00	\$19,500.00
12	Bus Set	Rod Bearings	10	\$64.00	\$640.00
13	Bus Set	Main Bearing	10	\$219.27	\$2,192.70
14	Ea.	Liners	60	\$191.87	\$11,512.20
15	Ea.	Head Gasket	5	\$428.75	\$2,143.75
16	Ea.	Upper Gasket Set	5	\$844.99	\$4,224.95
17	Ea.	Oil Pan Gasket	20	\$133.60	\$2,672.00
18	Ea.	Stiffener Plate Gasket	20	\$92.85	\$1,857.00
19	Ea.	Oil Pan	5	\$505.51	\$2,527.55
20	Ea.	Throttle Actuator	5	\$574.16	\$2,870.80
21	Ea.	Fuel Control Valve	10	\$1,429.19	\$14,291.90
22	Ea.	Ignition Control Module	10	\$1,648.45	\$16,484.50
23	Ea.	Ignition Coils	120	\$175.23	\$21,027.60
24	Ea.	Engine Harness	5	\$1,493.62	\$7,468.10
25	Ea.	Ignition Harness	10	\$167.53	\$1,675.30
26	Ea.	Oil Cooler	5	\$179.73	\$898.65
27	Ea.	Lube Pump	5	\$275.51	\$1,377.55
28	Ea.	Front Crank Seal	10	\$30.54	\$305.40
29	Ea.	Rear Seal	10	\$28.65	\$286.50
30	Ea.	Water Pump	10	\$175.03	\$1,750.30
31	Ea.	Vibration Damper	10	\$344.21	\$3,442.10
32	Ea.	Belt Tensioner (If applicable)	20	\$145.47	\$2,909.40
33	Ea.	CoolantTemperature Sensor	20	\$11.21	\$224.20
34	Ea.	Oil Pressure Sensor	10	\$98.10	\$981.00
35	Ea.	Fuel Pressure Sensor	10	\$144.34	\$1,443.40
36	Ea.	Low Fuel Pressure Regulator	10	\$1,222.22	\$12,222.20
37	Ea.	Engine Cradle	5	\$1,420.00	\$7,100.00
38	Ea.	Belt Guard	5	\$358.80	\$1,794.00
39	Ea.	Complete Engine Package (See definition in TS-2)	4	\$66,430.00	\$265,720.00
40	Bus Set	Spark Plugs	15	\$42.02	\$630.30
41	Bus Set	Adaptation Kit (Eng to Trans)	3	\$1,066.00	\$3,198.00
42	Ea.	PPA Dollies	8	\$685.00	\$5,480.00

PRICING FORM

PF2 - CNG 40'

SCHEDULE A - SPARE PARTS

Contract Mod. No.13

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 13

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
COOLING SYSTEM					
1	Ea.	Radiator Packages (See definition in TS-2)	5	\$7,715.00	\$38,575.00
2	Ea.	Thermal Management Controllers	5	\$598.32	\$2,991.60
3	Bus Set	Fan Resistors	20	\$48.60	\$972.00
4	Bus Set	CAN Interface Cables	5	\$101.25	\$506.25
5	Ea.	Fan Reversal LED Panel	5	\$593.39	\$2,966.95
6	Ea.	Fan Assembly	30	\$40.66	\$1,219.80
7	Ea.	Coolant Reservoir	10	\$556.20	\$5,562.00
8	Ea.	Transmission Cooler	10	\$648.00	\$6,480.00
9	Bus Set	Pressure Relief Valve	20	\$23.85	\$477.00
10	Ea.	Radiator Cap	30	\$5.27	\$158.10
11	Ea.	Coolant Overflow Tank	10	\$36.29	\$362.90
CHARGING SYSTEM					
1	Ea.	Alternator	10	\$9,750.00	\$97,500.00
2	Ea.	Voltage Regulators	10	\$351.00	\$3,510.00
3	Ea.	Batteries	40	\$203.77	\$8,150.80
4	Ea.	Battery Equilizer	20	\$418.50	\$8,370.00
5	Ea.	Battery Disconnect	10	\$31.82	\$318.20
6	Ea.	Battery Separator	5	\$297.00	\$1,485.00
7	Ea.	Power Distribution Panel in Battery Compartment	5	\$267.30	\$1,336.50
8	Ea.	Low Voltage Disconnect	10	\$44.55	\$445.50
9	Ea.	Circuit Breaker 80A	20	\$31.59	\$631.80
10	Ea.	Circuit Breaker 100A	20	\$39.15	\$783.00
11	Ea.	Circuit Breaker 120A or 130A, whichever applies	20	\$49.95	\$999.00
12	Bus Set	Fuse and Circuit Breaker Panels	5	\$310.50	\$1,552.50
SUSPENSION					
1	Bus Set	Air Ride Beams	10	\$2,310.00	\$23,100.00
2	Bus Set	Air Bags	20	\$672.00	\$13,440.00
3	Ea.	Front Axle	10	\$4,879.85	\$48,798.50
4	Ea.	Rear Axle	10	\$9,721.86	\$97,218.60
5	Bus Set	Radius Rods	5	\$412.80	\$2,064.00
6	Bus Set	Shocks	10	\$383.68	\$3,836.80
7	Bus Set	Leveling Valve Front	10	\$191.81	\$1,918.10
8	Bus Set	Leveling Valve Rear	10	\$191.81	\$1,918.10
DRIVE TRAIN					
1	Ea.	Transmission	5	\$14,261.00	\$71,305.00
2	Ea.	TCM Programmed	5	\$611.00	\$3,055.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 13

CONTRACTOR: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
3	Ea.	Adaptation Kit (Trans to Eng)	2	\$1,066.00	\$2,132.00
4	Ea.	Drive Shaft	10	\$544.00	\$5,440.00
5	Ea.	Differential	15	\$6,972.00	\$104,580.00

STEERING SYSTEM

1	Bus Set	Steering Gear and Linkage	10	\$1,172.50	\$11,725.00
2	Ea.	Steering Column	10	\$596.77	\$5,967.70
3	Ea.	Steering Shaft	10	\$135.30	\$1,353.00
4	Ea.	Steering Box Assembly	10	\$277.78	\$2,777.80
5	Ea.	Power Steering Gear Assembly	10	\$893.97	\$8,939.70

PNEUMATIC SYSTEM

1	Bus Set	Air Tanks (Complete Sets)	10	\$352.00	\$3,520.00
2	Ea.	Air Dryer	10	\$400.66	\$4,006.60
3	Ea.	Air Governor	10	\$68.80	\$688.00
4	Bus Set	Pressure Reducing Valves	10	\$28.80	\$288.00
5	Bus Set	Check Valves	10	\$57.60	\$576.00
6	Bus Set	Brake Control Valve	10	\$46.40	\$464.00
7	Bus Set	Brake Pedal Valve	10	\$134.54	\$1,345.40
8	Bus Set	Quick Release Valve	10	\$17.60	\$176.00
9	Bus Set	Parking Relay Valve	10	\$57.60	\$576.00
10	Bus Set	Parking Control Valve	10	\$46.40	\$464.00
11	Bus Set	Air Brake Tubing	10	\$134.54	\$1,345.40
12	Bus Set	Solenoid Valve Assembly	10	\$17.60	\$176.00

FUEL SYSTEM

1	Bus Set	Fuel Cylinder Assembly	2	\$68,300.00	\$136,600.00
2	Ea.	Fill Manifold	2	\$592.00	\$1,184.00
3	Bus Set	Shut Off Valve Assembly	5	\$440.00	\$2,200.00
4	Bus Set	PRD'S	10	\$134.40	\$1,344.00
5	Ea.	High Fuel Pressure Regulator	20	\$600.00	\$12,000.00
6	Bus Set	Defueling Valves	5	\$1,560.00	\$7,800.00
7	Ea.	Low/High Pressure Filer Assembly	5	\$704.00	\$3,520.00
8	Bus Set	Fuel Pressure Gauges	10	\$88.00	\$880.00
9	Bus Set	Defueling Switches	5	\$41.60	\$208.00
10	Bus Set	Manifold Shut Off Valve Assembly	10	\$325.00	\$3,250.00
11	Bus Set	Solenoid Valve Assembly	10	\$376.00	\$3,760.00
12	Bus Set	Fuel Line Assembly	10	\$576.00	\$5,760.00
13	Ea.	Low Pressure Sensor	20	\$144.00	\$2,880.00
14	Ea.	Proximity Switch @ the Fuel Fill Door	20	\$7.94	\$158.80
15	Bus Set	Fuel Line Assembly	5	\$576.00	\$2,880.00
16	Bus Set	Vent Tubes	5	\$137.60	\$688.00

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 13

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
17	Ea.	Control Harness	5	\$240.00	\$1,200.00
18	Ea.	Proximity Switch @ the Fast Fill Recepticle	20	\$7.94	\$158.80

DOORS

1	Bus Set	Complete Base Plate and Operator Assembly	5	\$1,920.00	\$9,600.00
2	Bus Set	Front/Rear Turning Shaft Assembly	5	\$1,864.00	\$9,320.00
3	Bus Set	Door Panels	5	\$6,387.00	\$31,935.00
4	Bus Set	Door Glass	2	\$1,816.00	\$3,632.00

BODY INTERIOR

1	Bus Set	Interior AVA Sign Assembly	5	\$1,580.00	\$7,900.00
2	Ea.	Destination Sign Controller	2	\$512.00	\$1,024.00
3	Ea.	Next Stop Sign	5	\$256.00	\$1,280.00
4	Bus Set	Interior Speaker Assembly	10	\$192.00	\$1,920.00
5	Ea.	Microphone Hand Set	5	\$92.80	\$464.00
6	Ea.	Visor/Sun Shade(s) Front & Side	10	\$316.80	\$3,168.00
7	Bus Set	Access Panels	5	\$960.00	\$4,800.00
8	Bus Set	Light Covers	5	\$916.80	\$4,584.00
9	Bus Set	Modesty Panels	10	\$880.00	\$8,800.00
10	Bus Set	Ceiling Panels	10	\$1,472.00	\$14,720.00
11	Bus Set	Side Wall Trim Panel	10	\$480.00	\$4,800.00
12	Bus Set	Floor Covering	5	\$2,637.58	\$13,187.90
13	Bus Set	Wheelchair Securement Devices	5	\$1,248.00	\$6,240.00
14	Bus Set	Passenger Seat	4	\$34,087.00	\$136,348.00
15	Bus Set	Seat Track	2	\$388.00	\$776.00
16	Ea.	Operator Seat	5	\$2,680.00	\$13,400.00
17	Ea.	Farebox Grabrail	4	\$248.00	\$992.00
18	Bus Set	Manual Release Mechanism	6	\$47.00	\$282.00
19	Bus Set	Passenger Hand Strap	10	\$496.00	\$4,960.00
20	Ea.	HVAC Return Grill	5	\$390.00	\$1,950.00

