# Assessment of State DOT Transit Vehicle Procurement Models

# **FINAL REPORT**

**Prepared for:** National Cooperative Highway Research Program Transportation Research Board Of The National Academies

> Jerry Hsu Scott Baker AECOM Arlington, VA

> > June 2016

#### ACKNOWLEDGMENT OF SPONSORSHIP

This work was sponsored by one or more of the following as noted:

American Association of State Highway and Transportation Officials, in cooperation with the Federal Highway Administration, and was conducted in the **National Cooperative Highway Research Program**,

Federal Transit Administration and was conducted in the **Transit Cooperative Research Program**,

Federal Aviation Administration and was conducted in the **Airports Cooperative Research Program**,

Research and Innovative Technology Administration and was conducted in the **National Cooperative Freight Research Program**,

Pipeline and Hazardous Materials Safety Administration and was conducted in the **Hazardous Materials Cooperative Research program**,

Federal Railroad Administration and was conducted in the **National Cooperative Rail Research Program**,

which is administered by the Transportation Research Board of the National Academies.

#### DISCLAIMER

This is an uncorrected draft as submitted by the Contractor. The opinions and conclusions expressed or implied herein are those of the Contractor. They are not necessarily those of the Transportation Research Board, the National Academies, or the program sponsors.

# Assessment of State DOT Transit Vehicle Procurement Models

# **FINAL REPORT**

**Prepared for:** National Cooperative Highway Research Program Transportation Research Board Of The National Academies

> Jerry Hsu Scott Baker AECOM Arlington, VA

> > June 2016

# NCHRP 20-65 Task 57 Vehicle Procurement Report

## **Table of Contents**

Table of Figuresiv
Acknowledgements
Executive Summary1
Chapter 1 Background and Research Approach2
Multiagency Purchases
Procurement Approaches
Other Best Practices4
Research Objectives
Chapter 2 Survey Results
Principal Procurement Approaches
Other Best Practices
Multiagency Purchases
FAST Act
Chapter 3 Case Studies
Texas21
Procurement21
Concerns
Oregon23
Procurement23
Concerns24
lowa24
Procurement24
Concerns25
Morongo Basin Transit Authority25
Appendix A-1

# **Table of Figures**

Figure 1 - Attributes of Vehicle Procurement Models	6
Figure 2 - Summary of State DOT Purchasing Practices Utilized	8
Figure 3 - Types and Numbers of Vehicles Reported as Procured under State DOT Contracts	10
Figure 4 - Types and Numbers of Vehicles Reported as Procured Directly by Subrecipients	11
Figure 5 - Types and Numbers of Vehicles Reported as Procured through Multi-Agency Consortia or	
Cooperatives	12
Figure 6 - Comparison of State DOT Purchasing with Subrecipient Purchasing, for Selected States	
Reporting Both Practices	13
Figure 7 - Suggested Best Practices for States Engaging in State Contracting, Direct Purchases by	
Subrecipients, and Multi-Agency Consortia	15
Figure 8 - Advantages and Challenges in Each Purchasing Approach Reported by Respondents	16
Figure 9 - Comparison Table of Case Studies	20

## Acknowledgements

The research reported herein was performed under NCHRP Project 20-65 by AECOM. Scott Baker of AECOM was the Principal Investigator and Jerry Hsu of AECOM was a principal author.

#### **Executive Summary**

This research is intended for State transit administrators who are involved with vehicle procurement. State transit administrators use a range of variations on three procurement approaches to equip their subrecipients with vehicles:

- 1) Direct procurement by the State
- 2) Direct procurement by subrecipients, and
- 3) Use of multi-agency consortia.

Most states allow use of more than one of these approaches. They report the advantages and disadvantages in the areas of

- Control of and responsibility for compliance with regulatory requirements
- Pricing power and economies of scale
- Flexibility in suiting the respective subrecipients' needs
- Responsibility for the vehicles and their ownership.

The states also report a range of best practices that offer flexibility in selection of vehicle features and purchase terms, efficiency in purchasing administration, pricing advantages, and vehicle features responsiveness.

There is ongoing interest in multi-agency purchasing, particularly using direct state procurements, and more specifically, state purchase schedules. This is accompanied by continuing concern about the potential adverse effect on competition and pricing that may arise from certain multi-agency purchasing practices. The Fixing America's Surface Transportation (FAST) Act provides significant new latitude for state purchasing practices and for interstate use of state arrangements.

Key differences among the models cited by the users are:

- The state had more confidence in Federal compliance with direct state procurement model
- Operating agencies feel that direct subrecipient procurement and procurement consortia more consistently provide vehicles best matched to the operating needs of the agencies
- The state procurement model provides greater purchasing power and is believed to offer more advantageous pricing, and can smooth volume of purchases over time as well as the accumulation of funds, relative to the subrecipient or consortium models.

The objective of this research is to research the following:

- 1. Various state-operated or consortium transit vehicle procurement methods now being employed, how each works, the attributes and limitations of each from the state.
- 2. Basic, federal procurement regulations and guidance (including best practices manual and FAQ's) associated with each method of procurement and which entity is responsible for compliance, and
- 3. Non-required procurement activities that states are employing, the attributes and limitations of each, and which one(s) should be considered a "best practice."

Instruments used by selected states are presented in the appendices.

#### Chapter 1 Background and Research Approach

Aside from operator supervision (recruitment, training, motivation, dispatching, and discipline), vehicle procurement may be the most critical function to successful transit service delivery. Both the passenger experience and the cost of service are impacted directly and to a significant degree by the cost-effectiveness of vehicle procurement. Further, the complex constraints imposed by Federal and state procurement restrictions and by an atypical supply market render the development of vehicle procurement models for state transit programs surprisingly challenging. The NCHRP and American Association of State Highway and Transportation Officials (AASHTO) Standing Committee on Public Transportation (SCOPT) programs undertook an initial review of the procurement models focused exclusively on Section 5310 program vehicles in NCHRP 20-65 (Task 9), published at

http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\_rrd\_315.pdf. This research builds on that work and focuses particularly on the models for collective procurement programs (both state and independent consortium), rather than the decentralized, independent subrecipient purchaser, although the best practice research will have value for independent subrecipient purchasers as well as states.

With the increasing number and complexity of federal procurement guidelines, state DOT's face a challenging situation when attempting either to procure vans, rural demand responsive vehicles or full size transit vehicles on behalf of their grantees or to set up a state consortium to do so. The level of state DOT involvement in these types of procurements varies from state to state, but most states find it more viable for ensuring federal compliance by being involved in the procurement, as opposed to having grantees procure the vehicles on their own and then having to ensure that the grantees (especially Section 5310 recipients) are in full compliance with federal procurement

requirements. As in many procurement activities, there is no "one-size-fits-all" approach for procuring transit vehicles, and a number of states use a range of approaches. However, in the light of recent FTA "Dear Colleague Letters" and procurement rulings, state DOTs are less certain of long standing procurement models. One issue that arises is more commonly referred in various contexts as "piggybacking," primarily referring to the practice of agencies purchasing from a contract originally entered into by another agency. It is the subject of a number of FTA rulings and enforcement actions. In some instances, "piggybacking" on other contracts is viewed negatively by in-state vendors that lose business to out-of-state vendors providing the same vehicle type they sell, or viewed as limiting in-state and broader competition.

#### **Multiagency Purchases**

Because of their similarities and good communications with each other, transit operating agencies very often see a great advantage in purchasing vehicles under the terms of a contract entered into by a peer agency, rather than undertaking a new procurement. The advantages may be perceived in terms of calendar time, administrative cost and effort, certainty of the resulting product, and pricing or other contract terms. The methods used to accomplish this range from a formal procurement consortium for specific requirements of its members led by one agency to the modification of a single agency's single-purpose contract by assigning additional purchasing rights to a new agency. Very often, quantities of vehicles specified as additional options in the original contract are involved.

Piggybacking is an unclear term, used by different people in the industry to refer to different things. Due to this ambiguity, where possible the use of this term will be avoided in this report.

#### **Procurement Approaches**

The three broad categories of procurement as used in this report are based on categories used in prior studies, and are 1) Procurement by State DOTs, 2) Direct procurement by State DOT subrecipients, and 3) use of multi-agency consortia.

Procurement by State DOTs refers to both centralized "turn-key" State procurement processes, in which the state has complete responsibility for paratransit vehicle purchases, as well as grant recipient vehicle purchasing via a central state-procured contract, where grant recipients purchase using a central state-procured vehicle contract. In turn-key procurement, the state notifies applicants of the grant award and then handles all aspects of procurement and purchasing directly. In grant recipient vehicle purchasing the state retains responsibility for procurement of the vehicle, but the grant recipient takes responsibility for placing a vehicle order under the contract and inspecting the vehicle on delivery.

Direct procurement by State DOT subrecipients refers to a Decentralized Independent Procurement Process, in which a grant recipient independently develops its own vehicle specifications, usually following the guidance of the state DOT. All steps in the procurement process, including preparation of vehicle specifications, solicitation of offers, procurement, and contract award, are conducted by the grant recipient, with state oversight along the way.

Use of multi-agency consortia refers to a Decentralized Third-Party/ Consortium Procurement Process, which includes situations in which two or more grant recipients form a procurement consortium to purchase vehicles, the state department of transportation (DOT) designates a lead agency to conduct the procurement on behalf of some or all Section 5310 grant recipients in the state, or a third-party agency procures vehicles on behalf of grant recipients.

There are a number of states that would like to develop a state-wide or consortium transit bus procurement program or reevaluate their current procurement practice, but have been unsure of the options available to them or the attributes and limitations of doing either.

#### **Other Best Practices**

Further, there are a number of transit vehicle procurement activities that states undertake that are not performed for the purpose of meeting federal procurement requirements but are beneficial to the process or final product. An analysis of these activities from a "best practice" perspective would provide the states with options for consideration in their procurement process. Possible activities to be explored in this analysis could include pilot vehicle development; in-plant inspection methods; pre-bid conferences; multi-year contracts; escalation clauses; vehicle option formulations, etc.

Figure 1 briefly summarizes the attributes of these procurement models.

		State DOT Procurement	Direct Purchasing by Subrecipients	Multi-Agency Consortia
Attributes and Limitations	State Perspective	States are able to leverage their greater administrative, procurement, and purchasing power to procure a broad base of vehicle types and options. Limited by funding. Smooths statewide procurement numbers and funding requirements.	Passing through funding and vehicles to subrecipients allows greater flexibility in purchasing and customization if options are not available on State DOT contract.	An intermediate choice generally including a number of medium or large transit entities; brings more purchasing power than the individual agencies, and may also provide more administrative expertise. Does not provide the same power as the state direct model, but may offer more flexibility.
	Subrecipient Perspective	It can be difficult to customize a vehicle for the specific needs of a subrecipient, although usually a higher availability of vehicle types and options.	Gives subrecipients flexibility in purchasing. Compliance and documentation challenges for both pre and post-procurement. Accumulating funding more difficult.	Compliance and documentation challenges, but offers flexibility and options between direct purchasing and state procurement.
tes	Assignee/End User Limitations	State may or may not own vehicles. State may maintain a lien on vehicle until useful life is over.	Subrecipients own vehicles and are responsible for upkeep and maintenance. State may maintain a lien on vehicle until useful life is over.	Subrecipients own vehicles and are responsible for upkeep and maintenance. State may maintain a lien on vehicle until useful life is over.
Option/Quantity Attribut	Quantity Specifications	Usually limited procurement quantity but with higher total quantities and options available. Some use of state purchasing schedules.	Limited procurement quantity. Smallest numbers and least purchasing power.	Moderate procurement quantity.
	Other Attributes	Some states require vendors to provide option lists in addition to pricing information, increasing the available customization options by subrecipients.	Options available differ by specific procurement.	Options available differ by specific procurement.