BODY EXTERIOR

1	Bus Set	Passenger Windows	2	\$14,186.40	\$28,372.80
2	Bus Set	Replacement Pass Side Window Glass (if not bonded)	2	\$4,560.00	\$9,120.00
3	Bus Set	Side Window Film or Guards	5	\$1,847.00	\$9,235.00
4	Bus Set	Windshield	3	\$680.00	\$2,040.00
5	Bus Set	Operator Window	2	\$1,139.68	\$2,279.36
6	Bus Set	Access Door Set (excluding engine door and HVAC access door)	3	\$2,180.00	\$6,540.00
7	Ea.	Engine Door	2	\$623.00	\$1,246.00
8	Ea.	HVAC Rear Attic Door	2	\$428.80	\$857.60
9	Ea.	Bike Rack	2	\$1,148.34	\$2,296.68
10	Ea.	Emergency Roof Hatch	2	\$249.20	\$498.40
11	Bus Set	Windshield Wiper Assy.	3	\$766.96	\$2,300.88
12	Ea.	Windsheild Washer Reservoir	2	\$52.80	\$105.60

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 13

CONTRACTOR: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
13	Bus Set	Mirrors	4	\$971.28	\$3,885.12
14	Bus Set	Bumper	3	\$2,208.00	\$6,624.00
15	Bus Set	Mud Guards	3	\$104.00	\$312.00
16	Ea.	Head Lights	10	\$742.00	\$7,420.00
17	Bus Set	Front Turn Signal	10	\$54.40	\$544.00
18	Bus Set	Side Marker Lights	10	\$128.00	\$1,280.00
19	Bus Set	Rear Door Lights	10	\$64.00	\$640.00
20	Bus Set	Under Hood Hazard Lights	10	\$115.20	\$1,152.00
21	Ea.	License Plate Installation	5	\$20.80	\$104.00
22	Bus Set	CNG Tank Cover Installation	4	\$3,800.00	\$15,200.00
23	Bus Set	Exterior Trim (including fender skirts, exit door trim and trim pieces covering joints between body panels)	4	\$1,387.00	\$5,548.00

CLIMATE CONTROL SYSTEM

1	Ea.	Compressor	2	\$6,800.00	\$13,600.00
2	Ea.	Controller	2	\$300.00	\$600.00
3	Ea.	Evaporator	2	\$6,300.00	\$12,600.00
4	Ea.	Condensor	2	\$410.25	\$820.50
5	Ea.	Blower Assembly	4	\$555.00	\$2,220.00
6	Ea.	Thermostat	2	\$55.79	\$111.58
7	Ea.	Marine Pump	3	\$603.00	\$1,809.00

WHEELCHAIR

1	Bus Set	Ramp Assembly	3	\$7,995.00	\$23,985.00
2	Bus Set	Valve Assembly	2	\$87.00	\$174.00
3	Bus Set	Electrical Harness	2	\$348.40	\$696.80
4	Ea.	Ramp	2	\$7,995.00	\$15,990.00
5	Ea.	Controller	2	\$707.38	\$1,414.76
6	Ea.	Motor	3	\$819.00	\$2,457.00

BRAKES

1	Bus Set	Pressure Switches (include all for each Bus Set)	10	\$585.00	\$5,850.00
2	Bus Set	Protection Valve	10	\$84.00	\$840.00
3	Bus Set	Brake Air Chamber	10	\$269.70	\$2,697.00
4	Bus Set	Brake Wear Indicator	5	\$390.00	\$1,950.00
5	Ea.	ABS Electronic Control Unit	5	\$388.50	\$1,942.50
6	Ea.	ABS Harness	2	\$367.50	\$735.00
7	Bus Set	ABS Sensor	5	\$295.50	\$1,477.50

MULTIPLEX CONTROLS SYSTEM

1	Ea.	Event Data Recorder	2	\$2,200.00	\$4,400.00
2	Ea.	DVR	2	\$5,535.40	\$11,070.80
3	Bus Set	Complete Bus Wiring Harnesses	2	\$21,071.15	\$42,142.30
4	Bus Set	Communication Module (Gateway Module)	10	\$3,630.00	\$36,300.00
5	Bus Set	Multiplex Module	10	\$6,610.81	\$66,108.10

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-2 (CNG- 40') - SCHEDULE A OF PRICES SPARE PARTS (OPTIONAL)
CONTRACT MODIFICATION NO. 13

CONTRACTOR: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
6	Bus Set	Wheels	5	\$2,860.00	\$14,300.00
			Total Unit Price	\$507,667.92	
<u>TOTAL PARTS BUY</u>					<u>\$2,261,788</u>

In U.S. Dollars Using Words:

TWO-MILLION TWO-HUNDRED SIXTY ONE THOUSAND SEVEN HUNDREDEIGHTY EIGHT DOLLARS

Authorized Signature

Date

TONY WAYNE

Print Name

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-3 (CNG -40') - SCHEDULE B OF PRICES SPECIAL TOOLS (OPTIONAL)
CONTRACT MODIFICATION NO. 13

Contractor ELDORADO NATIONAL(CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
<u>TOWING</u>					
1	Set	Special Towing Equipment Adapters (TS 25) Note: Make sure towing equipment can do front lift and flat towing	15	\$386.00	\$5,790.00
1	Set	Rear recovery devices / tie downs (TS 25)	2	\$505.00	\$1,010.00

DOLLIES

1	Ea.	PPA Dollies	2	\$455.00	\$910.00
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OTHER SPECIAL TOOLS

1	Set	Complete Voith Special Service Tool Kit (P/N 3040093309)	2	\$4,510.80	\$9,021.60
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00
				\$0.00	\$0.00

Total Unit Price **\$5,856.80**

TOTAL BUY **\$16,731.60**

In U.S. Dollars Using Words:

SIXTEEN THOUSAND ONE HUNDRED TEN DOLLARS

Authorized Signature

Date

TONY WAYNE

Print Name

GROUP A - UP TO 600 40' CNG BUSES
FORM PF-4 (CNG-40') - SCHEDULE C OF PRICES DIAGNOSTIC TEST EQUIPMENT (OPTIONAL)
CONTRACT MODIFICATION NO. 13

Contractor **ELDORADO NATIONAL (CALIFOORNIA), INC.**
Contract No.: **OP28367-000**
Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
<u>ENGINE/TRANSMISSION (TS 5.6.5)</u>					
1	Ea.	Engine Diagnostic software, including necessary cables and connectors	30	\$1,170.00	\$35,100.00
2	Ea.	Transmission diagnostic software, including necessary cables and connectors (Voth P/N 151.00400712)	20	\$805.50	\$16,110.00
3	Ea.	Nexiq Technologies USB Link PC to Vehicle Interface	30	\$774.00	\$23,220.00
4	Ea.	ABS diagnostic software, including necessary cables and connectors	30	\$1,370.00	\$41,100.00
5	Ea.	Engine Cooling Diagnostic or Programming Software	30	\$0.00	\$0.00
<u>ELECTRICAL SYSTEM (TS 5.6.5)</u>					
1	Ea.	Multiplex System PC software and connection kit	30	\$332.00	\$9,960.00
<u>INTERIOR (TS 5.6.5)</u>					
1	Ea.	Video Security Diagnostic Kits	30	\$105.00	\$3,150.00
2	Ea.	Destination Sign Diagnostic Equipment	30	\$0.00	\$0.00
<u>HEATING VENTILATION/AIR CONDITIONING (HVAC) (TS 5.6.5.)</u>					
1	Ea.	A/C Interface Software and cable	30	\$585.00	\$17,550.00
<u>DIAGNOSTIC PCs SPECIFICATIONS (TS 5.6.5)</u>					
1	Ea.	Diagnostic Laptop PC (See TS 5.6.6 for Specifications)	30	\$2,925.00	\$87,750.00
<u>DOOR DIAGNOSTIC TOOLS AND EQUIPMENT (TS 5.6.5)</u>					
1	Ea.	Door System Diagnostic/Programming Software, tools and equipment	30	\$905.00	\$27,150.00
<u>COMMUNICATIONS (TS 86.1)</u>					
1	Ea.	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1	1	\$74,930.00	\$74,930.00
Total Unit Price				\$83,901.50	
				<u>TOTAL BUY</u>	<u>\$336,020.00</u>

In U.S. Dollars Using Words:

THREE-HUNDRED FIFTY-FIVE THOUSAND & TEN THREE HUNDRED THIRTY SIX THOUSAND & TWENTY DOLLAR

Authorized Signature

Date

TONY WAYNE

Print Name

Contractor ELDORADO NATIONAL (CALIFORNIA), INC.
Contract No.: OP28367-000
Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

<u>NO.</u>	<u>UNIT</u>	<u>DESCRIPTION OF ITEM</u>	<u>QTY</u>	<u>UNIT PRICE</u>	<u>TOTAL PRICE</u>
1	Ea.	One complete running engine and transmission assembly, including cooling and fueling systems, mounted on a suitable roll around stand (TS 5.6.3 a.)	1	\$193,200.00	\$193,200.00
2	Ea.	Static Transmission Assembly Note: If the Contractor is offering an Allison B400 transmission, a visual transmission is not required Voith DIWA .6 transmission (TS 5.6.3 b)	1	\$30,925.00	\$30,925.00
3	Ea.	Complete Static Front Axle Assembly TS 5.6.3.c.	1	\$16,400.00	\$16,400.00
4	Ea.	Complete Static Rear Axle Assembly TS 5.6.3.d.	1	\$18,500.00	\$18,500.00
<u>ATECH ELECTRICAL TRAINING BOARDS - General Electrical Training (TS 5.6.3 e.)</u>					
1	Kit	GM Specialized Electronic Trainer	10	\$2,100.00	\$21,000.00
2	Kit	GM Electronic Instructor's Guide (Books Only - Stages 1, 2, & 3)	10	\$95.00	\$950.00
3	Kit	4 Resistors	10	\$35.00	\$350.00
4	Kit	Dual Filament Light	10	\$46.00	\$460.00
5	Kit	Horn	10	\$121.00	\$1,210.00
6	Kit	Blank Board	10	\$24.00	\$240.00
<u>SYSTEM SIMULATION TRAINING BOARDS</u>					
1	Ea.	Anti-Lock Brake/Air Brake Board (TS 5.6.3.f.)	1	\$32,000.00	\$32,000.00
2	Ea.	Electric Air Conditioning Training Simulator Module (TS 5.6.3.g.)	1	\$29,700.00	\$29,700.00
3	Ea.	Fire Suppression (TS 5.6.3.h.)	1	\$7,200.00	\$7,200.00
4	Ea.	Video Security System (TS 5.6.3.i.)	1	\$9,250.00	\$9,250.00
5	Ea.	Destination Sign (TS 5.6.3.j.)	1	\$6,000.00	\$6,000.00
6	Ea.	Multiplex Electrical Training Board (TS 5.6.3.k.)	2	\$23,500.00	\$47,000.00
<u>E-LARNING INTERACTIVE TRAINING MEDIA (TS 5.6.3)</u>					
1	Hr.	Module 1	6	\$23,000.00	\$138,000.00
2	Hr.	Module 2	3	\$23,000.00	\$69,000.00
3	Hr.	Module 3	3	\$23,000.00	\$69,000.00
4	Hr.	Module 4	2	\$23,000.00	\$46,000.00
5	Hr.	Module 5	4	\$23,000.00	\$92,000.00
6	Hr.	Module 6	2	\$23,000.00	\$46,000.00
7	Hr.	Module 7	2	\$23,000.00	\$46,000.00
8	Hr.	Module 8	1	\$23,000.00	\$23,000.00
9	Hr.	Module 9	1	\$23,000.00	\$23,000.00
10	Hr.	Module 10	1	\$23,000.00	\$23,000.00
				<u>TOTAL BUY</u>	<u>\$989,385.00</u>