		State Procurement	Direct Purchasing by Subrecipients	Multi-Agency Consortia
S	Prebid Conferences	Х	Х	
st Practice	First Product Sample	Х		
on-required Techniques and Be	Inspection Methods	Х	Х	Х
	Limited Contract with extension option	Х	Х	Х
	Vendors bid base price and provide an options list	Х	Х	Х
ž	Regional meetings with stakeholders/vendors	Х		

Figure 1 - Attributes of Vehicle Procurement Models

#### **Research Objectives**

The objective of this research is to investigate the following:

- 1. Various state-operated or consortium transit vehicle procurement methods now being employed, how each works, the attributes and limitations of each from the state.
- 2. Basic, federal procurement regulations and guidance (including best practices manual and FAQ's) associated with each method of procurement and which entity is responsible for compliance, and
- 3. Non-required procurement activities that states are employing, the attributes and limitations of each, and which one(s) should be considered a "best practice."

#### **Chapter 2 Survey Results**

As part of this research, a survey was created and disseminated to State DOTs for response. The survey was sent to all State DOTs, with 32 distinct responses received. This chapter will provide a summary of the results of the vehicle procurement survey, divided into four sections: 1) a summary of vehicle procurement, 2) additional best practices as recommended by survey respondents, 3) challenges reported for state contracting, and 4) challenges reported for subrecipient contracting.

The first question asked was what FTA grant programs were utilized by the various State DOTs in their vehicle procurement processes. By far, the most common FTA transit programs used were Section 5310, 5311, and 5339 funding, with 85% to 95% of responses indicating that such funding was utilized. Most other grant programs were used at a rate between 45% and 55% of responses. The least utilized programs were Section 5307 and various State Grant Programs, both of which were used by approximately 35% to 40% of respondents.

Section 5311 funding is provided for rural transportation projects in areas with populations fewer than 50,000. Section 5339 funding is for capital projects, which are generally comprised largely of bus purchases, particularly for systems not serving large urbanized areas. Section 5310 is to provide capital for transportation needs of elderly and disabled persons, and consequently is also directed largely toward vehicles. Section 5307 funding is provided for urbanized transportation projects in areas with populations of 50,000 and more. Funding is available for planning, engineering design and evaluation of transit projects, capital investment in bus and bus-related activities, crime prevention, facilities, and ADA paratransit services.

#### **Principal Procurement Approaches**



Figure 2 - Summary of State DOT Purchasing Practices Utilized

The survey asked respondents how State DOTs procured vehicles with FTA transit program funds, as divided by state-wide purchasing, allowing direct purchases by subrecipients, and allowing or participating in multi-agency consortia. Figure 2 summarizes their responses. Twenty-eight states responded that they used State-wide purchasing, with four states indicating they did not. Nineteen states responded that they used or allowed direct purchasing by subrecipients, with six states indicating they did not. Eight states indicated they used or allowed multi-agency consortia, and seventeen states indicated that they did not. The structure of the survey may have caused inconsistent response rates between state respondents. However, a number of conclusions can be made as a result of the general responses for this question. In general, most states participate in state-wide purchasing, where State DOTs are responsible for entering into purchasing agreements with vendors and for purchasing and distributing vehicles to subrecipients. In addition, most of these states also allow their subrecipients to engage in some form of direct purchasing, with the State DOTs participation ranging from minimal engagement and pass-through of funding only, to heavy involvement of State DOTs in assisting the subrecipient with procurement and solicitation processes. Finally, the responses on the subject of allowing multi-agency consortia, indicates that a relatively small number of State DOTs permit their subrecipients to either engage in multi-agency consortia, or participate in such arrangements themselves. While some States are looking into encouraging or participating in such organizations, most remain wary of such consortia.

State DOTs were asked the type and numbers of vehicles they procured through Statewide purchasing, direct purchasing by subrecipients, and through state consortia. There were five categories of vehicles as defined in this survey:

- 1. Large, heavy-duty transit buses including over the road buses (approximately 35'-40', and articulated buses): at least 12 years of service or an accumulation of at least 500,000 miles.
- 2. Small size, heavy-duty transit buses (approximately 30'): at least 10 years or an accumulation of at least 350,000 miles.
- 3. Medium-size, medium-duty transit buses (approximately 25'-35'): at least seven years or an accumulation of at least 200,000 miles.
- 4. Medium-size, light-duty transit buses (approximately 25'-35'): at least five years or an accumulation of at least 150,000 miles.
- 5. Other types of vehicles.

These classifications were drawn from the FTA Circular C9300.1B, Capital Investment Program Guidance and Application, November 1, 2008. The purpose of this classification is to differentiate rolling stock based on the useful life of the vehicle during service as well as ensuring that buses acquired are "necessary for regularly scheduled transit revenue service." In addition to the various types of bus vehicles listed, the "Other" category also includes other light-duty vehicles such as regular and specialized vans, sedans, light-duty buses of at least four years or an accumulation of at least 100,000 miles. In the survey responses, states indicated a variety of vehicles under the "Other" category, including accessible 5-passenger minivans, MMV's, MV-1's, Dodge Grand Caravans, Ford E350s, and other light modified buses and minivans.

Figure 3 displays a breakdown of the responses for State-wide purchasing. Of the eighteen responses which indicated numerical values for at least one type of vehicle class being purchased under this category, most indicate a relatively small number of purchases of up to fifty vehicles per year in each category of vehicle. A few states reported extremely high values in purchases in a few categories, particularly in light and medium-duty transit buses. States reported that they entered into State-wide purchasing for a variety of reasons, broadly falling into three main categories: compliance, as well as economies of scale in administration and pricing. Multiple states noted that they engaged in state-wide purchasing because it allowed them to ensure that vehicles purchased met FTA regulations, and others noted that purchasing as a state allowed them to both provide administrative and procurement assistance to grantees while also ensuring that vehicles could be purchased at the best possible price without individually

bidding out vehicles. A few states reported reasons not related to these three categories, including permission to award multiple awards as well other agencies being responsible for purchasing rather than the State DOT, such as the State Comptroller's Office. States also reported challenges they faced with state-wide purchasing, including coordinating among agencies to ensure that commonly used technical specs meet the needs of a majority of grantees and compliance with FTA regulations like the 4220.1F Circular.





Figure 4 displays a breakdown of the responses for direct purchasing by subrecipients. Of the thirteen responses which indicated numerical values for at least one type of vehicle class being purchased under this category, values reported by State DOTs were heavily skewed towards purchasing in one or two size categories for each entity. Values are much more heavily skewed towards single categories of purchases. While States purchasing under state-wide arrangements often purchased sizable numbers of vehicles relatively evenly across the different categories of vehicles, it appears that most of the vehicle purchases made directly by subrecipients were in the category of light-duty transit buses, with a mere handful of purchases made of other types of vehicles. The reasons cited by State DOTs in allowing their subrecipients to purchase vehicles the State does not have a contract in place for, being unable to predict the number of vehicles to be purchased in a given year, and the State not wanting to own the vehicle.

One state responded that there was no real advantage to purchasing directly, while another responded that subrecipients should purchase directly if eligible. Challenges that State reported with allowing their subrecipients to directly purchase vehicles mostly involved ensuring that subrecipients remained in compliance with relevant regulations both before and after purchase, and ensuring that the subrecipients navigate the procurement process smoothly.



Figure 4 - Types and Numbers of Vehicles Reported as Procured Directly by Subrecipients

Figure 5 displays a breakdown of the responses for purchases through multi-agency consortia. Of the three responses which indicated numerical values for at least one type of vehicle class being purchased under this category, values indicate that this arrangement, while permitted by relatively few States, is also relatively unused. Each of the respondents shows a unique use of the program. One state allowed for the purchase of a relatively low number of vehicles across all vehicle classes. A second state purchased the most vehicles in a single class, but no vehicles were purchased in the other types of vehicles. The final reporting state indicated a mere handful of purchases made in a single class of vehicles, perhaps indicating a niche requirement for a single subrecipient that was not covered by other contracting arrangements. States either participated in or allowed their subrecipients to participate in multi-agency consortia for reasons including vehicle types not available in their state contracts, streamlining the procurement process, and giving transit systems the freedom to acquire their vehicles through any method which complies with FTA regulations. Among

the challenges cited by States with multi-agency consortia included ensuring participating agencies could prove they are a party to the contract, as well as ensuring subrecipients comply with state and federal requirements.





Figure 6 shows selected results from a number of states reporting procurement through both state-wide contracts as well as direct procurement by subrecipients. States that did not report numbers of vehicles purchases or which only reported cumulative purchases were omitted from this comparison table. The extreme outlier in this chart corresponds to Texas DOT, which reported a statewide procurement contract but focuses on subrecipient purchasing for primarily rural subrecipients. Based on survey data provided, a slight majority of States reporting both practices utilized primarily State DOT contracts for the bulk of their purchases, with a minority relying on subrecipient purchasing. The results shown in this figure may be skewed by low numbers of responses, inconsistencies in reporting vehicle procurement methods, or incomplete data. Several State DOTs not included in this chart reported allowing subrecipients.



Figure 6 - Comparison of State DOT Purchasing with Subrecipient Purchasing, for Selected States Reporting Both Practices

As part of the survey, respondents were asked for any additional practices they recommended for state contracting. Figure 7 displays a breakdown of such practices that were recommended as part of their responses. Some recommendations include Limited Term Contracts, multiple approved vendors, pre-bid conferences, and pre-approved add-ons or option lists to reduce customizations. The recommended lengths of contracts appeared to be between two and five years, and included options such as extension options and periodic evaluations. Any shorter than two years, and some states reported issues with getting much use out of a contract before the procurement process had to begin for its replacement, and any longer than five years and some states indicated that the contract was not as responsive for their procurement needs. Extension options were valued as they gave the State DOT the ability to reward performance without necessarily putting the entire contract up for competitive bidding again. Periodic evaluations likewise also gave State DOTs the ability to check the performance of vendors during the contract, ensuring quality control as well as informing future procurements.

Florida DOT responded that they utilized price escalation practices, which allows for a number of inflation factors and other indices which can be used for converting Present Day Costs (PDC) to Year of Expenditure costs (YOE). For project costs related to other transportation modes or non-construction components of costs, the Florida DOT allows for the use of the Consumer Price Index (CPI), the Employment Cost Index (ECI) as examples of indices usable for price escalation. An example of a Price Escalation formula is provided in Appendix A (Exhibit 5, Formula for Computation of Second Stage Price Escalation). The escalation formula uses the US Department of Labor Producer Price Index (PPI) for Bus and Firefighting vehicles, and applies a three stage formula for calculating the appropriate price escalation. The formula first identifies the Index Point Change by calculating the difference between the PPI for the Base Award Month and the Future Recomp Month. This Index Point Change is then divided by the Base Award Month PPI for percentage change factor. The Certain Dollar Amount, the second stage price of the vehicle divided by 100, is then multiplied with this percentage change factor to yield the applicable price escalation.

[This space intentionally blank}

	State DOT Contracting and Procurement	Direct Purchasing by Subrecipients	Multi-Agency Consortia or Cooperative purchasing
Suggested Best Practices	<ul> <li>-Price escalation requirements include documented increases in chassis cost plus Purchasing Price Index rise across various eligible components.</li> <li>-Contracts</li> <li>-Contracts limited to 2 years.</li> <li>-Contracts reviewed every 18 months.</li> <li>-Contracts not to exceed 5 years.</li> <li>-Regional meetings with stakeholders/subrecipients/vendors for feedback.</li> <li>-Biennial vehicle fairs with workshops and presentations.</li> <li>-Pre-bid conferences, mini Q&amp;As.</li> <li>-All transit providers required to perform a mini-RFQ to obtain competitive pricing.</li> <li>-Multiple vendors and different vehicles and add-on lists in the solicitation.</li> <li>-Vendors bid base model price and provide an options list in the RFP.</li> </ul>	-Grantees required to provide all Federal and State required documentation before going under contract. -Two year contract with limited extension option. -Using a procurement checklist to ensure all requirements are met. -Pre-bid Q&A. -Vendors bid base model price and provide an options list in the RFP.	-Two year contract with limited extension option. -Vendors bid base model price and provide an options list in the RFP – for price adjudication, option pricing is weighted according to the pre- determined, likely utilization rate.

Figure 7 - Suggested Best Practices for States Engaging in State Contracting, Direct Purchases by Subrecipients, and Multi-Agency Consortia

Some of the challenges facing States for state-wide purchasing include 1) Agency to Agency coordination, 2) Decentralized delivery and inspections, and 3) State to State coordination. Some of the challenges facing States for direct purchases by subrecipients include 1) Involvement during procurement, 2) Administrative Assistance, 3) Sample documentation, and 4) Administrative compliance. The reasons given by States for and against their participation in the three categories of purchasing are summarized in Figure 8.

# Florida DOT Price Escalation Formula (2015) State DOT Contracting and Procurement Direct Purchasing by Subrecipients Multi-Agency Consortia or Cooperative purchasing

	Procurement	Subrecipients	Cooperative purchasing
Advantages	-Control over compliance with state and federal regulations. -Better pricing and purchasing power. -Reduces collective administrative, oversight, maintenance, and procurement burdens. -Economies of scale and efficiency.	<ul> <li>-Flexibility for subrecipients when state contract does not meet their needs.</li> <li>-Reduces administrative burdens on the State.</li> <li>-Statutory restrictions on State activities.</li> <li>-Large, sophisticated transit agencies who are capable of purchasing on their own.</li> <li>Quality considerations from more direct after-sale assistance.</li> <li>A reluctance to take responsibility for the vehicles.</li> <li>-Difficult to predict the number of vehicles required.</li> </ul>	-Streamlines the procurement process. -Central control of compliance with state and federal regulations. -Some pricing advantage. Quality considerations from more direct after-sale assistance. -Some Flexibility for subrecipients when state contract does not meet their needs.
Challenges encountered	<ul> <li>-Responsibility for</li> <li>compliance with state and</li> <li>federal regulations.</li> <li>-Inefficiency of 'one-size-</li> <li>fits-all' approach may not</li> <li>meet subrecipient needs.</li> <li>-Coordinating with other</li> <li>state agencies (where</li> <li>procurement is not carried</li> <li>out by transit).</li> <li>-Buy America provisions.</li> <li>-Internal state resource</li> <li>limitations, e.g., staff.</li> </ul>	<ul> <li>-Compliance with state and federal regulations.</li> <li>-Maintaining adequate documentation.</li> <li>-Financial limitations.</li> <li>-Increased monitoring burden.</li> <li>-Buy America provisions.</li> </ul>	<ul> <li>-Less control of compliance with state and federal regulations than direct state approach.</li> <li>-Convincing systems not to infringe on piggybacking restrictions.</li> <li>-Proving participating agencies are party to the contract.</li> </ul>

Figure 8 - Advantages and Challenges in Each Purchasing Approach Reported by Respondents

#### **Other Best Practices**

Respondents to the survey were also asked for suggestions that they felt could potentially improve the procurement process. Several noted issues with Buy America, and suggested either easing or better explaining the Buy America requirements for vendors and manufacturers. However, the FAST Act has tightened rather than easing the American content requirements. Other notable suggestions include the use of multi-

award contracts, clarifications of multi-agency contracting and local co-ops, and allowing for contract extensions past the initial five year period under some circumstances. The New Hampshire DOT suggested that a central repository for successful and FTA-compliant specifications would be helpful for avoiding the need to start specifications from scratch; an example, is the framework of heavy duty urban transit bus specifications maintained by APTA on their website.

Some of these best practices could be useful in mitigating deficiencies found in some procurement programs. For example, one state DOT's State Management Review report, dated within the last decade, found a number of deficiencies dealing with procurement. Specifically, the State did not have procedures to ensure the award of contracts to responsible contractors possessing the ability, willingness, and integrity to perform successfully under the terms and conditions of the contract. The State also did not include required Federal clauses or certifications in procurement documents, and did not have procedures to ensure that subrecipients and contractors comply with FTA requirements when procuring with FTA funds. These three areas are examples where implementing best practices could be beneficial for procurement operations. The two instances where the State DOT lacked procedures in place to include certain clauses in contracts or to ensure that subrecipients complied with FTA requirements could be mitigated by implementing a procurement checklist to ensure all requirements are being met. The lack of procedures to ensure the award of contracts to responsible contractors could be mitigated through the implementation of regular contract reviews, awarding contracts to multiple vendors, and regional meetings with vendors and stakeholders for feedback. Regular contract reviews, combined with regional meetings for feedback allow the State to review contracts during their period of performance to see if contractors are performing satisfactorily for the State's subrecipients, with an eye that a lack of performance may influence their ability to win future contracts. Awarding multiple vendor contracts introduces an element of competition in vehicle procurement, while also allowing the State a number of contractual options for fulfilling their orders in the event that one vendor is found to be unsatisfactory. The States selected for further study were selected in part because of their use of selected best practices. As shown later in Figure 9, each of these States has implemented certain best practices that help them deal with the challenges associated with efficient procurement of bus vehicles. Oregon for example, uses purchasing schedules, multiple vendors, and conducts post and pre-award on every purchase. Iowa also uses multiple vendors and limited term contracts. Texas deals primarily with rural subrecipients and provides administrative oversight and assistance with a practice of decentralized delivery and inspection.

#### **Multiagency Purchases**

A major issue of note that emerged through this research was the issue known popularly as piggybacking. FTA policy defines piggybacking as "the post-award use of a contractual document/process that allows someone who was not contemplated in the original procurement to purchase the same supplies/equipment through that original document/process." This practice is actually permitted under limited circumstances in the FTA Best Practices Manual<sup>1</sup>, although it is generally discouraged due to the complexity and risk involved. A Piggybacking Worksheet<sup>2</sup> has also been provided by the FTA for grantees who are interested in multi-agency purchasing and able to affirmatively determine that associated contract meets federal requirements, including compliance with the FTA Circular 4220.1F<sup>3</sup> and the Dear Colleague Letter C-98-25.<sup>4</sup>

Where grantees have run into significant issues with multi-agency purchasing have been when contracts with indefinite quantities and unlimited options. In these cases, the purchase is not permitted, since vendors are essentially unable to plan for production needs and more importantly unable to accurately estimate competitive prices for vehicles. The FTA believes that contracts with unlimited options are disruptive to bus manufacturers and also may cause grantees to pay higher prices than they otherwise would through a competitive bidding process.

#### FAST Act

During the course of this project, the Fixing America's Surface Transportation (FAST) Act was proposed and signed into law. It is a five year legislation which covers funding for infrastructure relating to the country's roads, bridges, transit systems, and rail transportation networks, and was signed into law by President Obama on December 4, 2015. Relevant for Bus and Bus facilities programs, the FAST Act increases funding from FY2015 to FY2016 by \$268 million to a total of \$696 million.<sup>5</sup> The FAST Act made a number of changes to grant programs, including the reestablishment of the Bus Discretionary Program, creation of a pilot program for Innovative and Coordinated Access and Mobility, and changes to the 5310, 5311, and 5339 grant programs. Section 3019 of the Act loosens restrictions on purchasing for public transportation systems, allowing multiple states and transit providers to purchase capital assets through cooperative interstate procurements.<sup>6</sup> Nonprofit organizations are also permitted by the FAST Act to purchase cooperatively under a pilot program, and increases the domestic

<sup>&</sup>lt;sup>1</sup> http://www.fta.dot.gov/12831\_6189.html#BM6\_3\_3

<sup>&</sup>lt;sup>2</sup> http://www.fta.dot.gov/12831\_6210.html

<sup>&</sup>lt;sup>3</sup> http://www.fta.dot.gov/legislation\_law/12349\_4063.html

<sup>&</sup>lt;sup>4</sup> http://www.fta.dot.gov/regions/region10/region10\_3673.html

<sup>&</sup>lt;sup>5</sup> http://www.fta.dot.gov/FAST.html

<sup>&</sup>lt;sup>6</sup> http://www.fta.dot.gov/FAST.html

content of Buy America from 60 percent currently to 65 percent in 2018 and 70 percent in 2020 while changing the waiver denial process.<sup>7</sup>

Previously, the FTA has focused on ensuring that procurements have an identified set of end-users, and that each procurement be limited to a justifiable quantity of vehicles. The common grant rule of 49 CFR 18 or the Federal Transit Act prohibits recipients from receiving a completely unplanned assignment of purchase rights under a properly procured contract. Other restrictions are codified in Circular 4220.1C and subsequent issuances of Circular 4220, and are the subject of Dear Colleague letters in 2003 and 2013. Provisions of the FAST Act may be interpreted to loosen these restrictions going forward. Specifically, Section 3019(b)(1)(B) addresses the general rules of innovative procurement and Section 3019(b)(2) addresses state cooperative procurement schedules.<sup>8</sup> Section 3019(b)(1)(B) allows grantees to voluntarily engage in cooperative procurement without regard to whether grantees are located in the same state as parties to the contract. Cooperative procurement contracts may be for an initial duration of no more than 2 years, and may be extended for up to a total length of 5 years. Section 3019(b)(2) allows a State government to enter into cooperative procurements contracts with one or more vendors if the vendors agree to specific terms and the State government acts as the lead procurement agency. These changes directly and indirectly impact the practice known colloquially as 'piggybacking,' a practice which previously generated a number of sanctions and clarifications, and as previously referenced, has been referenced by multiple States as a major cause for concern due to the needs and inclinations of their subrecipients.

Due to the changes in procurement requirements as a result of the passage of the FAST Act, it is expected that there may be significant changes in State DOT practices as States come to terms with new procurement options, particularly with regards to cooperative procurements and Buy America. Vermont, a state which previously acquired its transit vehicle needs primarily through the use of the New York State DOT contract in conjunction with Section 5310 funding, was previously impacted by these negative rulings. It is anticipated that the new loosening of restrictions on innovative cooperative procurements across state lines will allow Vermont new flexibility in acquiring vehicles for its transit fleets. Oregon and Washington States, a case in which both states named each other on their State DOT procurements and maintained a position that either state could purchase using the other's procurement if necessary, would also theoretically be impacted by the new requirements set forth in the FAST Act.