In U.S. Dollars Using Words:

NINE-HUNDRED EIGHTY NINE THOUSAND THREE HUNDRED EIGHTY FIVE DOLLARS

Authorized Signature

Date

TONY WAYNE
Print Name



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-050

Response Required: No

Date: November 19, 2019

File Nos.:

Action Item(s):

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
CONTRACT MODIFICATION NO.: 14
EXERCISE OF OPTION BUY

Reference:

Dear Mr. Himes:

Enclosed is one (1) copy of the subject unilateral modification based on the negotiated option buy bus unit price and the terms and conditions agreed upon between Metro and ENC.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Contract Modification No. 14

cc: Kwesi Annan
Marc Manning
Wayne Okubo
Joe Marzano
Victor Ramirez

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

**CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 14
(EXERCISE OF OPTION BUS BUY)**

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 14 to Contract No.: OP28367-000 is made effective on the 19th day of November 2019 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, Contract Modification No. 12 dated January 17, 2019, and Contract Modification No. 13 dated February 8, 2019, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. In accordance with the Board of Directors approval on September 26, 2019, MTA to exercise Option 1 to procure 259 buses at a per bus unit price of \$653,388 plus \$60,196.62 in taxes, and \$275 delivery charge.
2. The Period of Performance for the Base Buy bus order is up to and including February 28, 2020.
3. The Period of Performance for Option Buy bus order is 21 calendar months from the date set forth in the Notice to Proceed.
4. The Pricing Form for the Option Buy is set forth in the attached PF-1 (2.0 Option Buy).

The following Articles of the Contract are modified as follows:

ARTICLE IV: COMPENSATION

A. Contract Price

1. Base Buy Order (295 buses)

In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of \$199,067,748, inclusive of tax and delivery as provided in this

Article and in the Contract Document entitled Compensation and Payment Provisions.

2. Option Buy (259 Buses)

Contract Option for 259 bus order is hereby exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

In consideration of the Contractor's full performance of the Work for Contract Option Buy, and in accordance with the terms of the Contract, LACMTA will pay the Contractor the Contract Price of \$185,000,742, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

ARTICLE V: CONTRACT TERM AND PERIOD OF PERFORMANCE

The Effective Date of this Contract is **August 15, 2017**.

1. Base Buy

. The Period of Performance of this Contract shall begin on September 1, 2017 (hereinafter "Commencement Date"). Contractor shall complete delivery of the Base quantity of 295 vehicles no later than **February 28, 2020**, 130 weeks (911 calendar days) after the Commencement Date, unless this Contract is terminated earlier or extended by LACMTA, in writing, as provided in the Contract. ~~Said complete delivery date of November 29, 2019 for Group A buses shall be automatically extended on a day-for-day basis if the Contract for the Base Buy is not executed by LACMTA on or before September 1, 2017.~~

The Base quantity for Group A is 295 Vehicles. The Base quantity delivery schedule is for a minimum of five (5) and a maximum of ten (10) vehicles per week. Any Group A vehicles delivered beyond that **February 28, 2020** date may be subject to Liquidated Damages in accordance with Special Provisions SP – 10. ~~If any Option for Group A vehicles is exercised, the Group A Option Vehicles shall be delivered in accordance with the schedule contained in the Modification to exercise the Option.~~

2. Option Buy

The Period of Performance for the Option Buy for this Contract shall begin on **the date set forth in the Notice to Proceed** (hereinafter "Commencement Date"). Contractor shall complete all Work, excluding Warranty, under the Contract within 21 months (640 calendar days) after the Commencement Date for the Option Buy, unless this Contract is terminated earlier or extended by LACMTA, in writing, as provided in the Contract.

The Option Buy quantity is 259 Vehicles. The Option bus scheduled delivery dates are as follows:

SCHEDULE DELIVERY DATES

Start Dates	Scheduled Delivery Dates	No. of Buses Delivered (Qtr.)	No. of Buses (Total)
7/1/2020	9/30/2020	30	30
10/1/2020	12/31/2020	55	85
1/1/2021	3/31/2021	70	155
4/1/2021	6/30/2021	78	233
7/1/2021	8/19/2021	26	259

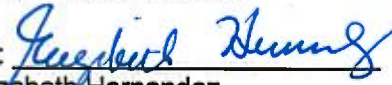
Any Option vehicles delivered beyond the scheduled delivery dates specified above may be subject to Liquidated Damages in accordance with Special Provisions SP – 10.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 14 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: 
Elizabeth Hernandez
Principal Contract Administrator

11/19/19
Date

CONTRACT MODIFICATION NO.: 14

Option Bus Buy

Proposer: ELDORADO NATIONAL (CALIFORNIA), INC.

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

2.0 CONTRACT FOR 259 BUSES (OPTION BUY)				<u>Taxable</u>		
<u>No.</u>	<u>Qty.</u>	<u>Description of Item</u>		<u>Unit Price</u>	<u>Unit Price</u>	<u>Total Price</u>
10	259	40' Low Floor CNG Buses (Option Buy) for 259 vehicles*		\$ 633,648.64	\$ 653,388.64	\$ 169,227,657.76
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***		\$ -	\$ -	\$ -
10b	259	Vehicle Delivery Charge for Option Buy	Value of all taxable delivery charges per bus**:		\$ 275.00	\$ 71,225.00
10c	259	Tax (Option Buy)		9.50%	\$ 60,196.62	\$ 15,590,924.79
11		Reserved			\$	\$
12	Lot	Performance Bond for Option Buy***			Lump Sum	\$ 110,934.00
13	0	Total Training Hours for Option Buy****				\$ -
13a	0	Contractor (Proposer/Prime) Option Buy				\$ -
13b	0	Subcontractor/Supplier Option Buy				\$ -
14		Reserved			\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation						
In U.S. Dollars Using Words:		ONE-HUNDRED EIGHTY FIVE MILLION SEVEN HUNDRED FORTY TWO DOLLARS				
				In U.S. Dollars Using Figures: \$ 185,000,742.00		

- NOTE**
- * Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A
 - ** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column
 - *** Actual cost of the Bond are for all 259 bus Options exercised.
 - **** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.



Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

Metro

MAEL-060

Response Required: No

Date: March 2, 2020

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 15
CHANGE ORDERS ON OPTION BUS BUY; UPDATED PRICING FORMS**

Reference: ELMA-76, 77

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 15

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

**CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 15
(EXERCISE OF OPTION BUS BUY)**

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 15 to Contract No.: OP28367-000 is made effective on the 21st day of February 2020 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, Contract Modification No. 12 dated January 17, 2019, Contract Modification No. 13 dated February 8, 2019, and Contract Modification No. 14 dated November 19, 2019, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Modify the Contract to include change orders and associated costs on the bus configuration for the:
 - a. Option Bus Buy Order;
 - b. Retrofit change order on the Base Buy Orderconsistent with Attachment I – Summary of Change Orders.
2. Exercise Optional Configuration to procure additional service manuals for the Option Bus Buy Order.
3. Modify Volume II - Technical Specifications consistent with Attachment II
4. Modify Article IV – Compensation, section A (2) and update Pricing Forms PF-1 and PF1-A (attached) as follows:

ARTICLE IV: COMPENSATION

2. Option Buy (259 Buses)

Contract Option for 259 bus order is hereby exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

In consideration of the Contractor's full performance of the Work for Contract Option Buy, and in accordance with the terms of the Contract, LACMTA will pay the Contractor the Contract Price of ~~\$185,000,742~~ **\$184,973,963**, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

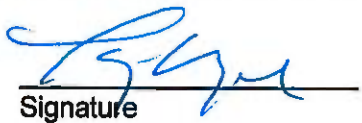
(Reference modified Pricing Forms PF-1 and PF1A as attached)

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 15 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:


Signature

Tony Wayne
Type and Print Name

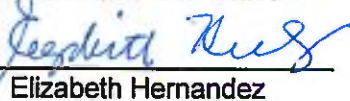
2/24/2020
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington

Chief Executive Officer

By:


Elizabeth Hernandez

Principal Contract Administrator

3/2/20
Date

ATTACHMENT I - SUMMARY OF CHANGE ORDERS

A. CHANGE ORDERS FOR THE OPTION BUS BUY

RFC NO.	DESCRIPTION	OPTION QTY	UNIT PRICE	TOTAL PRICE
10	Transom Type Windows to Full Fixed Glazing (TS 53)	259	(\$481.86)	(\$124,801.74)
11	Aries Stainless Steel with Camira fabric inserts to Gemini Composite Seats with Printed Vinyl inserts (TS 78.15)	243	(\$378.05)	(\$91,866.15)
13	Provisions for All Doors Boarding (Tap Card Readers) (TS 86.12)	259	\$32.22	\$8,344.98
14B	Single Red Belt W/C Securement Upgrade for Option Bus Order (TS 81.5.2)	259	\$199.79	\$51,745.61
			TOTAL	(\$156,577.30)

BUS PRICING SUMMARY:

Approved Changes	OPTION BUY QTY	Per Bus	Total
RFC 10, 13, 14B	16	(\$249.85)	(\$3,997.60)
RFC 10, 11 13, 14B	243	(\$627.90)	(\$152,579.70)
			(\$156,577.30)

B. CHANGE ORDERS FOR THE BASE BUY ORDER

RFC NO.	DESCRIPTION	BASE BUY QTY	UNIT PRICE	TOTAL PRICE
14A	Single Red Belt W/C Securement Upgrade for Base Bus Order (TS 81.5.2)	295	\$410.85	\$121,200.75

C. Manuals for Option Bus Buy

RFC 15	Manuals for Option Bus Order	10	Lot	\$23,400.00
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CONTRACT NO.: OP28367-000
Modification No. 15, Attachment II
Volume II Technical Specification Changes

Ref #	Reference #	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue
24	Contract Mod. No.: 15	<p>TS 53. Side Windows</p> <p>TS 53.1 Configuration</p> <p>Side window assemblies shall be constructed of heavy-duty aluminum shall be easily replaceable without disturbing adjacent windows and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. Window assemblies shall incorporate "change in place" design to permit replacement (removal and installation) of each glazing (transparent glass piece less any framing) from windows installed on the bus. This requirement shall permit one mechanic to enter the bus and remove and install each glazing using common hand tools in 60 minutes, or less. The window shall be fully serviceable immediately following replacement of glazing. Change in place method shall be tamper resistant. An additional six minutes will be added for each glazing replacement, if necessary, for replacement of the associated anti-vandalism sacrificial film.</p> <p>All frame surfaces and components (except the emergency escape handles) shall be finished with black anodizing. Emergency escape latches shall be red and labeled to indicate their purpose and function. Miscellaneous hardware, such as fasteners and latches, shall be the window manufacturer's standard hardware.</p> <p>Transom style side windows shall extend from the shoulder height of a seated 5th percentile female passenger to the eye level of a standing 95th percentile male passenger in the front section; The rear section window upper edge shall be approximately 56 inches above the floor at the start of the raised deck and no less than 51 inches at the rearmost window's upper edge. Each individual window glazing shall be easily replaceable without removing the entire window assembly or disturbing adjacent window assemblies and shall be mounted so that flexing or vibration from engine operation or normal road excitation is not apparent. To the extent practical, the number of different sizes of windows should be minimized.</p> <p>Quick Change Passenger Side Windows</p> <p>Glazing in the window assembly shall be capable of being replaced without removing the window from its installed position on the bus using simple hand tools. The glazing shall be held in place mechanically by a system constructed to last the life of the vehicle.</p> <p>Traditional Frame</p> <ul style="list-style-type: none"> • Fully fixed. • Openable windows with inward-opening transom panels