<sup>&</sup>lt;sup>7</sup> http://www.dot.ca.gov/hq/transprog/map21/implementation/aashto\_sum\_fastact\_121615v2.pdf

<sup>&</sup>lt;sup>8</sup> https://www.gpo.gov/fdsys/pkg/BILLS-114hr22enr/html/BILLS-114hr22enr.htm

## **Chapter 3 Case Studies**

Based on the results of the initial survey, three State DOTs were selected for further investigation as case studies. Selection of these States was based on a number of factors, including the detail and breadth of their responses in the survey, the size and complexity of their annual procurements, and their cited practices and concerns for industry practice. While a number of states responded that they permitted multi-agency consortia, the types and amount of survey feedback associated with these states was relatively sparse, and due to resource constraints the research team elected to proceed with the states that seemed more promising in terms of cited practices and data. A fourth entity, Morongo Basin Transit Authority, was identified as a subject of interest during the course of these discussions as a hybrid type of State/Multi-Agency Consortia and was included as an additional case study.

	Texas	Oregon	lowa	Morongo Basin Transit Authority
Procurement	-State Procurement Contract held by Comptroller's office -Allows direct purchasing by subrecipients -Moving towards Consortia-type organization -Provides administrative oversight and assistance -Decentralized delivery and inspections	-State Procurement Contract held by Administrative Services -Allows direct purchasing by subrecipients -Crosswalk Purchasing Schedule -Micropurchasing format -Provides administrative oversight and assistance -Reciprocity with	-State Procurement -Allows direct purchasing by subrecipients -Allows joint procurements -Multiple Awards permitted for State Agencies -Single Awards permitted for individual or trade consortiums -Two year contract with one year extension	-State purchasing schedule overlaid on local purchasing schedule -Advantageous for small agencies with uncertain funding -State has purchased some vehicles through this arrangement
Concerns	-Vendor competency/Lack of Vendors -Multi-agency purchasing, "Piggybacking"	-Multi-agency purchasing, "piggybacking"	-Multi-agency purchasing, "piggybacking" -Risk from using contracts of other entities	-Temporary solution -Moving towards more traditional contracting format -Implications of the FAST Act

Figure 9 - Comparison Table of Case Studies

#### Texas

#### Procurement

Texas has seven large transit systems, but Texas DOT has very little to do with their procurement operations. Instead, Texas DOT deals mostly with rural transit systems, of which about three quarters are small urban systems. Many of these systems rely on Section 5310 grant-based funding for Specialized Transit Systems, which include adult daycare systems and human services. Texas DOT reported that while they do enter into a statewide bus acquisition contract for subrecipients, the contract is held and administered by the Texas State Comptroller's Office, with Texas DOT providing an advisory role. As part of a legislative change, components of Texas DOT that were not directly related to transit were spun off into other government bodies. Texas DOT used to develop transit specifications and provide them to grantees; assisting grantees implement grants with minimum delay. Now they administer transit programs, while monitoring procurement for compliance with federal rules. Most agencies look to the Comptroller to buy vehicles; many of their needs are conversions and cutaways. Texas DOT plays more of an advisory role, complementing the Comptroller's needs for dealing with the industry.

Vehicles available under the state contract include sedans, vans, pickups, accessible vans, and light-duty cutaway buses. A new contract was issued in September, and deals mostly with a few types of vehicles, such as conversion vans and small cutaway buses. The new contract also includes an option for a large cutaway bus, with a gross vehicle rating of 19,000 pounds. 35-45 foot purpose built buses, however, are not part of the Comptroller contract.

Texas DOT also reported that they allow their subrecipients to purchase buses directly, allowing them to purchase accessible vans, light, medium, and heavy duty cutaway buses, and conventional buses. The number of vehicles in each category procured directly by subrecipients also varied from 8 reported in the small size, heavy-duty transit bus category, to 361 in the medium-size, light-duty transit bus category.

In Texas, the process of purchasing vehicles begins with the approval of the request. Texas DOT monitors agency procurement procedures throughout the process, checking if they have proper protest procedures, etc. During the solicitation phase, Texas DOT ensures that the agency has clearly stated its needs, and reviews the actual solicitation to ensure FTA compliance. The order then goes to Bid phase, and then to a Purchase Order. Before the agency agrees to the terms of the bid, Texas DOT reviews the order again, checks for pre-award audits, etc. Upon the vehicle delivery, Texas DOT checks post-delivery audits and is the lienholder of record on the vehicles themselves.

Once this process is complete, Texas DOT issues reimbursement. Each agency has to bid by itself, or be a part of a consortium. Texas DOT recommends a min/max approach, and does not support coop or General Services Administration-account purchasing.

Delivery and inspections are very decentralized by tradition. District shops offer to do delivery inspections, with minimal involvement from the main Texas DOT. At one point, Texas DOT developed a course on how to do delivery inspections.

#### Concerns

Texas has concerns about vendors and piggybacking. For example, subrecipients commonly purchase a truck frame and then put a chassis on it. With four major bus dealers in Texas, there have been reported incidents where some chassis vendors try to enter the transit industry but are not focused on the industry needs. The unproven vendors put in unrealistically low chassis bids, which are accepted by the Comptroller, and are subsequently unable to provide the desired vehicles to transit providers. Limited experienced chassis providers are crowded out by inexperienced bidders because the Comptroller only accepts a limited number of vendors on the State's contract. As a result, Texas reported 2 to 3 years where the State of Texas only had one transit vendor under contract that was considered a viable option. Furthermore, the comptroller contract lacks 35-40 foot bus options. The situation is improving, as Texas was able to find an additional transit vendor in the last year. However, there continue to be complications, such as legislation passed in the 84th legislature which, while intending to correct the possibility that state agencies might do something wrong, inadvertently altered the Texas Master Award Schedule, which is essential to Texas DOT, the Texas Transportation Association, and the Comptroller.

Multi-agency purchasing is also an issue for Texas, having been utilized for a number of years. After a well-known incident with the Houston-Galveston Council, the FTA shut down the practice as used by Texas subrecipients. While Circular 4220 has not been amended yet, Dear Colleague letters from the FTA make it clear that multi-agency purchasing is not a favored practice, though permitted in limited form as part of the FTA's Best Practices Guide. Buying buses has become more difficult as a result, but the recent changes prescribed by the FAST Act may alleviate some of the burden. Texas is also exploring the possibility of moving towards a Consortium arrangement that is based on a system previously used by Morongo Basin in California. Morongo Basin set up a consortium with the State of California where not every agency is listed on the purchasing contract, one with limitations that avoided sanctions under the existing system and brought it the approval of the FTA. More information on this type of Consortium arrangement is provided in a subsequent section on Morongo Basin.

#### Oregon

#### Procurement

Oregon reported that they both entered into a statewide contract for bus purchasing, and also permitted their subrecipients to purchase vehicles directly. They utilize FTA grant funding from Sections 5310, 5311, and 5339, and also maintain a contract with a point service provider. As in Texas, Oregon transit division is also not the lead agency in procurement, which is in this case the Department of Administrative Services. The Oregon procurement system operates primarily on a Purchasing schedule format. The schedule is a crosswalk type system, with Category A vehicles, Category B vehicles, and so on down to minivan class. A crosswalk is categorization system which maps equivalent elements or fields between multiple databases. The schedule is an Open Competitive format, taking two years to complete procurement and a five year contract period. In the last contract cycle, there were only four responsive bids, all of which were awarded. The contract follows a micropurchase format: when required, operators are required to write specs so that vendors can provide a price. ODOT emails all four vendors to get responses, with one month to procure vehicle response times. Oregon DOT has found through experience that the threshold for micropurchase might be more effective at \$10,000. When a subrecipient picks a vendor, the subrecipient sends their documentation to ODOT, and ODOT then sends a request to the vendor. Post and Preaward are done off every purchase off the contract. Pre-award is handled as part of the initial award, and administrators are required to keep records of all certifications, including Buy America. As ODOT does not give checklists to their subrecipients, grantees maintain their own. Once the vehicles are received, grantees pay the vendors and are then reimbursed by ODOT, although this is not necessary for Section 5310 grants. The Oregon Special Transportation Fund is used as a local match, and Section 5310 uses FTP transfer in Oregon. Documentation for micropurchase, sample spec sheets, and the vehicle crosswalk schedule are available on the ODOT website.

Oregon works hand in hand with administrative services, meeting with contract administrators. ODOT encourages subrecipients to maintain contact and collect feedback from drivers and mechanics, and has Regional Transit Coordinators work with providers as well. If a procurement is deemed deficient, Oregon DOT has in the past forced several subrecipients to cancel their procurements and redo them. When providers get a request for a quote, they are selected on Best Value or Lowest Price factors. Selecting for Best Value requires the permission of the state. Oregon DOT does not use vehicle reference based opinions. While Oregon has few large systems, those that exist understand the intent behind Best Value and are able to use it to its best

effect. However, the use of Best Value is otherwise discouraged. Vendors often provide vendor, warranty, or PM work. The real focus is on lowest cost if they understand life-cycle cost the vehicle.

#### Concerns

Like Texas, Oregon is concerned with multi-agency purchases (piggybacking). In Oregon's case, the state maintains a contract with reciprocity with the State of Washington. In compliance with the FTA's preferences regarding multi-agency purchases, buyers cannot use the contract unless they are listed, so there are no violations in that respect. As a result, other states cannot buy through Oregon DOT's contract, but buyers inside the state of Oregon and Washington can utilize the contract. For reciprocity, the buyer must be listed as an authorized purchaser. The State is listed, not the individual, both States have the same vendors. Oregon also allows cooperatives; the Oregon Cooperative Purchasing charges a fee for Nonprofit Organizations and they can then use the cooperative to buy vehicles.

The contract, while reciprocal, has essentially been unused for interstate purchases. While Washington State almost had to use ODOT's contract and vice versa, it was only because it took longer than expected to award contracts. Another reason the reciprocity clause can be used is for point service, for example, if ODOT does not have access to coaches but WasDOT does. To use reciprocity, the state (in this example Washington) must issue Notice asking if they can purchase something. Oregon then checks how much money is left in the contract, and Washington must follow Oregon procedures. Effectively however, there is no limit, since the state imposes a \$100 Million Contract limit. The reason for this limit is that the Department of Administrative Services requires every contract to have an amount, and the Contract Officer maintains a history of actual purchases. ODOT suggests that more states use purchasing schedules, and ODOT also operates a Vendor Conference. Tri-Met has their own procurement, does not have to use these contracts, but is on the contract and bought \$2.2 Million in cutaways last year through the contract.