CONTRACT NO.: OP28367-000
Modification No. 15, Attachment II
Volume II Technical Specification Changes

Ref #	Reference #	Paragraph number, Paragraph title, and Paragraph changes. Additions are in bolded Red and deletions are in crossed out bolded Blue
		<p>TS 53.2 Emergency Exit (Egress) Configuration</p> <p>Minimum Egress</p> <p>All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements.</p> <p>TS 53.3 Configuration</p> <p>Operable Windows with Inward Opening Transom Panels (Fixed Bottom, Tip-In Top)</p> <p>Each side window shall incorporate an upper transom portion. The transom shall be between 20 and 35 percent of the total window area. The lower portion of the window shall be fixed. The transom portion shall be hinged along the lower edge and open inward. Side windows shall have an upper section that can be opened inward a minimum of four inches to provide maximum interior ventilation. When opened the upper window section shall not interfere with access to the passenger signal pull cable. The operable section shall be a minimum of eight inches and a maximum of 10 inches in height, hinged at the bottom, and shall be the full width of all windows. In the event of a latch failure the upper window section shall remain in the closed position and shall latch in the closed position by means of a gas filled cylinder or mechanical spring. Rearmost windows which are lower than shoulder height for seated passengers shall not be opened or equipped with emergency escape provisions, subject to LACMTA approval in Pre-Production meeting.</p> <p>All side windows shall be fixed in position, except as necessary to meet the emergency escape requirements</p>

End of Attachment II

CONTRACT NO.: OP28367-000
MODIFICATION NO.: 15 - Option Bus Buy

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: **OP28367-000**

Contract Title: **FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT**

2.0 CONTRACT FOR 259 BUSES (OPTION BUY)		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
10	16	40' Low Floor CNG Buses (Option Buy) for 16 vehicles*	\$633,399.00	\$ 10,450,224.00
243	40'	Low Floor CNG Buses (Option Buy) for 243 vehicles*	\$652,761.00	\$ 158,620,923.00
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$ -	\$ 23,400.00
10b	259	Vehicle Delivery Charge for Option Buy	\$ 275.00	\$ 71,225.00
10c	16	Tax (Bus Option Buy)	9.50%	\$ 962,766.48
243		Tax (Bus Option Buy)	9.50%	\$ 14,613,289.79
11a	295	Base Buy Bus Order Securement Retrofit	\$ 410.85	\$ 121,200.75
11b	295	Base Buy Order Securement Retrofit Tax	\$ -	\$ -
12	Lot	Performance Bond for Option Buy***	Lump Sum	\$ 110,934.00
13	0	Total Training Hours for Option Buy****		\$ -
13a	0	Contractor (Proposer/Prime) Option Buy		\$ -
13b	0	Subcontractor/Supplier Option Buy		\$ -
14		Reserved	\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation				
In U.S. Dollars Using Words: ONE-HUNDRED EIGHTY FOUR MILLION NINE HUNDRED SEVENTY THREE THOUSAND NINE HUNDRED SIXTY THREE DOLLARS				
			In U.S. Dollars Using Figures: \$ 184,973,963.00	

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A (Unit prices are rounded up to the dollar)

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Actual cost of the Bond are for all 259 bus Options exercised.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

CONTRACT NO.: OP28367-000
MODIFICATION NO.: 15 - Option Bus Buy

Contractor: ELDORADO NATIONAL (CALIFORNIA), INC
Contract No.: OP28367-000

OPTION BUY

<u>NO.</u>	<u>DESCRIPTION OF ITEM</u>	
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **	
2.1 TS 9.	Propulsion Power Assembly (PPA)***	\$18,372
2.2 TS 9.	Engine	\$60,324
2.3 TS 10.	Cooling System	\$12,650
2.4 TS 18.	Fuel System	\$68,300
2.5 TS 19.2	Heat shield between catalytic converter and HVAC unit	\$332.55
2.6 TS 23.1	Hinge Rear Cross Seat Access to the bulkhead	\$65.66
2.7 TS 31.	Suspension	\$19,950
2.8 TS 33.	Steering System	\$4,950
2.9 TS 37.	Brakes	\$3,260
2.10 TS 39.	Pneumatic System	\$6,850
2.11 TS 42.	Charging System	\$36,800
2.12 TS 44.	Multiplex Control System	\$24,200
2.13 TS 54.	HVAC Climate Control System	\$29,450
2.14 TS 75.2	Protective film on modesty panels	\$116.94
2.15 TS 76	Ethernet Cable to Farebox	\$38.38
2.16 TS 78.	Passenger Seats	\$28,955
2.17 TS 80.	Doors	\$14,830
2.18 TS 81.	Accessibility Provisions	\$19,740
2.19 TS 86.	Communications	\$3,244
2.20 TS 86.3	Ethernet Cables in ITS enclosure	\$310.91
2.21 TS 11	Transmission	\$14,261
2.22 TS 78.1	USB Passenger Charging Port	\$480
2.23 TS85.1	Wireless Stop Request Button	\$485
2.24 TS 86.3	Matrix APC	\$4,596
2.99 TS 34	Meritor Rear Axle Upgrade	\$1,040
	All other bus subsystem equipment not included above including flooring	\$242,338

TOTAL CNG BUS PRICE OPTION QUANTITY \$615,939.46

PPI ADJUSTMENT (AS NEGOTIATED) \$37,449.18

OPTION BUS BUY PRICE PER UNIT \$653,388.64

QTY

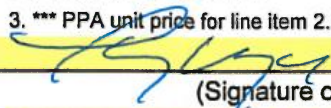
16	<u>Option Bus No. 296 to 311 (Change Orders)</u>	CHANGES (\$249.85)	* \$653,139.00
243	<u>Option Bus No. 312 to 554 (Change Orders)</u>	(\$627.90)	* \$652,761.00

* Rounded Off; Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, -line ite

Notes: 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.

2. Price for line Item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.

3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99


(Signature of Person Executing Proposal)

2/24/20
Date

TONY WAYNE VICE PRESIDENT & GENERAL MANAGER



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-069

Response Required: No

Date: July 24, 2020

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 16
COVID MITIGATION CHANGE FOR ETHERNET FOR ALL DOOR TAP
READERS - OPTION BUS BUY**

Reference: ELMA-086

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 16

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY
CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 16
(COVID MITIGATION CHANGE FOR ETHERNET FOR ALL DOOR TAP READERS)

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 16 to Contract No.: OP28367-000 is made effective on the 8th day of July 2020 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, Contract Modification No. 12 dated January 17, 2019, Contract Modification No. 13 dated February 8, 2019, Contract Modification No. 14 dated November 19, 2019, and Contract Modification No. 15 dated February 21, 2020, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

1. Modify the Contract to add ethernet cable in the ITS enclosure for data transfer on the all door TAP reader for an increase in the total contract price of \$52,183. The total Contract price is increased from \$184,973,963.00 to \$185,026,146.00.
2. Modify Volume II - Technical Specifications TS 86.12 consistent with Attachment I to this Modification.

ARTICLE IV: COMPENSATION

2. Option Buy (259 Buses)

Contract Option for 259 bus order is hereby exercised unilaterally by LACMTA in accordance with Special Provisions Article SP-28, Options.

In consideration of the Contractor's full performance of the Work for Contract Option Buy, and in accordance with the terms of the Contract, LACMTA will pay the Contractor the Contract Price of ~~\$184,973,963~~ **\$185,026,146**, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment Provisions.

(Reference modified Pricing Forms PF-1 and PF1A as attached)

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 16 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:

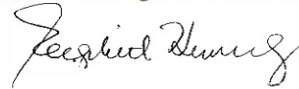

Signature

TONY WAYNE
Type and Print Name

7/9/20
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington

By: 

Elizabeth Hernandez
Principal Contract Administrator

7/24/20
Date

CONTRACT NO.: OP28367-000
MODIFICATION NO.: 16 - Option Bus Buy
COVID Mitigation Change for Ethernet for All Door TAP Readers

Proposer: **ELDORADO NATIONAL (CALIFORNIA), INC.**

Contract No.: OP28367-000

Contract Title: FORTY FOOT (40') LOW FLOOR CNG BUS PROCUREMENT

2.0 CONTRACT FOR 259 BUSES (OPTION BUY)		Taxable		
No.	Qty.	Description of Item	Unit Price	Total Price
10	16	40' Low Floor CNG Buses (Option Buy) for 16 vehicles*	\$653,323.00	\$ 10,453,168.00
243	40'	Low Floor CNG Buses (Option Buy) for 243 vehicles*	\$652,945.00	\$ 158,665,635.00
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***	\$ -	\$ 23,400.00
10b	259	Vehicle Delivery Charge for Option Buy	\$ 275.00	\$ 71,225.00
10c	16	Tax (Bus Option Buy)	9.50%	\$ 60,190.39
243		Tax (Bus Option Buy)	9.50%	\$ 60,154.48
11a	295	Base Buy Bus Order Securement Retrofit	\$ 410.85	\$ 121,200.75
11b	295	Base Buy Order Securement Retrofit Tax	\$ -	\$ -
12	Lot	Performance Bond for Option Buy***	Lump Sum	\$ 110,934.00
13	0	Total Training Hours for Option Buy****		\$ -
13a	0	Contractor (Proposer/Prime) Option Buy		\$ -
13b	0	Subcontractor/Supplier Option Buy		\$ -
14		Reserved	\$	\$
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation			ONE-HUNDRED EIGHTY FIVE MILLION TWENTY SIX THOUSAND ONE HUNDRED FORTY SIX DOLLARS	
In U.S. Dollars Using Words:			In U.S. Dollars Using Figures: \$ 185,026,146.00	

NOTE

* Taxable Unit Price is the Unit Price less 1.14 Accessibility Provisions on PF-1A (Unit prices are rounded up to the dollar)

** Input the taxable portion of the Delivery Charge under the Taxable Unit Price column and the total Delivery Charge under the Unit Price column

*** Actual cost of the Bond are for all 259 bus Options exercised.

**** Training Hours for Option Buy are only estimates and not a guaranteed level of effort. The total for this Line is a Not-to-Exceed provisional amount.