#### lowa

#### Procurement

lowa reported that they both enter into statewide contracts and permit their subrecipients to purchase vehicles directly. The State is able to offer multiple awards instead of lowest price vendor only, and has oversight responsibilities for transit systems. In practice, the State operates with a two year contract and an option to extend the term for one year. When bidding, vendors are asked to bid the base model price only, and provide options lists as part of being responsive to the RFP. To order

vehicles, subrecipients first ask the lowa DOT for concurrence. Their grants are then reviewed, and if everything is correct and concurrence is given, subrecipients call the vendor and order the bus. Subrecipients take full ownership of the vehicles procured, and are responsible for tracking and maintaining their own vehicles. Subrecipients are responsible for post-delivery audits and Buy America information, which is then sent to the lowa DOT with vehicle invoice and information. Iowa DOT then issues payment to the transit system upon receipt of proper documentation. Funding is passed through completely to subrecipients, and the State offers oversight and administrative assistance only. However the lowa DOT does place a lien on the vehicle until the useful life of the vehicle has expired. The state believes that allowing multiple awards and restricting the contract to instate entities confers considerable advantages for procurement. Multiple awards are only allowed for state government agencies, while individual or trade consortiums are only permitted to issue awards to one vendor. For example, in one case, Iowa City, Cambus, and Coralville joined into a group bus procurement and all three systems chose to opt out of the procurement after a year due to the winning vendor's vehicles being too high to pass under bridges in Iowa City. As the lowa DOT has four heavy duty bus vendors on their procurement, this would allow public transit systems in Iowa to purchase off the state's procurement with more flexibility.

#### Concerns

lowa DOT allows their subrecipients a great deal of freedom due to the fact that subrecipients fully own their vehicles. They are permitted to purchase off the state contract, directly, or in consortiums or other arrangements involving multiple agencies, so long as FTA regulations are met. These arrangements are typically used for heavy duty bus contracts, and the most commonly used one in Iowa is the Akron, Ohio contract. The State has noted concerns about using the contracts of other entities and tries to discourage their subrecipients from engaging in such activities. Iowa DOT stated that the FTA will hold those who use these mechanisms responsible for everything the lead agencies do wrong on the contract. If there is a major issue, the FTA can request their funds back or Iowa DOT can withhold payment to the transit system forcing them to pay out of their local funds. However, as the transit systems have a right to use these arrangements, Iowa DOT allows them to do so if they are willing to assume to risk.

#### Morongo Basin Transit Authority

The Morongo Basin Transit Authority was reported to have an interesting contracting arrangement by other state DOTs, herein referred to as the Morongo Basin model. While traditionally reliant on CalDOT for procurement, they reported that they found the state purchasing schedule to be unsatisfactory, with quality issues as well as an inability

to award for several years in a row. Subsequently, Morongo Basin went out to bid with other operators using local government purchasing schedules for several years, until the FTA took adverse action on a Texas multi-agency purchase (see Houston-Galveston Council). As a result, Morongo Basin formulated a new arrangement with local and state transit entities, which achieved FTA approval in large part due to the state involvement.

As part of this arrangement, Morongo Basin had the State Department of General Services in California issue an overlay on a local purchasing schedule, limiting it to the State of California and thereby making it a state purchasing schedule and distinguishing it from prohibited multi-agency purchases. This arrangement was also distinct from joint procurement as each buyer is identified, and operates less specifically as a schedule type procurement. Because the schedule can stipulate terms such as a minimum order of ten vehicles but likely in the range of eighty, the arrangement is advantageous to small agencies that may be dependent on competitive grants. The Morongo Basin Transit Authority reported that there were no major issues as a result of using this arrangement, and the State of California also utilized the schedule for purchasing some types of vehicles which it did not have on its primary procurement contract. However, Morongo Basin also reported that since completing a procurement cycle with the Morongo Basin model, it is expecting to enter into a more traditional cooperative contracting arrangement in the future, as the Morongo Basin model was formulated as a temporary solution to their requirements. The new procurement flexibility afforded by the FAST Act is also expected to affect their procurement activities in the coming year. Documentation on Morongo Basin procurements is available on their website.

# Appendix

## **Table of Contents**

NCHRP 20-65 (057) Online Survey	A-2
Penn DOT List of Optional Equipment for Vehicles	A-14
Oregon DOT Price Comparison Form	A-22
Texas DOT Sample Specifications (Van)	A-25
Florida DOT Price Escalation Formula (2015)	A-65

#### NCHRP 20-65 (057) Online Survey

#### NCHRP 20-65 (057) Online Survey

Vehicle Procurement Survey

Assessment of State DOT Transit Procurement Models

Welcome to the Survey for NCHRP 20-65 (57) Assessment of State DOT Transit Vehicle Procurement Models. This survey is carried out as part of a study under the National Highway Cooperative Research Program of the Transportation Research Board. This study seeks to understand what measures state Departments of Transportation use to procure vehicles for their transit programs. Specifically, this survey is designed to determine if a state uses a statewide contract, consortium or allows grantees to purchase vehicles directly.

Following are several questions asking what measures your state DOT uses to acquire transit vehicles on behalf of your subrecipients. Your responses will be valuable to this study. Thank you for your participation and input. If you have any questions regarding this survey, please contact Jerry Hsu at (703) 340-3055, or jerry.hsu@aecom.com

1. Does your State DOT purchase or arrange for the purchase of vehicles through FTA transit programs? If yes, please select any that apply:

<u> </u>	ection 5307
----------	-------------

Section 5309

I	
Section 5311	

Section 5316

Section 5317

Section 5339

State Grant Program(s)

Other (please specify)

2. Does your State DOT directly operate or contract for the operation of bus or van services?

$\bigcirc$	Yes
$\sim$	

O No

I'm not sure

# NCHRP 20-65 (057) Online Survey

Vehicle Procurement Survey
Statewide Bus Acquisition Contracts
3. Is the State responsible for entering into statewide bus acquisition contracts for subrecipients?
Yes.
<u> </u>
Vehicle Procurement Survey
--
Statewide Bus Acquisition Contracts
4. Please describe the types of vehicles which are avail
5. How many vehicles does your State DOT typically loc Large, heavy-duty transit buses including over the road buses (approximately 35'-40', and articulated buses): at least 12 years of service or an accumulation of at least 500,000 miles.
Small size, heavy-duty transit buses (approximately 30'): at least 10 years or an accumulation of at least 350,000 miles.
Medium-size, medium-duty transit buses (approximately 25'–35'): at least seven years or an accumulation of at least 200,000 miles.
Medium-size, light-duty transit buses (approximately 25'–35'); at least five years or an accumulation of at least 150,000 miles.
Other, please specify.
6. What are your State DOT's reasons for entering into

7. What challenges, if any, do your State DOT face with the statewide contract?

8. Does your State DOT engage in any activities - not for satisfying federal requirements - that you regard to be "best practices" or have positive effects on your procurement activities? If so, please briefly describe any activities in the following areas:

- Pre-bid conferences.
- Price escalation formulas.
- Prototype first article requirements.
- In-plant or other Innovative Inspection methods.
- Contract term lengths (base and option).
- Requirements contracts.
- Other activities.

Vehicle Procurement Survey
Direct purchases by subrecipients
9. Does your state allow subrecipients to buy buses directly?
No.

Vehicle Procurement Survey

Direct purchases by subrecipients

10. Please describe the types of vehicles which are available to subrecipients.

11. Does your State DOT have any restrictions on subrecipient purchases or provide guidance beyond Federal requirements and State law? If so, please describe them briefly below.

12. How many vehicles do your State DOT's subrecipients typically look to acquire on a yearly basis, and of what types?

Large, heavy-duty transit buses including over the road buses (approximately 35'-40', and articulated buses): at least 12 years of service or an accumulation of at least 500,000 miles.

Small size, heavy-duty transit buses (approximately 30'): at least 10 years or an accumulation of at least 350,000 miles.

Medium-size, medium-duty transit buses (approximately 25'-35'): at least seven years or an accumulation of at least 200,000 miles.

Medium-size, light-duty transit buses (approximately 25'–35'): at least five years or an accumulation of at least 150,000 miles.

Other, please specify.

13.	What are	your State DOT's	reasons for allowing	a subrecipients to b	uv buses directly?
10.	what are		reasons for anowing		uy buses uncouy:

14. What challenges, if any, do your State DOT face with allowing subrecipients to buy buses directly?

15. Does your State DOT engage in any activities - not for satisfying federal requirements - that you regard to be "best practices" or have positive effects on your procurement activities? If so, please briefly describe any activities in the following areas:

- Pre-bid conferences.
- Price escalation formulas.
- Prototype first article requirements.
- In-plant or other Innovative Inspection methods.
- Contract term lengths (base and option).
- Requirements contracts.
- Other activities.

Vehicle Procurement Survey

Multi-agency bus consortium or other mechanism

16. Does your State DOT fund transit vehicle purchases through a multi-agency bus consortium or another mechanism to assist subrecipients with buying buses?

O Yes.

🔿 No.

Vehicle Procurement Survey

Multi-agency bus consortium or other mechanism

17. Please briefly describe the mechanism(s) and what types of vehicles which are available through these mechanisms.

18. How many vehicles do your State DOT's subrecipients typically look to acquire on a yearly basis through these multi-agency purchases, and of what types?

Large, heavy-duty transit buses including over the road buses (approximately 35'-40', and articulated buses): at least 12 years of service or an accumulation of at least 500,000 miles.

Small size, heavy-duty transit buses (approximately 30'): at least 10 years or an accumulation of at least 350,000 miles.

Medium-size, medium-duty transit buses (approximately 25'-35'): at least seven years or an accumulation of at least 200,000 miles.

Medium-size, light-duty transit buses (approximately 25'–35'): at least five years or an accumulation of at least 150,000 miles.

Other, please specify.

19. What are your State DOT's reasons for participating in this mechanism?

20. What challenges, if any, do your State DOT face with this system of procurement?

21. Does your State DOT engage in any activities - not for satisfying federal requirements - that you regard to be "best practices" or have positive effects on your procurement activities? If so, please briefly describe any activities in the following areas:

- Pre-bid conferences.
- Price escalation formulas.
- Prototype first article requirements.
- In-plant or other Innovative Inspection methods.
- Contract term lengths (base and option).
- Requirements contracts.
- Other activities.

**Vehicle Procurement Survey** 

Additional Questions

22. What restriction(s) does your State DOT find most problematic or complex for the acquisition process?

23. Are you aware of any planned changes to transit procurement procedures? If so, what changes, and what prompted the changes?

24. Do you and/or your State DOT have any suggestions, ideas, or practices not covered in this survey that might improve the acquisition process? Please briefly describe any.