CONTRACT NO.: OP28367-000
MODIFICATION NO.: 16
COVID Mitigation Change for Ethernet for All Door TAP Readers

Contractor: ELDORADO NATIONAL (CALIFORNIA), INC
Contract No.: OP28367-000

<u>OPTION BUY</u>			
<u>NO.</u>	<u>DESCRIPTION</u>	<u>OF ITEM</u>	
2	Purchased Subsystem Equipment (Items 2.1 through 2.99) **		
2.1	TS 9.	Propulsion Power Assembly (PPA)***	\$18,372
2.2	TS 9.	Engine	\$60,324
2.3	TS 10.	Cooling System	\$12,650
2.4	TS 18.	Fuel System	\$68,300
2.5	TS 19.2	Heat shield between catalytic converter and HVAC unit	\$332.55
2.6	TS 23.1	Hinge Rear Cross Seat Access to the bulkhead	\$65.66
2.7	TS 31.	Suspension	\$19,950
2.8	TS 33.	Steering System	\$4,950
2.9	TS 37.	Brakes	\$3,260
2.10	TS 39.	Pneumatic System	\$6,850
2.11	TS 42.	Charging System	\$36,800
2.12	TS 44.	Multiplex Control System	\$24,200
2.13	TS 54.	HVAC Climate Control System	\$29,450
2.14	TS 75.2	Protective film on modesty panels	\$116.94
2.15	TS 76	Ethernet Cable to Farebox	\$38.38
2.16	TS 78.	Passenger Seats	\$28,955
2.17	TS 80.	Doors	\$14,830
2.18	TS 81.	Accessibility Provisions	\$19,740
2.19	TS 86.	Communications	\$3,244
2.20	TS 86.3	Ethernet Cables in ITS enclosure (APC)	\$310.91
2.21	TS 11	Transmission	\$14,261
2.22	TS 78.1	USB Passenger Charging Port	\$480
2.23	TS85.1	Wireless Stop Request Button	\$485
2.24	TS 86.3	Matrix APC	\$4,596
2.99	TS 34	Meritor Rear Axle Upgrade	\$1,040
	All other bus subsystem equipment not included above including flooring		
			\$242,338

TOTAL CNG BUS PRICE OPTION QUANTITY	\$615,939.46
PPI ADJUSTMENT (AS NEGOTIATED)	\$37,449.18
OPTION BUS BUY PRICE PER UNIT	\$653,388.64

QTY		CHANGES	
16	<u>Option Bus No. 296 to 311 (Mod 16 - Change)</u>	(\$66.00)	*\$653,323.00
243	<u>Option Bus No. 312 to 554 (Mod 16 - Change)</u>	(\$444.00)	*\$652,945.00

* Rounded Off; Transfer Total CNG Bus Price to Contract Price Summary Form (PF-1 - Unit Price column, -line ite

- Notes:** 1. ** Price shall include design, engineering, manufacturing/assembly, testing, shipping, profit and other associated costs. Price for each subsystem equipment shall include all applicable apparatus.
2. Price for line Item Nos. 1-9 and 10a-27 in the CONTRACT PRICE SUMMARY (Form PF-1) shall not be included in computing price of any of the line items above.
3. *** PPA unit price for line item 2.1 excludes prices for items 2.2 through 2.99


(Signature of Person Executing Proposal)

7/5/20
Date

TONY WAYNE /VICE PRESIDENT & GENERAL MANAGER

LACMTA
CONTRACT NO. OP28367-000
GA12-93

PRICING FORM
PF1A - CNG 40'
Contract Mod. No. 16



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-070

Response Required: No

Date: July 24, 2020

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 17
REVISED PROJECT DELIVERY SCHEDULE - OPTION BUS BUY**

Reference: ELMA-084

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 17

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

**CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 17
(REVISED DELIVERY SCHEDULE - OPTION BUS BUY)**

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 17 to Contract No.: OP28367-000 is made effective on the 9th day of July 2020 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, Contract Modification No. 12 dated January 17, 2019, Contract Modification No. 13 dated February 8, 2019, Contract Modification No. 14 dated November 19, 2019, Contract Modification No. 15 dated February 21, 2020, and Contract Modification No. 16, dated July 8, 2020, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein; Now, therefore, it is mutually agreed, by and between the parties as follows:

The Period of Performance for Option Buy bus order is ~~24 calendar months~~ **712 calendar days** from the date set forth in the Notice to Proceed.

ARTICLE V: CONTRACT TERM AND PERIOD OF PERFORMANCE, Section 2. Option Buy is modified as follows:

1. Option Buy

The Period of Performance for the Option Buy for this Contract shall begin on **the date set forth in the Notice to Proceed** (hereinafter "Commencement Date"). Contractor shall complete all Work, excluding Warranty, under the Contract within ~~24 months~~ **640 712** calendar days after the Commencement Date for the Option Buy, unless this Contract is terminated earlier or extended by LACMTA, in writing, as provided in the Contract.

The Option Buy quantity is 259 Vehicles. The Option bus scheduled delivery dates are as follows:

SCHEDULE DELIVERY DATES

Start Dates	Scheduled Delivery Dates	No. of Buses Delivered (Qtr.)	No. of Buses (Total)
7/1/2020	9/30/2020	30 34	30 34
10/1/2020	12/31/2020	55 48	85 82
1/1/2021	3/31/2021	70 48	155 130
4/1/2021	6/30/2021	78 48	233 178
7/1/2021	8/19/2021 9/30/2021	26 60	259 238
10/1/2021	10/31/2021	21	259

Any Option vehicle(s) delivered beyond the scheduled delivery dates specified above may be subject to Liquidated Damages in accordance with Contract Special Provisions SP-10.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 17 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

By:

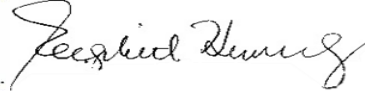

Signature

TONY WAYNE
Type and Print Name

7/9/20
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington

By: 

Elizabeth Hernandez
Principal Contract Administrator

7/24/20

Date



Metro

Los Angeles County
Metropolitan Transportation Authority

One Gateway Plaza
Los Angeles, CA 90012-2952

213.922.2000 Tel
metro.net

MAEL-072

Response Required: No

Date: August 17, 2020

Richard Himes
Contract Administration Manager
Eldorado National (California), Inc. (ENC)
9670 Galena Street
Riverside, CA 92509

**SUBJECT: OP28367-000 40' LOW FLOOR CNG TRANSIT BUSES
EXECUTED CONTRACT MODIFICATION NO.: 18
WAIVER OF METRO'S TRANSPORTATION CHARGES (295 BASE BUS
ORDER)**

Reference: ELMA-090

Dear Mr. Himes:

Enclosed is your executed original of the subject modification.

Please call me at 213.922.7334 or e-mail at hernandezel@metro.net if you have any questions.

Sincerely,

Elizabeth Hernandez
Principal Contract Administrator

Enclosure: Fully executed Contract Modification No. 18

cc: Kwesi Annan

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 18 (SP-40.12.5 Reimbursement for Labor And Other Related Costs)

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 18 to Contract No.: OP28367-000 is made effective on the 4th day of August 2020 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, Contract Modification No. 12 dated January 17, 2019, Contract Modification No. 13 dated February 8, 2019, Contract Modification No. 14 dated November 19, 2019, Contract Modification No. 15 dated February 21, 2020, Contract Modification No. 16, dated July 8, 2020, and Contract Modification No. 17, dated July 9, 2020, (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein; Now, therefore, it is mutually agreed, by and between the parties as follows:

Modify Contract Special Provision 40.12.5 as follows:

SP-40.12.5 Reimbursement for Labor And Other Related Costs

The LACMTA shall be reimbursed by the Contractor for labor. The amount shall be determined by LACMTA for a qualified "A Mechanic" at their standard wage rate per hour, plus 80 percent for fringe benefits and overhead. Should a Contractor request LACMTA to transport vehicles to a vendor/subcontractor for repairs, the Contractor shall reimburse LACMTA for all expenses incurred.

LACMTA hereby grants waiver of the requirement for reimbursement by the Contractor for labor for transporting vehicles to-and-from Riverside (El Dorado Facility) for retrofit work of the 295 base buy buses (bus numbers 1505 -1799) under this Contract. (Attachment 1 –Retrofit Matrix)

If required, Contractor shall reimburse LACMTA for costs associated with towing or moving a bus if such action was necessary and if the bus was in the normal service area. Also, the Contractor shall assume all liability for damage from the time the vehicle is released from LACMTA's custody until it is returned.

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 18 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.


By: 
Signature

Tony Wayne
Type and Print Name

8/7/20
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington
Chief Executive Officer

By: 

Elizabeth Hernandez
Principal Contract Administrator

August 14, 2020
Date

[illegible]

[illegible]

[illegible]

[illegible]

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[illegible]

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Project ID		Project Name		Project Manager		Project Status		Project Location		Project Start Date		Project End Date		Project Budget		Project Revenue		Project Profit		Project ROI		Project NPV		Project IRR		Project Payback Period		Project Break-Even Point		Project Sensitivity Analysis		Project Risk Assessment		Project Mitigation Strategies		Project Monitoring & Reporting		Project Evaluation		Project Conclusion	
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	Project Name and Location	Project Lead/Manager	Project Start Date	Project End Date	Project Status	Project Budget (USD)	Project Revenue (USD)	Project Profit (USD)	Project ROI (%)	Project Risk Level	Project Complexity	Project Duration (Months)	Project Team Size	Project Milestones	Project Deliverables	Project Stakeholders	Project Sponsor	Project Steering Committee	Project Governance	Project Reporting	Project Communication	Project Documentation	Project Archiving	Project Review	Project Audit	Project Compliance	Project Ethics	Project Sustainability	Project Innovation	Project Scalability	Project Flexibility	Project Resilience	Project Adaptability	Project Agility	Project Speed	Project Quality	Project Cost	Project Risk	Project Impact	Project Legacy	Project Future
1	Project A	John Doe	2023-01-01	2023-03-31	Completed	100000	120000	20000	20%	Low	Medium	6	10	Project A Milestones	Project A Deliverables	Project A Stakeholders	Project A Sponsor	Project A Steering Committee	Project A Governance	Project A Reporting	Project A Communication	Project A Documentation	Project A Archiving	Project A Review	Project A Audit	Project A Compliance	Project A Ethics	Project A Sustainability	Project A Innovation	Project A Scalability	Project A Flexibility	Project A Resilience	Project A Adaptability	Project A Agility	Project A Speed	Project A Quality	Project A Cost	Project A Risk	Project A Impact	Project A Legacy	Project A Future
2	Project B	Jane Smith	2023-04-01	2023-06-30	In Progress	150000	180000	30000	20%	Medium	High	8	15	Project B Milestones	Project B Deliverables	Project B Stakeholders	Project B Sponsor	Project B Steering Committee	Project B Governance	Project B Reporting	Project B Communication	Project B Documentation	Project B Archiving	Project B Review	Project B Audit	Project B Compliance	Project B Ethics	Project B Sustainability	Project B Innovation	Project B Scalability	Project B Flexibility	Project B Resilience	Project B Adaptability	Project B Agility	Project B Speed	Project B Quality	Project B Cost	Project B Risk	Project B Impact	Project B Legacy	Project B Future
3	Project C	Mike Johnson	2023-07-01	2023-09-30	On Hold	80000	90000	10000	12.5%	Low	Low	4	8	Project C Milestones	Project C Deliverables	Project C Stakeholders	Project C Sponsor	Project C Steering Committee	Project C Governance	Project C Reporting	Project C Communication	Project C Documentation	Project C Archiving	Project C Review	Project C Audit	Project C Compliance	Project C Ethics	Project C Sustainability	Project C Innovation	Project C Scalability	Project C Flexibility	Project C Resilience	Project C Adaptability	Project C Agility	Project C Speed	Project C Quality	Project C Cost	Project C Risk	Project C Impact	Project C Legacy	Project C Future
4	Project D	Sarah Brown	2023-10-01	2023-12-31	Planned	120000	140000	20000	16.7%	Medium	Medium	5	12	Project D Milestones	Project D Deliverables	Project D Stakeholders	Project D Sponsor	Project D Steering Committee	Project D Governance	Project D Reporting	Project D Communication	Project D Documentation	Project D Archiving	Project D Review	Project D Audit	Project D Compliance	Project D Ethics	Project D Sustainability	Project D Innovation	Project D Scalability	Project D Flexibility	Project D Resilience	Project D Adaptability	Project D Agility	Project D Speed	Project D Quality	Project D Cost	Project D Risk	Project D Impact	Project D Legacy	Project D Future
5	Project E	David Wilson	2024-01-01	2024-03-31	Planned	90000	110000	20000	22.2%	Low	Low	3	6	Project E Milestones	Project E Deliverables	Project E Stakeholders	Project E Sponsor	Project E Steering Committee	Project E Governance	Project E Reporting	Project E Communication	Project E Documentation	Project E Archiving	Project E Review	Project E Audit	Project E Compliance	Project E Ethics	Project E Sustainability	Project E Innovation	Project E Scalability	Project E Flexibility	Project E Resilience	Project E Adaptability	Project E Agility	Project E Speed	Project E Quality	Project E Cost	Project E Risk	Project E Impact	Project E Legacy	Project E Future
6	Project F	Emily Davis	2024-04-01	2024-06-30	Planned	110000	130000	20000	18.2%	Medium	Medium	4	10	Project F Milestones	Project F Deliverables	Project F Stakeholders	Project F Sponsor	Project F Steering Committee	Project F Governance	Project F Reporting	Project F Communication	Project F Documentation	Project F Archiving	Project F Review	Project F Audit	Project F Compliance	Project F Ethics	Project F Sustainability	Project F Innovation	Project F Scalability	Project F Flexibility	Project F Resilience	Project F Adaptability	Project F Agility	Project F Speed	Project F Quality	Project F Cost	Project F Risk	Project F Impact	Project F Legacy	Project F Future
7	Project G	Chris Miller	2024-07-01	2024-09-30	Planned	130000	160000	30000	23.1%	Medium	High	6	14	Project G Milestones	Project G Deliverables	Project G Stakeholders	Project G Sponsor	Project G Steering Committee	Project G Governance	Project G Reporting	Project G Communication	Project G Documentation	Project G Archiving	Project G Review	Project G Audit	Project G Compliance	Project G Ethics	Project G Sustainability	Project G Innovation	Project G Scalability	Project G Flexibility	Project G Resilience	Project G Adaptability	Project G Agility	Project G Speed	Project G Quality	Project G Cost	Project G Risk	Project G Impact	Project G Legacy	Project G Future
8	Project H	Alexander Lee	2024-10-01	2024-12-31	Planned	140000	170000	30000	21.4%	Medium	High	7	16	Project H Milestones	Project H Deliverables	Project H Stakeholders	Project H Sponsor	Project H Steering Committee	Project H Governance	Project H Reporting	Project H Communication	Project H Documentation	Project H Archiving	Project H Review	Project H Audit	Project H Compliance	Project H Ethics	Project H Sustainability	Project H Innovation	Project H Scalability	Project H Flexibility	Project H Resilience	Project H Adaptability	Project H Agility	Project H Speed	Project H Quality	Project H Cost	Project H Risk	Project H Impact	Project H Legacy	Project H Future
9	Project I	Olivia White	2025-01-01	2025-03-31	Planned	100000	120000	20000	20%	Low	Medium	5	11	Project I Milestones	Project I Deliverables	Project I Stakeholders	Project I Sponsor	Project I Steering Committee	Project I Governance	Project I Reporting	Project I Communication	Project I Documentation	Project I Archiving	Project I Review	Project I Audit	Project I Compliance	Project I Ethics	Project I Sustainability	Project I Innovation	Project I Scalability	Project I Flexibility	Project I Resilience	Project I Adaptability	Project I Agility	Project I Speed	Project I Quality	Project I Cost	Project I Risk	Project I Impact	Project I Legacy	Project I Future
10	Project J	Benjamin Green	2025-04-01	2025-06-30	Planned	120000	150000	30000	25%	Medium	Medium	6	13	Project J Milestones	Project J Deliverables	Project J Stakeholders	Project J Sponsor	Project J Steering Committee	Project J Governance	Project J Reporting	Project J Communication	Project J Documentation	Project J Archiving	Project J Review	Project J Audit	Project J Compliance	Project J Ethics	Project J Sustainability	Project J Innovation	Project J Scalability	Project J Flexibility	Project J Resilience	Project J Adaptability	Project J Agility	Project J Speed	Project J Quality	Project J Cost	Project J Risk	Project J Impact	Project J Legacy	Project J Future
11	Project K	Mia Black	2025-07-01	2025-09-30	Planned	110000	140000	30000	27.3%	Medium	Medium	5	12	Project K Milestones	Project K Deliverables	Project K Stakeholders	Project K Sponsor	Project K Steering Committee	Project																						

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LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

**CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 19
(ATTACHMENT D – RELEASE AGREEMENT)**

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 19 to Contract No.: OP28367-000 is made effective on the 26th day of October 2020 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, Contract Modification No. 12 dated January 17, 2019, Contract Modification No. 13 dated February 8, 2019, Contract Modification No. 14 dated November 19, 2019, Contract Modification No. 15 dated February 21, 2020, Contract Modification No. 16, dated July 8, 2020, Contract Modification No. 17, dated July 9, 2020, and Contract Modification No. 18, dated August 4, 2020 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties as follows:

Modify Contract Volume No. 1 to incorporate the enclosed **ATTACHMENT D – RELEASE AGREEMENT RE: FIRE INCIDENT OF MAY 26, 2020.**

Except as expressly amended hereby, the Existing Contract remains in full force and effect as originally executed.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 19 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above.

EL DORADO NATIONAL (CALIFORNIA), INC.

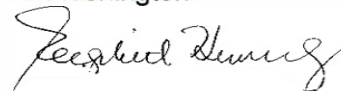
By: 
Signature

RICHARD HIMES
Type and Print Name

11/5/2020
Date

**LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY**

Philip A. Washington

By: 

Elizabeth Hernandez
Principal Contract Administrator

11/16/20
Date

RELEASE AGREEMENT

This Release Agreement (the "Release Agreement") is effective as of the date of the last signature below (the "Effective Date"), between: Los Angeles County Metropolitan Transportation Authority ("LACMTA"), with offices located at One Gateway Plaza, Los Angeles, CA 90012; MV Transportation, Inc. ("MV"), with offices located at 2711 N. Haskell Avenue, Suite 1500, Dallas, TX, 75204; and El Dorado National (California), Inc. ("ENC") with offices located at 9670 Galena Street #3809, Riverside, CA 92509, collectively known as the "Parties," for resolution of a claim arising from a fire incident that occurred on May 26, 2020, at 21222 S. Wilmington Ave., Carson, CA 90810, (the "Incident").

WHEREAS, LACMTA and ENC entered into a contract agreement, OP28367-000 (the "Contract"), pursuant to which ENC manufactured and provided various transit buses to LACMTA pursuant to the terms and conditions and as more fully set forth in the Contract;

WHEREAS, MV leased certain buses from LACMTA to operate on certain LACMTA bus routes;

WHEREAS, three (3) buses owned by LACMTA bearing the bus numbers 1565, 1568, and 1569 with VINs 1N9APA9N2KC084103, 1N9APA9N8KC084106, 1N9APA9NXKC084107 ("the Destroyed Buses"), sustained total loss damages;

WHEREAS, a building sustained damages in the Incident ("the Building Damages");

WHEREAS, the Parties desire to fully and finally settle all property damages, costs, claims, and potential claims related to the Destroyed Buses;

WHEREAS, this Release Agreement is hereby incorporated into the Contract by this reference, but in the event of any conflict between the terms of the Contract and this Release Agreement, this Release Agreement shall control;

NOW THEREFORE, in order to resolve the Incident as it relates to the Destroyed Buses, and with the intention to be legally bound, the Parties agree as follows:

- 1. Replacement of the Destroyed Buses.** ENC shall provide to LACTMA at no additional cost, including the cost of any applicable taxes, three (3) buses of the same design, with the same options and features as those currently being manufactured by ENC for LACMTA ("the Optional Configuration buses") to replace the destroyed buses. The three replacement buses shall be the first three Optional Configuration buses ENC manufactures after October 31, 2020 ("the Replacement Buses"), and shall be delivered to LACMTA as soon as reasonably possible thereafter. In exchange for the mutual consideration provided in this Release Agreement, LACMTA shall transfer ownership title of the Destroyed Buses to ENC. Upon title transfer, ENC shall issue a credit invoice for the purchase price, including the cost of any applicable taxes, of the Destroyed Buses. ENC shall then issue an offsetting new invoice for the Replacement Buses in the same dollar amount as the credit invoice issued for the Destroyed Buses when the Replacement Buses are shipped. The applicable warranty on the Replacement Buses shall be pursuant to the terms and conditions as fully set forth in Special Provisions Article SP-40 of the Contract. The effective date of the Replacement Bus warranty shall begin *on the first date of revenue service but no later than 15 days after acceptance.*

Release Agreement on behalf of that Party. LACMTA and MV reserve their rights to pursue claim(s) against other third parties not a Party to this Release for loss of use, loss of revenue, or any other loss incurred by the ~~fire~~ Incident.

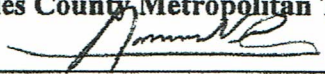
6. **No Admission of Liability.** The Parties expressly agree and acknowledge that their entering into this Release Agreement shall not be construed in any manner as an admission of any liability, or wrongdoing on the part of any Party. Each Party expressly denies any and all liability or wrongdoing with respect to the Incident.
7. **Cooperation between the Parties.** Each Party shall fully cooperate with each other with respect to the terms of this Release Agreement. Each Party will make its best efforts to provide or make available to any other Party any information and will execute, acknowledge and deliver such further documents that may reasonably be required in order to replace the Destroyed Buses described in this Release Agreement
8. **Governing Law and Venue.** This Release Agreement will be governed by and interpreted in accordance with the laws of the State of California, without giving effect to the principles of conflicts of law of such state. The Parties hereby agree that any action arising out of this Release Agreement will be brought solely in the appropriate Superior Court of the State of California. The Parties hereby submit to the exclusive jurisdiction and venue of any such court.
9. **Binding Agreement.** This Release Agreement shall be binding upon and inure to the benefit of the successors, assigns and legal representatives of the Parties. There are no third-party beneficiaries to this Release Agreement. Each Party acknowledges and agrees that it fully understands the provisions set forth in this Release Agreement and their effect, and that each Party is voluntarily entering into this Release Agreement.
10. **Severability.** If any provision or portion of this Release Agreement shall be held by a court of competent jurisdiction to be illegal, invalid, or unenforceable, the remaining provisions or portions shall remain in full force and effect.
11. **Construction.** The headings and captions appearing in this Release Agreement have been inserted for the purposes of convenience and ready reference, and do not purport to and shall not be deemed to define, limit or extend the scope or intent of the provisions to which they appertain. This Release Agreement shall not be construed more strongly against any Party regardless of which Party is more responsible for its preparation.
12. **Counterparts.** This Release Agreement may be executed in one or more counterparts, each of which will be deemed to be an original, but all of which together will constitute one and the same instrument, without necessity of production of the others. An executed signature page delivered via facsimile transmission or electronic signature shall be deemed as effective as an original executed signature page.