Vehicle Procurement Surv	/ey
Thank you	
25. We appreciate your particip the consultants for this study m The project team may also get phase of the study.	ation in this survey. Please provide your contact information below. One of ay contact you for additional information regarding your responses above. in touch with you if your state DOT is selected for a case study in the next
Name	
Affiliation	
Position	
Phone	
Email	
	12

A-13

# Penn DOT List of Optional Equipment for Vehicles

ITEM	EQUIPMENT	ADDED	DESCRIPTION	NOTES
NO	OPTION	COST		
<u>1)</u>	Air Conditioner Winter Protection	\$150	Protects exterior air conditioning unit from corrosion during the winter	For Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>2)</u>	AM/FM Radio	\$200		For all vehicles except standard non- accessible vehicles (radio is standard option)
<u>3)</u>	Brake Retarder	\$5,000	Assists brakes in stopping a vehicle by turning an impeller in a fluid which absorbs vehicle	For Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>3HD</u> )	Heavy Duty Brake Retarder	\$5,000	Same as above	For Heavy Duty Buses Only
<u>4)</u>	Cigarette Lighter	\$20		For Accessible Cutaway Buses Only
<u>5)</u>	Digital Clock	\$50		
<u>6)</u>	Reverse Assistance System	\$4,000	Warning device that automatically activates when vehicle shifts in reverse	For Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>Z)</u>	Energy Absorbing Bumpers	\$1,000	Heavy-duty impact resistant bumpers which has an energy absorbing system for repetitive impact resistance	For Buses Only (except low floor buses) Not for Sprinter Type Vehicles (SPEC A/SP)
<u>-8)</u>	Farebox	\$800		For Buses Only
<u>9)</u>	High-Back Driver's Seat	\$200		For and Accessible Cutaway Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>10)</u>	Locking Fuel Tank Caps	\$25		For Accessible Cutaway Buses Only
11)	Passive Wheelchair Lift	\$4,000	A lift which requires one passenger entrance and, when stowed, provides steps for ambulatory passengers. When operational it forms a platform to raise a wheelchair	For Buses Only (except low floor buses) Not for Sprinter Type Vehicles (SPEC A/SP)

### EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

EXHIBIT "C"

10/24/2006

Page 1 of 8

ITEM NO	EQUIPMENT OPTION	ADDED COST	DESCRIPTION	NOTES
			passenger.	

### EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

EXHIBIT "C"

10/24/2006

Page 2 of 8

ITEM	EQUIPMENT	ADDED	DESCRIPTION	NOTES
NO	OPTION	COST		
<u>12)</u>	Performance Bond		A guaranty that the bidder will execute the contract. It also commits a bonding company to step in and complete the contract if the bidder defaults on the contract after it is awarded.	
<u>13)</u>	Rear Emergency Door Lower Window	\$250		For Buses Only
<u>14)</u>	Roof Vent/Escape Hatch	\$350		For Accessible Cutaway Buses Only
<u>15)</u>	Driver's Side Running Board	\$125		Not for Grand Accessible Mini Vans or Accessible Mini Vans
<u>15STD)</u>	Running Boards	\$250		For Standard Non- accessible vehicles only
<u>16)</u>	Tilt Steering Wheel	\$350		Not for Sprinter Type Vehicles (SPEC A/SP)
<u>17)</u>	415 CID 6.8 Liter V- 10 Gasoline Engine			For Accessible Cutaway Buses Only. Not for Sprinter (SPEC A/SP) or (SPEC A/L- LIFT-G) type vehicles.
<u>18)</u>	50 square inch Exterior Mirrors	\$50	Larger mirrors to improve driver's visibility	For Accessible Cutaway Buses Only
<u>19)</u>	Vinyl Flooring	\$400	Vinyl Flooring provided rather than rubber flooring as specified	For Accessible Cutaway Buses Only
<u>20)</u>	Bid Bond		Protects the agency from bidders who attempt to withdraw their bids after the bid opening date, and a guarantee that the apparent low bidder will sign the contract.	

#### EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

#### EXHIBIT "C"

10/24/2006

Page 3 of 8

ITEM	EQUIPMENT	ADDED	DESCRIPTION	NOTES
NO	OPTION	COST		
21)	Pennsylvania Steel Products Procurement Act Certification Form and Air Conditioning Certification Form are not to be completed Determination of the		Required	For Standard Non- accessible vehicles only
_	Lowest Responsive and Responsible Bidder with Trade-Ins		Addendum page if price of new vehicle(s) will include trade-in values of trade-in vehicle(s)	
<u>23)</u>	Tinted Safety Privacy Glass	\$200		For Buses Only
<u>24)</u>	Driver's Coat Hook	\$15		For Buses Only
<u>25)</u>	Destination Sign	\$950		For Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>26)</u>	Increased Wheelchair Entrance Door Height			For Buses Only (except low floor buses) Not for Sprinter Type Vehicles (SPEC A/SP)
<u>27Bus)</u>	Four Wheel Drive (Bus)	\$8,000		For Accessible Cutaway Buses Only
<u>28)</u>	Seat Belts mounted on Seat Frame			For Accessible Cutaway Buses Only
<u>29)</u>	Bottom of Fold-Away Seats to Include Track for Belt Storage.			For Accessible Cutaway Buses Only
<u>30)</u>	Daytime Running Lights	\$150		For Accessible Cutaway Buses Only
<u>31)</u>	Block Heater for Diesel Engine			For Buses Only
<u>32)</u>	Driver's Plexiglas Barrier With Protective Edge Cushion			For Accessible Cutaway Buses Only
<u>33)</u>	Factory Shop Repair Manual	\$60		For Buses Only

#### EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

EXHIBIT "C"

10/24/2006

Page 4 of 8

ITEM	EQUIPMENT	ADDED	DESCRIPTION	NOTES
NO	OPTION	COST		
<u>34)</u>	System Charging Monitor		Visual and audible devise that monitors battery voltage and alternator output, and alerts the driver of low battery voltage or of an inoperative charging system.	For Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>35)</u>	High Idler Device			For Buses Only
<u>36)</u>	Larger Lift			For Accessible Cutaway Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>37)</u>	Step Heater on First Step of Passenger Entrance			For Accessible Cutaway Buses Only
<u>38)</u>	Secured Storage Area Above Driver			For Buses Only
<u>39)</u>	Overhead Package Rack	\$35 per foot	Overhead package racks above the seats on both sides of the passenger compartment	For Buses Only
<u>40)</u>	Anti-Microbial Seating Vinyl	\$21 per seat	The material doesn't allow micro- organisms to impregnate seat surface preventing spread of disease	For Accessible Cutaway Buses Only
<u>41)</u>	Rubber Shear Spring Suspension System	Rear only - \$950	Isolates and absorbs road shock to improve ride quality	For Accessible Cutaway Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>42)</u>	Lift Interlock System	\$300	Controls for the lift are interlocked with emergency brakes and transmission	For Accessible Cutaway Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>43)</u>	Transmission Controller	\$200	Allows vehicle to "program" overdrive to automatically engage when at highway speeds	For Accessible Cutaway Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>44)</u>	Park Crank Only Module	\$75	Allows engine to start only when transmission is in park	For Accessible Cutaway Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)

#### EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

### EXHIBIT "C"

10/24/2006

Page 5 of 8

ITEM	EQUIPMENT	ADDED	DESCRIPTION	NOTES
NO	OPTION	COST		
<u>45)</u>	Signal Mirrors	\$100	Patented system incorporating a turn signal behind the mirror surface	For Buses Only
<u>46)</u>	BDS Dead Angle Roadside and Curbside Rear View Mirrors	\$100	Special rearview mirrors which eliminates blind spots	For Buses Only
<u>47)</u>	EZ 48 Access System Wheelchair and Scooter Securing Device	\$5,000	The flush mounted wheelchair/scooter securing swivel device is a rotating platform that is permanently in transit vehicles to provide secure restraint for individuals with disabilities confined to wheelchairs and scooters during transportation.	For Buses Only
<u>48)</u>	Fuel Sender		A stainless steel fuel sender access panel shall be provided directly over the fuel tank. The panel shall allow for the easy removal and replacement of the fuel sender without dropping the fuel tank.	For Buses Only
<u>49)</u>	Industrial Coating for Structural Members		Structural members of each vehicle shall be coated with Industrial Coating.	For Buses Only
<u>50)</u>	Header Mounted LED Stepwell Strip Lights		Stepwell lights shall be header mounted LED Stepwell Strip Lights.	For Buses Only
<u>51)</u>	LED Automatic Electronic Passenger Information Display Sign System			For Buses Only
<u>52)</u> (A	Remote Controlled Curb Side Outside Mirror			SELECT ONLY ONE (A OR B)

EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

### EXHIBIT "C"

10/24/2006

Page 6 of 8

or <u>52)</u> (B)	or Remote Controlled Outside Mirrors			For Accessible Cutaway Buses Only
ITEM	EQUIPMENT	ADDED	DESCRIPTION	NOTES
NO	OPTION	COST		
<u>53</u>	Power Driven Front			SELECT ONLY
<u>(A)</u>	Entrance Door			ONE (A OR B)
or <u>53</u> (B)	or Manually Operated Front Entrance Door			For Buses Only Not for Sprinter Type Vehicles (SPEC A/SP)
<u>54 (A-</u>	Spare Wheel and			SELECT ONLY
bus)	Tire mounted in the			ONE (A OR B)
or	Interior of each Vehicle or Spare			For Accessible Cutaway
54 (B-	Wheel and Tire			Buses Only
bus)	Provided Loose			
	with each Vehicle			

EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

EXHIBIT "C"

10/24/2006

Page 7 of 8

EXHIBIT "C" List of Addendums for Optional Equipment for Vehicles

> EXHIBIT "C" 10/24/2006 Page 8 of 8

# Oregon DOT Price Comparison Form

Oregon DOT Price Comparison Form

	ODOT PUBLIC TRAI	VSIT VEHICLE PURCI	HASE	
Agency Name:			Contact Person:	
Grant Agreement No.		Date:	Phone No.	
STATE PRICE AGREEMEN	IT RFQ COMPARISO	N - BEST VALUE DET	ERMINATION SELEC	CTION - Page 1
Vehicle Useful Life Category:	No. of Vehicles to be Purcha	sed:	No. of Regular Seats:	No. of ADA Stations:
Required Specifications:	🗌 From RFQ (attach all RFQ's b	chind this form)	Other (Attach list or docu	ment)
Additional Preferred Options:	From RFQ (attach all RFQ's b)	ehind this form)	Other (Attach list or docu	ment)
Best Value Factors (non-purchase-price)	From RFQ (attach all RFQ's b)	chind this form)	Other (Attach list or docu	iment)
PR	ICES QUOTED FROM VENDO	RS (Insert Vendor Names in C	olumns Below):	
Requested Quotes	Vendor:	Vendor:	Vendor:	Vendor:
Vehicle Make/Model Proposed:				
Vehicle Base Price:				
Cost of Required Specifications:				
Total Vehicle Cost With Required Specifications:	0\$	\$0	\$0	\$0
Cost of Additional Preferred Options (if any - enter zero If none):				
Total Vehicle Cost With Required and Preferred Options:	\$0	\$0	\$0	\$0
	ODOT PUBLIC TRA	NSIT VEHICLE PURC	HASE	

Best Value Determination Form

Vehicle Purchase Documentation

ODOT Public Transit Division

Agency Name:			Grant Agreement No:	
STATE PRICE AGREEMEN	NT RFQ COMPARISO	N - BEST VALUE DET	ERMINATION SELEC	:TION - Page 2
Best Value Determination Fa	actors (list below with assigne	d rating criteria or point scori	ng; attach explanation of fact	ors & rating)
Best Value Factors (non-purchase-price)	Vendor:	Vendor:	Vendor:	Vendor:
Scoring is based on (list factors/scores):				
Total Rating Score or Evaluation:				
Best Value Vehicle Selected:	□ Selected	□ Selected	□ Selected	Selected
	Not Selected	Not Selected	Not Selected	Not Selected
Explanation/Rationale for Vehicle Selected:				
	AGENCY :	SIGNATURE (Required):		
Agency Representative (enter printed name a	and title below)		Phone No. / E-mail address (	enter below)
Signature of Agency Representative:			Date of signature:	