- 13. Notices.** All notices or other communications required under this Release Agreement shall be in writing and shall be deemed effective when received, but in no case later than five business days after sending the correspondence. All such communications shall be made by either (i) hand delivery, (ii) registered mail, (iii) certified mail, return receipt requested, (iv) overnight mail, or (v) electronic mail (email) addressed to the Party to be notified at the addresses referenced above or email address as follows: Alberto Vazquez for LACMTA, vazquezal@metro.net; Mark Collins and Marie Graul for MV, mark.collins@mvtransit.com and marie.graul@mvtransit.com; and Tony Wayne for ENC, tony.wayne@eldorado-ca.com.
- 14. Waiver.** No waiver of any term or right in this Release Agreement shall be effective unless in writing, signed by an authorized representative of the waiving Party. The failure of any Party to enforce any provision of this Release Agreement shall not be construed as a waiver or modification of such provision, or impairment of the right to enforce such provision or any other provision of this Release Agreement thereafter.
- 15. Entire Agreement; Modification.** This Release Agreement is the entire agreement between the Parties with respect to the Destroyed Buses and the Replacement Buses and supersedes any prior agreement or communications between the Parties, whether written, oral, electronic or otherwise. No change, modification, amendment, or addition of or to this Release Agreement shall be valid unless in writing and signed by authorized representatives of the Parties. Each Party hereto has received or had the opportunity to receive independent legal advice regarding this Release Agreement and their respective rights and obligations set forth herein. The Parties acknowledge and agree that they are not relying upon any representations or statements made by the other Party or the other Party's employees, agents, representatives, or attorneys regarding this Release Agreement, except to the extent such representations are expressly set forth herein.

*** SIGNATURE PAGE TO FOLLOW***

IN WITNESS WHEREOF, the Parties have signed this Release Agreement.

Los Angeles County Metropolitan Transportation Authority

By: 
Name: Alberto Vazquez
Title: Sr. Risk Analyst
Date: 9/18/2020

MV Transportation, Inc.

By: _____
Name: Mark Collins
Title: President, Chief Operating Officer
Date:

MV Transportation, Inc.

By: _____
Name: Marie Graul
Title: Chief Financial Officer
Date:

El Dorado National (California), Inc.

By: _____
Name: Tony Wayne
Title: Vice President/General Manager
Date:

IN WITNESS WHEREOF, the Parties have signed this Release Agreement.

Los Angeles County Metropolitan Transportation Authority

By: _____

Name: Alberto Vazquez

Title: Sr. Risk Analyst

Date: _____

MV Transportation, Inc.

DocuSigned by:

Mark Collins

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By: _____

Name: Mark Collins

Title: President, Chief Operating Officer

Date: 9/21/2020

MV Transportation, Inc.

DocuSigned by:

Marie Meisenbach Gaul

CC90F4517A5F42E...

By: _____

Name: Marie Gaul

Title: Chief Financial Officer

Date: 9/22/2020

El Dorado National (California), Inc.

By: _____

Name: Tony Wayne

Title: Vice President/General Manager

Date: 9/22/2020

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY

CONTRACT NO. OP28367-000, CONTRACT MODIFICATION NO.: 20

FOR: FORTY FOOT (40') LOW FLOOR CNG TRANSIT BUSES

This Contract Modification No. 20 to Contract No.: OP28367-000 is made effective on the 1st day of June 2021 by and between the LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY, hereinafter referred to as "MTA", and EL DORADO NATIONAL (CALIFORNIA), INC., hereinafter referred to as "CONTRACTOR".

WHEREAS, CONTRACTOR and MTA entered into Contract No.: OP28367-000 effective August 15, 2017, as amended by Contract Modification No. 1, dated November 6, 2017, Contract Modification No. 2, dated December 6, 2017, Contract Modification No. 3 dated December 27, 2017, Contract Modification No. 4 dated January 19, 2018, Contract Modification No. 5 dated February 12, 2018, Contract Modification No. 6 dated April 23, 2018, Contract Modification No. 7 dated October 3, 2018, Contract Modification No. 8 dated October 26, 2018, Contract Modification No. 9 dated November 5, 2018, Contract Modification No. 10 dated January 9, 2019, Contract Modification No. 11 dated January 15, 2019, Contract Modification No. 12 dated January 17, 2019, Contract Modification No. 13 dated February 8, 2019, Contract Modification No. 14 dated November 19, 2019, Contract Modification No. 15 dated February 21, 2020, Contract Modification No. 16, dated July 8, 2020, Contract Modification No. 17, dated July 9, 2020, Contract Modification No. 18, dated August 4, 2020, and Contract Modification No. 19, dated October 26, 2020 (the "Existing Contract") and;

WHEREAS, CONTRACTOR and MTA desire to modify the Existing Contract as provided herein;

Now, therefore, it is mutually agreed, by and between the parties, that the following articles of the Contract are modified as follows: (deletions are shown as bold ~~blue-strikeout~~; added language indicated as **bold red** font)

1. Increase the total Contract Price to incorporate a Merv13 filter into the Base Buy (\$84,821) and Option Buy (\$73,665) Buses in an amount not to exceed \$158,680.

ARTICLE IV: COMPENSATION is hereby amended as follows:

A. Contract Price

1. Base Buy Order (295 buses)

In consideration of the Contractor's full performance of the Work, and in accordance with the terms of the Contract, Metro will pay the Contractor the Contract Price of **\$199,408,991.00** ~~\$199,324,170.00~~, inclusive of tax and delivery as provided in this Article and in the Contract Document entitled Compensation and Payment.

2. Option Buy (259 Buses)

Contract Option for 259 bus order is hereby exercised unilaterally by LACMTA in accordance with Special Provisions Article AP-2, Options.

In consideration of the Contractor's full performance of the Work for Contract Option Buy, and in accordance with the terms of the Contract, LACMTA will pay the Contractor the Contract Price of **\$185,099,811.00** ~~\$185,026,146.00~~, inclusive of tax and delivery as provided in this article and in the Contract Document entitled Compensation and Payment Provisions.

2. FORM PF – 1 CONTRACT PRICE SUMMARY (Second BAFO) Base Buy is hereby amended as follows:

1.0 CONTRACT FOR 295 BUSES (BASE BUY)					Taxable		
No.	Qty.	Description of Item			Unit Price	Unit Price	Total Price
1	229	40' Low Floor CNG Buses (Base Buy) from P	Values derived from PF-1A*:		\$596,199.46	\$615,939.30	\$141,050,100
	66	40' Low Floor CNG Buses (Base Buy) from PF-1A			\$595,805.53	\$615,545.53	\$40,626,005
1a	Lot	Manuals (Base Buy) (TS 5.6.4)			\$2,281.50	Lump Sum	\$23,400.00
1b	295	Vehicle Delivery Charge for Base Buy	Value of all taxable delivery charges per bus**:			\$275.00	\$81,125.00
1c	229	Tax (Base Buy Production Bus 67 - 295)			9.75%	\$58,129.45	\$13,313,925
1d	66	Tax (Base Buy Production Bus 1-66)			9.75%	\$58,091.04	\$3,834,009
1e	295	MERV 13 Retrofit Kits (Mod 20)				\$ 262.58	\$77,461.87
	295	MERV 13 Retrofit Kits Tax (Mod 20)			9.50%	\$ 24.95	\$7,358.88
2	2	Pilot Buses Retrofit with Rear Axle Upgrade				\$8,600	\$17,201
2a		Tax			9.75%	\$838.55	\$1,677
7	Lot	Performance Bond (Base Buy)				Lump Sum	\$119,336.00
8	1,000	Total Training Hours for Base Buy***				\$175,000.00	
8a	900	Contractor (Proposer/Prime) Base Buy				\$175.00	\$157,500.00
8b	100	Subcontractor/Supplier Base Buy				\$175.00	\$17,500.00
9	1	System Management Tool for use at up to (13) MTA Operating Divisions per TS 86.1				\$74,930.00	\$74,930.00
10a	15	Special Towing Equipment (TS 25)				\$386.00	\$5,790.00
10b		Tax			9.75%	\$37.64	\$564.53
11a	2	Rear Recovery Devices/Tie Downs (TS 25)				\$505.00	\$1,010.00
11b		Tax			9.75%	\$49.24	\$98.48
1.0 Total Price for CONTRACT for 295 Base Buy Buses (Sum of Items "1" through "11b") to be the BASIS for Price Proposal evaluation							
In U.S. Dollars Using Words:		ONE HUNDRED NINETY - NINE MILLION FOUR HUNDRED AND EIGHT THOUSAND NINE HUNDRED NINTY - ONE DOLLARS					
		ONE HUNDRED NINETY NINE MILLION THREE HUNDRED TWENTY FOUR THOUSAND ONE HUNDRED SEVENTY DOLLARS					
							\$199,324,470
In U.S. Dollars Using Figures:							\$199,408,991

3. FORM PF – 1 CONTRACT PRICE SUMMARY (Second BAFO) Option Bus Buy is hereby amended as follows:

2.0 CONTRACT FOR 259 BUSES (OPTION BUY)				Taxable		
No.	Qty.	Description of Item		Unit Price	Unit Price	Total Price
10	16	40' Low Floor CNG Buses (Option Buy) for 16 vehicles*		\$633,583.00	\$653,323.00	\$ 10,453,168.00
	243	40' Low Floor CNG Buses (Option Buy) for 243 vehicles*		\$633,205.00	\$652,945.00	\$ 158,665,635.00
10a	Lot	Manuals (Option Buy) (TS 5.6.4)***		\$ -	\$ -	\$ 23,400.00
10b	259	Vehicle Delivery Charge for Option Buy	Value of all taxable delivery charges per bus**:		\$ 275.00	\$ 71,225.00
10c	16	Tax (Bus Option Buy)		9.50%	\$ 60,190.39	\$ 963,046.16
	243	Tax (Bus Option Buy)		9.50%	\$ 60,154.48	\$ 14,617,537.43
10d	196	MERV 13 Retrofit Kits (Mod 20)			\$ 262.58	\$ 51,466.19
	63	MERV 13 In-production (Mod 20)			\$ 250.92	\$ 15,807.87
10e	196	MERV 13 Retrofit Kits Tax (Mod 20)		9.50%	\$ 24.95	\$ 4,889.29
	63	MERV 13 Kits In-production Tax (Mod 20)		9.50%	\$ 23.84	\$ 1,501.75
11a	295	Base Buy Bus Order Securement Retrofit			\$ 410.85	\$ 121,200.75
11b	295	Base Buy Order Securement Retrofit Tax		9.50%	\$ -	\$ -
12	Lot	Performance Bond for Option Buy***			Lump Sum	\$ 110,934.00
2.0 Total Price for CONTRACT for 150 Up to 305 Option Buy Buses (Sum of Items "10" through "14") to be the BASIS for Price Proposal evaluation						
ONE-HUNDRED EIGHTY FIVE MILLION NINETY- NINE THOUSAND EIGHT HUNDRED ELEVEN DOLLARS						
ONE-HUNDRED EIGHTY FIVE MILLION TWENTY-SIX THOUSAND ONE HUNDRED FORTY-SIX DOLLARS						
In U.S. Dollars Using Words:						
						\$185,026,146.00
						In U.S. Dollars Using Figures: \$ 185,099,811.00

4. TECHNICAL SPECIFICATIONS – VOLUME II is hereby amended as follows:

TS 57 Air Filtration

Air shall be filtered before discharge into the passenger compartment. ~~The filter shall meet the ANSI/ASHRAE 52.2 requirement for five percent or better atmospheric dust spot efficiency, 50 percent weight arrestance, and a minimum dust holding capacity of 120 g per 1000 cfm cell.~~ Air filters shall be easily removable for service.

~~More efficient air filtration may be provided to maintain efficient heater and/or evaporator operation.~~ **Minimum Efficiency Reporting Value (MERV) 13 filtration shall be provided for the passenger compartment.** Moisture drains from air intake openings shall be located so that they will not be subject to clogging from road dirt.

5. COMPENSATION AND PAYMENT PROVISIONS, CP-02, ARTICLE E.4.D.1 is hereby amended as follows:

CP-02 MILESTONE PAYMENTS

D. Milestone Payment for Production Vehicles (This payment shall

NOT apply to the Pilot Vehicle or First Article Vehicle.)

1. ~~For 40' and 60' CNG Buses - Ninety percent (90%) of the Total Price of each production Vehicle including Option Vehicles will be paid within 30 days after acceptance of each Vehicle. Fifty percent (50%) of the Total Price of each Vehicle will be paid upon completion of Line 5.~~

Forty-eight percent (48%) upon delivery to LACMTA's CMF and acceptance by LACMTA, within 30 days.

Two percent (2%) of Vehicle invoice price will be held until vehicle has completed three (3) months or 10,000 miles of revenue service, whichever occurs first. Additionally, the vehicle must have all Vendor Failure Notices (VFN's) closed prior to the holdback payment. Regardless of status, LACMTA will pay any remaining holdback balance due to ENC within a period of six (6) months from the date of acceptance and/or in-service date, whichever occurs first.

Note: Milestone Payments for Production Vehicles including the 2% retention will only apply to remaining Option Buses shipped beginning June 1, 2021.

IN WITNESS WHEREOF, the parties have caused this Contract Modification No. 20 to the Existing Contract to be executed by their respective officers duly authorized on the date first written above

EL DORADO NATIONAL (CALIFORNIA), INC.

By:

Signature

JASON MOORE
VP AND GM

Type and Print Name

06/23/21

Date

LOS ANGELES COUNTY
METROPOLITAN TRANSPORTATION
AUTHORITY

Philip A. Washington

Chief Executive Officer

By:

Joe Marzano

Director, Contract Administration

Date

6/24/21



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 17.B
Section: DEPARTMENTAL
ITEMS - TRANSPORTATION
Meeting Date: April 26, 2022

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: Approve Fuel Contract Increases with Pinnacle Petroleum and Clean Energy for the Purchase of Gasoline and Compressed Natural Gas (CNG) for FY22

COUNCIL ACTION REQUIRED:

Staff Recommendation: Approve Fuel Contract Increases

RECOMMENDATION AND STAFF SUMMARY:

In FY21 GTrans used nearly 240,000 gallons of gasoline and over 60,000 gasoline gallon equivalents of compressed natural gas (CNG) to operate over 1,000,000 miles. GTrans spends between \$1,000,000 and \$1,500,000 million in fuel each year to operate its transit service and non-revenue vehicles.

In 2020, GTrans prepared its two-year budget for FY21 and FY22, and included a conservative estimate for both gasoline and CNG expenditures in both years. At that time we were not able to foresee the nationwide increase in fuel prices, which have been even higher in California and the Los Angeles area. GTrans has negotiated contracts with both Pinnacle Petroleum and Clean Energy for its gasoline and CNG supply, which provide some discount in our contracted rate. However, our original estimates for fuel for FY22 are not sufficient to carry us through the end of June 30, 2022. Staff has done an analysis to calculate anticipated fuel needs through the end of the fiscal year.

Therefore, staff recommends increasing the fuel contracts for FY22 to the following:

1. Increase FY22 authorization for Pinnacle Petroleum by \$364,594, for a new total of \$1,316,101
2. Increase FY22 authorization for Clean Energy by \$74,331, for a new total of \$320,102

FINANCIAL IMPACT/COST:

GTrans can accommodate these increases within its overall FY22 budget. There is no impact to the General Fund.

ATTACHMENTS:

[City Council Approval of Blanket POs 8_10_2021.pdf](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio". The signature is fluid and cursive, with a period at the end.

Clint Osorio, City Manager



City of Gardena

Gardena City Council Meeting

AGENDA REPORT SUMMARY

Agenda Item No. 11.A
Section: DEPARTMENTAL
ITEMS - ADMINISTRATIVE
SERVICES
Meeting Date: August 10, 2021

TO: THE HONORABLE MAYOR AND MEMBERS OF THE GARDENA CITY COUNCIL

AGENDA TITLE: Approval of Blanket Purchase Orders for Fiscal Year 2021-2022

COUNCIL ACTION REQUIRED:

Staff Recommendation: Approve Blanket Purchase Orders

RECOMMENDATION AND STAFF SUMMARY:

A blanket purchase order authorizes the City to buy goods or services with predetermined terms or conditions. Since these vendors either have individual contracts, are piggybacking on State contracts or provide vital services which the City is mandated to use, it is only necessary for the requisitioner to request one purchase order for the estimated amount of the expenditure for the fiscal year. The blanket purchase order is limited by a dollar amount, as approved by Council, and authorizes the Purchasing Officer to issue releases for goods or services until the pre-established dollar amount of the blanket purchase order is reached.

Per the City's Purchasing Policy, Section 3.B. "the purchase of goods or services in excess of \$30,000 must be authorized by the City Council". Therefore, as the estimated budgeted expenditure amount exceeds \$30,000, it is requested that Council approve the following Blanket Purchase Orders for FY 21-22 as specified in Exhibit A.

FINANCIAL IMPACT/COST:

General Fund	\$2,185,013
GTrans	\$2,032,383
Other Funds	\$ 619,293
Total Budgeted Expense	\$4,836,689

ATTACHMENTS:

[Exhibit A.docx](#)

APPROVED:

A handwritten signature in blue ink, appearing to read "Clint Osorio", is centered within a light gray rectangular box.

Clint Osorio, City Manager

EXHIBIT A

VENDOR	AMOUNT	DESCRIPTION OF SERVICE	FUNDING SOURCE
Adminsure Inc.	\$142,960	Third Party Administrator, Workers Compensation	Internal Service Fund
City of Hawthorne	\$95,000	Mark 43 (CAD/RMS)	General Fund
Crayon Software Experts	\$96,156	Microsoft Enterprise Licensing Renewal	General Fund
Data Gear	\$100,000	Video Policing Camera Maintenance	General Fund
Enterprise FM Trust	\$140,405	Patrol & City lease fleet	General Fund
JL Group	\$77,000	Investigative Services	General Fund
Jones & Mayer	\$122,186	City Attorney services	General Fund
Kent Behrends	\$40,800	IT consulting services	General Fund
LA Superior Court	\$430,000	Parking Citation Fees	General Fund
Honeywell	\$106,234	HVAC Annual Maintenance	General Fund
Mark Handler & Associates	\$200,000	Building Official – Plan Check	General Fund
Phoenix Group Information Systems	\$140,000	Citation Billing Services	General Fund
Pinnacle Petroleum	\$130,000	Fuel (Public Works)	General Fund
Prudential Overall Supply	\$ 44,000	Uniforms	General Fund
Pun Group LLC	\$53,127	Annual Audit Services	General Fund
Race Communication	\$54,724	Annual Fiber Internet Services	General Fund
Shige's Foreign Car Service	\$50,000	Vehicle Repairs	General Fund
Spicers Paper	\$30,000	Paper	General Fund
Tyler Technologies	\$52,421	Annual ERP Software Maintenance	General Fund
Western Collision Center	\$50,000	Vehicle Repairs	General Fund
Williams-Scotsman	\$30,000	Rental for Mobile Building	General Fund
Sub Total General Fund	\$2,185,013		
Aftermarket Parts	\$150,000	Budgeted bus replacement parts	GTrans
Clean Energy	\$245,771	Fuel – Compressed Natural Gas	GTrans
Copyland, Inc.	\$40,000	GTrans Bus Books and Materials	GTrans
Crayon Software Experts	\$33,452	Microsoft Enterprise Licensing Renewal	GTrans
Gillig LLC	\$45,000	Budgeted bus replacement parts	GTrans
Inter-Con Security Services	\$112,861	Security Guard Service	GTrans
Jobel Rentino	\$75,000	Procurement Consultant	GTrans
Michelin North America, Inc.	\$70,000	Tire lease and service for GTrans	GTrans
Mobile Relay	\$135,891	Digital Bus Radio System Lease	GTrans
Pinnacle Petroleum	\$951,507	Fuel	GTrans
PSI Repair Services	\$118,000	Reconditioning of Mono and Dual Inverters	GTrans
Pun Group LLC	\$12,557	Annual Audit Services	GTrans
Race Communication	\$12,344	Annual Fiber Internet Services	GTrans
Toms Truck Center	\$30,000	Ford Vehicle Parts	GTrans
Sub Total GTrans	\$2,032,383		

EXHIBIT A

Crayon Software Experts	\$30,503	Microsoft Enterprise Licensing Renewal	GFCC, Other Funds
Enterprise FM Trust	\$44,268	Patrol & City lease fleet	AQMD
LA County, Dept. of Public Works	\$173,000	Traffic Signal Maintenance, NPDES	Gas Tax
Mariposa Landscape, Inc.	\$88,080	Citywide Median Landscape Maintenance	Gas Tax
McCain, Inc.	\$65,000	Traffic Controllers and Ancillary Equipment	Gas Tax
Micro Electronics	\$30,000	Computer Replacement Parts	Computer Replacement Fund
Pun Group LLC	\$13,442	Annual Audit Services	GFCC
West Coast Arborists	\$175,000	Citywide Tree Trimming Services	Gas Tax
Sub Total Other Funds	\$619,293		
Grand Total All Funds	\$4,836,689		