Oregon DOT Price Comparison Form

Best Value Determination Form

Vehicle Purchase Documentation

ODOT Public Transit Division

		C TRANSIT VEHICLE PURCI	HASE	
Agency Name:			Contact Person:	
Grant Agreement No.		Date:	Phone No.	
STATE	E PRICE AGREEMENT RFQ	COMPARISON FORM - LOI	WEST COST SELECTION	
Vehicle Useful Life Category:	No. of Vehicles To Be Purchase	id:	No. of Regular Seats:	No. of ADA Stations:
Required Specifications:	From RFQ (attach all RFQ's beh)	ind this form)	Other (Attach list or document)	
Additional Preferred Options:	From RFQ (attach all RFQ's behi Equation of the state	ind this form)	Other (Attach list or document)	
	PRICES QUOTED FROM VE	ENDORS (Insert Vendor Names in I	Columns Below):	
Requested Quotes	Vendor:	Vendor:	Vendor:	Vendor:
Vehicle Make/Model Proposed:				
Vehicle Base Price:				
Cost of Required Specifications:				
Total Vehicle Cost With All Required Specifications:	0\$	0\$	0\$	0\$
Cost of Additional Preferred Options (if any - enter zero if none):				
Total Vehicle Cost With Required Specifications and Preferred Options:	\$0	80	0\$	\$0
Lowest Cost Vehicle Selected:	<ul> <li>Selected</li> <li>Not Selected</li> </ul>	<ul> <li>Selected</li> <li>Not Selected</li> </ul>	<ul> <li>Selected</li> <li>Not Selected</li> </ul>	<ul> <li>Selected</li> <li>Not Selected</li> </ul>
Comments:				
	AGEN	NCY SIGNATURE (Required):		
Agency Representative (enter printed nam	ie and title below)		Phone No. / E-mail address (ente	er below)
Signature of Agency Representative:			Date of Signature:	

Oregon DOT Price Comparison Form

ODOT Public Transit Division

'ehicle Purchase Documentation

Lowest Cost Vehicle Selection

TY	PE 1	SPEC	IFICATION	Texas Department of Transportation	REVISED: January 2003
Gei	neral the sec All Dis Tw fre	Descri vehicle uremen vehicle sabilities o appro quency	<b>Define:</b> The purpose OEM, equipped with the vehicle shall s delivered in accors s Act, including but aches to the transit of the lift use (light	of these specifications is to describe the conversion th a raised roof, wheelchair lift, provisions for stan be converted to use propane (LPG) fuel. Used or sh dance with this specification must meet the require not limited to the provisions of the wheelchair lift, conversion are described by this specification, base or heavy).	n of a full size van as manufactured by d-up entry and wheelchair passenger nopworn vehicles are not acceptable. ments of the Americans with wheelchair entry and securement. of on the customer's estimation of the
1)	For or a is th fron	custome pproved e side p t door e	ers anticipating light equal may be provi assenger door, as th xtensions (section C	: (infrequent) use of the wheelchair lift, the Braun T ided in accordance with these specifications. The pr e stowed side wheelchair lift permits ambulatory pr 210) is waived with this method of conversion.	Tranzsporter, ElDorado Versashuttle, rovision for stand-up entry in this case assenger entrance. The requirement for
2)	Cus up s door waiy	tomers a side lift r. As thi ved with	nticipating heavy ( providing ambulate s extension include this method of con	frequent) use of the wheelchair lift will prefer a co ory entrance through the front right passenger do is the provision of a stepwell, the requirement for version.	nventional raised roof van with a fold- or, necessitating the extension of that a powered step hft (paragraph C3) is
Unl liste sha	less o ed in 11 be j	therwise the man provideo	e specified, all units ufacturer's literature l whether shown as	shall be furnished complete with standard equipme e for the models specified herein. The following ite optional or standard equipment by the manufacture	ent and factory-installed accessories as ms are minimum requirements and er.
a. Body:					
		1.	Air Bags: Driver	and passenger	
		2.	Air Conditioning unit shall be locat 40,000 BTUs and	: Manufacturer's standard front plus auxiliary rear ed on the dashboard readily accessible to the seated fully warranted for a minimum of 12 months.	air. Separate controls for the auxiliary d driver. Auxiliary unit shall be rated at
		3.	Arm Rests, Door	-Mounted: Both right and left armrests are require	ed.
		4.	AM/FM Radio:	Manufacturer's standard.	
		5.	Auxiliary Power	Outlet: 12 volt.	
		6.	Headliner: Full 1	ength.	
		7.	Heater and Defre manufacturer's ac	oster: Assembly shall be the fresh air type customa cessory and shall be chassis-factory installed with c	arily offered as the standard vehicle controls mounted on the dashboard.
		8.	Rearview Mirror Overall face size	ts: Low mount, below eye level, left and right side: shall be approximately 6 inches by 9 inches.	s. Mirrors shall have metal frames.
		9.	Seat Belts with R space to meet or e	tetractors for Driver and Right Front Seat Passe exceed the requirements of FMVSS Nos. 209 and 2	nger: Installed for each passenger 10.
		10.	Side Panels, Inter	rior: Rigid material with a durable finish shall be i	installed on all walls and doors.
		11.	Sun Visor: Dual.		
		12.	Tinted Glass: W	indshield and all windows.	
		13.	Windows, Passer	nger: Required (factory installed, if available) for e	each row of seats.
		14.	Windshield Wipe	ers: Dual electric 2-speed type with intermittent fe	ature windshield washers.
		15.	Cargo Door: Rig	;ht side, Swing-Out Panel.	



FULL SIZE EXTENDED 15 PASSENGER VAN						
Series 760c						
ITEM	Minimum Requirements	Ford E 350 Super Club Wagon	Chevrolet/GMC G31706/Express			
Wheelbase, inches	127	138	155			
Approximate Payload Allowance, pounds	3,342	3,920	3,342			
Overall Length, inches	231.9	231.9	238.7			
GVWR, pounds	9,200	9,400	9,500			
Engine, Displacement, liters	5.4L V-8	5.4L V-8	5.7L V-8			
Engine, Net HP	245	255	250			
Engine, TORQUE	330	350	330			
Transmission, Automatic	Automatic	4R100	A4OD			
Tire Size & Load Range	As Shown	LT245/75R16E	LT245/75R16E			
Rim Size, inches	6	7	6.5			
Emissions Certification	As Shown	LEV	LEV			



#### C. Transit Conversion

- 1. Wheel Chair Lift The wheelchair lift shall deploy automatically and shall feature a power up/ gravity down lift cycle. The lift shall be equipped with a non-skid surface with thirty inches (30") minimum useable width and forty-eight inches (48") minimum platform length. Usable width means a 28 1/2" width measured at the platform and a 30" minimum width measured at 2" above the platform through the door onto the floor of the van. The lift shall include an interlock feature in accordance with 49 CFR 38.23. The lift or lift area shall have an assist handraft on each side of the lift or lift area. The lift shall be equipped with a roll stop with a minimum height of four inches (4").
- Wheelchair Entry The entrance dimensions shall be a minimum of thirty-one and one half inches (31 1/2") clear opening width and a minimum fifty-six inches (56") door opening height from raised lift platform to door header.
- 3. Step Lift The vehicle shall be equipped with a powered step lift to assist ambulatory passengers. This lift may be integrated in the lift apparatus or may be a separate feature.
- 4. Wheel Chair Securement The wheelchair position(s) shall be provided with restraint devices that will secure the occupied wheelchair. These devices shall be adjustable to accommodate varying track widths of wheelchairs.

#### 4.1 Forward Facing Track & Belt System

A four-point attachment system (2 front, 2 back) shall be used consisting of four separate belts. Two of the buckles shall be tensioning devices. A minimum of two tracks shall be placed parallel to each other and perpendicular to the direction in which the wheelchair faces. The tracks shall be securely mounted to the vehicle to ensure the track will not pull away from the van floor or shift position under anticipated loads. A separate 3-point chest/lap belt with height adjuster shall be made available for securing the passenger. No anchoring points shall project more than one-eighth inch (1/8") above the floor.

#### 4.1.1 Floor mounted tracks

There shall be a series of horizontal tracks of minimum dimensions 30" wide, spaced a minimum of 42" fore and aft.

- 4.1.1.1 These tracks may be recessed mounted in the kick panel, floor, and firewall with three-eighths inch (3/8") diameter, SAB Grade 5, bolts, washers, and self-locking nuts with National Fine Threads. Bolts shall be installed on each side flange of the track and spaced not greater than twelve inches (12") apart.
- 4.1.1.2 These tracks may be welded in the kick panel, floor, and firewall
- 4.1.1.3 Where mounting bolts do not piece or attach through the vehicle frame, sub-frame, body posts or other metal structure, a reinforcement metal plate not less than one-sixteenth inch (1/16") thick is required.

#### 4.1.2 Strap Assemblies

There shall be four (4) strap assemblies for each wheelchair position to secure the wheelchair to the tracks. Each strap assembly shall consist of a fixed-end strap, adjustable-end strap with tensioning device, closed hook and an end fitting.

4.1.2.1 The fixed-end strap shall be one and three-quarter inches (1-3/4") wide, five inches (5") long, with a strength rating of not less than two thousand five hundred (2,500) pounds. One end of this strap shall be secured to a tensioning mechanism. The other end of the strap shall be connected to an end fitting used to fasten the strap to the floor track. This fitting shall have a spring-loaded release.

4.1.2.2 The adjustable-end strap shall be one inch (1") wide, twenty inches (20") long, with a strength rating of not less than two thousand five hundred (2,500) pounds. One end of the strap shall be secured to a closed hook. This strap shall be used to fasten the wheelchair to fixed-end strap assembly.

4.1.2.3 A 3-point chest/lap belt with height adjuster shall be made available for fastening passenger in place for each wheelchair position. The belt shall be two inches (2") wide, seventy inches (70") long, with a strength rating of not less than two thousand five hundred (2,500) pounds. One end of this belt shall be secured to a female seat belt fitting and the other end shall have a male seat belt fitting. The belt assembly shall be adjustable for length.

Page 3

REVISED: July 2002

Texas Department of Transportation

TYPE 1 SPECIFICATION

The seat belt assembly shall have a quick-release and a snap lock to connect both ends together.

4.1.2.4 A wall mounted shoulder harness system shall be provided at each wheelchair securement location that is compatible with the specified restraints. The harness system shall be installed in accordance with all structural requirements established by the restraint supplier and all applicable regulations, including 49 CFR Part 571.

4.1.2.5 All belts, straps and harness assemblies shall be stored in a secure and convenient location.

#### 5. Floor and Undercarriage

5.1 The floor shall be wall-to-wall slip-resistant Altro Transfloor or approved equal, two (2) millimeters thick, securely bonded to subfloor with waterproof adhesive. The subfloor shall have a minimum of one-half inch  $(1/2^n)$  thick marine grade plywood. The vehicle shall be fully undercoated with a non-flammable resin-type material such as polyoleum.

5.2 Without passengers or driver and with all available options installed, there must be a minimum of 12.7 cm (5") of clearance between the breakover angle position of the vehicle exhaust pipe or the lowest point on the undercarriage and level ground.

#### 6. Raised Roof

The roof shall be transit style, constructed of metal or reinforced fiberglass. The roof shall contain a collapse resistant rollover cage. The rollover cage shall consist of a one inch  $(1^{\prime\prime})$  by one inch  $(1^{\prime\prime})$  tubular type frame with a minimum of five (5) steel, aluminum or graphite cross bows and at least three (3) steel, aluminum or graphite longitudinal stringers to support the roof and interior liner. The roof shall be sufficient height to provide at least sixty-six inches (66<sup>°</sup>) headroom at the center aisle. Attachments at all points of contact between the stringers and longitudinal members and other structural material shall be made by means of welding, riveting, or bolting. Headroom may be reduced slightly in some areas of the vehicle to accommodate other specified equipment such as air conditioner components and the normal contour of the roof.

- 6.1 The roof construction shall be of sufficient strength to prevent vibration, drumming or flexing and shall be of equivalent strength to the vehicle sidewalls
- 6.2 All exterior seams shall be constructed such that they will shed water, and in no case shall the sealing of the panels be dependent on caulking alone. All exterior joints and seams shall be protected by zinc chromate caulking, butyl rubber tape, or an approved equal.
- 6.3 All nuts, botts, clips and other fasteners shall be zinc or cadmium plated or phosphate coated. No sheet metal screws will be permitted
- 7. Electrical

With the exception of factory-installed wiring, all electrical wiring shall be insulated and enclosed in a fibrous or plastic loom, or flexible conduit for protection from external damage and short circuits. It shall be securely fastened at sufficient intervals to prevent sagging and to ensure clearance of mechanical parts. Routing of the wiring through the cab, frame, compartment box, and body shall be placed in such a manner so as not to interfere with normal operation and use, or present a safety hazard. Rubber grommets shall be used wherever wires, hoses or harness pass through metal.

- 7.2 All wring, circuits and electrical components shall comply with standards set forth by FMVSS and SAE.
- 7.3 Wiring other than OEM shall be color-coded and contained in a separate harness or PVC insulation. Complete wiring schematics shall be provided showing function code.
- 7.4 Vehicle will be equipped with a fast idle solenoid (Penn Tex, Vanner, or approved equal).

#### TYPE 1 SPECIFICATION

Texas Department of Transportation

#### REVISED: January 2003

#### 8 Lighting

- 8.1 Interior Lighting The overhead lights and the stepwell lights shall provide no less than five foot-candles of illumination on the entrance step area with the door open. This system shall be illuminated automatically when the door is open.
  - 8.1.1 Overhead and stepwell lights shall be wired to activate automatically when passenger door is opened. A separate dash mounted switch shall be provided to operate the overhead lights when the door is closed.
  - 8.1.2 Front stepwell area shall be lighted by a hooded stepwell light, so that the entire stepwell area of the vehicle is sufficiently illuminated. Stepwell light shall be on side away from wheel splash.
  - 8.1.3 All interior lighting shall have the master control located on the dash or near the driver for easy operation by the driver. Lighting in the passenger area shall be mounted in the ceiling cove at the sidewall. Lighting intensity for all cross-seats shall have a minimum average of fifteen (15) footcandles at the seated passenger reading plane. In addition, an effective lighting level shall be provided for all other seated passengers. The lighting components shall be located and constructed so as to prevent the entrance of water, contaminants and insects. Lighting fixtures shall be reasonably flush with the interior walls and ceiling so as not to present a hazard to the passengers. Lights shall be positioned correctly to prevent windshield glare.
  - <u>8.1.4</u> Light installation shall be designed to illuminate the wheelchair lift platform for night operation. Light shall be positioned in manufacturer's standard location in such a manner as to illuminate the area in the immediate vicinity of the wheelchair lift. Light shall be automatically activated only when the wheelchair lift doors are open. Light switch shall have a driver override. Illumination shall be sufficient to comply with ADA requirements.

#### 8.2 Exterior Lighting

Exterior lighting shall be in accordance with Federal Motor Carrier Safety Regulations (393.12). All lights shall have wire long enough to more the light at least six inches (6<sup>n</sup>) from vehicle for service. Lights shall be grounded to body framing structure. All lights shall be sealed from moisture. Fixtures, which are surfaced mounted to the body, shall be sealed from moisture.

- <u>8.2.1</u> Headlights and headlight supports and mountings shall be sufficiently rugged to maintain adjustments under road shock and service conditions. Headlight high beam indicator shall be installed on instrument panel. An audible "headlight on" warning buzzer shall be installed to notify the operator that the lights are on with the engine turned off.
  - Tail lamps shall be mounted on the rear of the vehicle so as not to be affected by engine exhaust heat. Each side shall include a hazard, signal, tail, and stop light. Lamp lenses shall not protrude from body more than two inches  $(2^{u})$ . Lights shall consist of sealed, single unit light fixtures.
  - Rear tail lamps shall include a pair of amber combinational hazard and signal lights. Rear tail lamps shall also include a pair of red taillights and red stoplights, which may be combinational.
- 82.4 Brake lights shall not override emergency flashers or turn signals.
- 8.2.5 A collision avoidance light shall be installed on the rear at the centerline of the vehicle. It shall be activated simultaneously with the stop lamp circuit. Collision avoidance lamp shall be a sealed, single unit light fixture.
- <u>8.2.6</u> Two (2) back-up lights adequate to illuminate for visibility when backing shall be furnished. One mounted on each side of the vehicle. The lamps shall each be a sealed, single unit light fixture.
- <u>8.2.7</u> Passenger entry door area shall be lighted by a hooded exterior door light, suitably mounted so that entire ground area immediately outside the entry door is sufficiently illuminated to comply

REVISED: July 2002



TYPE 1 SPECIFICATION

with ADA requirements.

- 8.2.8 Each vehicle shall be equipped with an exterior curb lamp. Light shall be positioned in manufacturer's standard location in such a manner as to illuminate the ground area in the immediate vicinity of the area of operation of the wheelchair lift. Light shall be automatically activated only when the wheelchair lift doors are open. Illumination shall be sufficient to comply with ADA requirements.
- 8.2.9 The vehicle shall be equipped with daytime running lights.

#### 9. Passenger Seating

The seating arrangements and configuration will be as per the attached floor plan. Floor anchorage shall be neat and of a non-tripable design. The seat frames shall be one inch (1") steel tubing and be sixteen (16) gauge or metal of equal mechanical properties. The front and back seat cushions shall have foam padding and be individually wedged to each passenger for occupant's comfort and retention. The indentation load deflection shall be sixty-five (65) to eighty-five (85) pounds. Seat cushion shall meet the flammability requirements of FMVSS-302. Seats shall be covered with Polyolefin fabric or vinyl fabrics. Color combination shall be determined by the purchaser from samples provided by the contractor. All conversion sets shall be supplied by a single manufacturer, either Braun "S" series (19-bench and 125 fold-away seating or C.E. White models ADA 35MB, L/R -17 MB and L-33 MB, or approved equal.

#### 9.1 Fabric or Vinyl Seating

**9.1.1 Flat-woven fabric** shall be one hundred percent (100%) polyester face. Minimum weight shall be twentythree (23) ounces per linear yard. Fabric shall be able to withstand a minimum of two hundred and fifty thousand (250,000) double rubs (ASTM 3597-77 Wyzewbeek Method). Color fastness to light shall be three hundred (300) hours minimum (MTCC-16-1977 Carbon Arc); Fabric shall be Level 3, puncture resistant, and treated for soil and stain resistance. Agency reserves the right to pre-approve all colors.

**9.1.2 Vinyl material** shall be expanded vinyl, thirty-six (36) ounces per linear yard minimum, transportation grade. Material shall be able to withstand a minimum of fifty thousand (50,000) double rubs (ASTM 3597-77 Wyzewbeek Method). Color fastness to light shall be three hundred (300) hours minimum (MTCC-16-1977 Carbon Arc). Material shall be Level 3, puncture resistant, and treated for soil and stain resistance. Agency reserves the right to pre-approve all colors.

9.2 Seat Spacing

Seats shall be spaced to provide a minimum of eleven inches (11') of knee room between seat cushion and seat back.

#### 9.3 Flip-seats in Wheelchair Lift Equipped Vehicle

Each wheelchair position will have flip-seats installed as per the floor plan for use when the wheelchair position is not occupied by wheelchairs. Flip-seats shall be provided with seat belts. Seat belt locking devices shall be of high quality, easy to latch and unlatch. The seats shall be of the same design as the other passenger seats. The bottom of the flip-seats shall be aluminum, ABS or carpeted. The seating arrangements and configuration shall be as per the required floor plan referenced on the invitation for bid. The type of flip-seat shall be indicated on the floorplan.

#### 9.4 Passenger Seatbelts

- 9.4.1 All seats and wheelchair positions shall be equipped with retractable seatbelts for each seated position. Each seat shall include self-tensioning seat belts in which the retracting mechanism attaches directly to the floor track structure or seat base.
- 9.4.2 The retractor shall be automatic locking style.
- 9.4.3 Each seat belt shall have a push-button release mechanism.

TYPE 1	SPE	CIFICATION	Texas Department of Transportation	REVISED: January 2003
10.	Passenger entrance door and stepwell			
	10.1	Passenger entrance d passenger door shall ambulatory passengers	oor and stepwell shall be located at right front be extended into the transit-style top to provide a s.	of the vehicle. This right from additional overhead clearance for
	10.2	The steps shall be des ground with the vehicl eight inches (8") deep the body to meet this r	igned so that the top of the first step is no more the le unloaded. Stepwell width of at least eighteen inco- and a maximum riser of nine inches (9") shall be equirement.	han twelve inches (12") above the shes (18") in width, approximately fabricated and installed inside of

- 10.3 The surface of all entrance steps shall be covered with eighth inch (1/8") thick rubber flooring on all risers and sides, three-sixteenths (3/16") thick ribbed rubber step treads with contrasting nosing properly sealed
- A two- (2) inch yellow safety nosing shall be placed on each step edge. 10.4
- The stepwell and doorframe shall be formed and welded fabrication using eleven- (11) gauge steel in a two-step design. Step assembly shall be cleaned, sealed, painted and undercoated prior to installation. 10.5 shall be a one-piece front hinged type and shall have a clear center opening width of thirty-two inches (32") and a minimum vertical opening of seventy-three inches (73"). The extended portion of the door shall be constructed of eleven- (11) gauge steel. The extended doorframe shall have vertical members constructed of sixteen (16) gauge steel and the horizontal member constructed of eleven (11) gauge steel
- 10.6 A provision shall be furnished to prevent wheel-splashed material from being deposited on entry/exit steps if furnished with exterior steps.

#### 11 Stanchion, Grab Rail & Modesty Panel

A vertical stanchion shall be provided at the aisle immediately behind the wheelchair lift. A horizontal grab rail with modesty panel attached shall extend from the wall to the stanchion.

#### 12. Wheelchair Lift Door

Side double outward opening doors shall be provided for the wheelchair lift. Lift shall be mounted within the vehicle body on the curbside. Wheelchair doorframe structure shall consist of minimum eleven (11) gauge steel, cleaned, primed and painted to match vehicle exterior base color. A water deflector shall be integrated into doorframe structure at the top. Door panels shall be made of a corrosion treated material. Foam core doors with wood frame supports are not acceptable. Door panel holders shall be equipped with a device to prevent doors from closing when the lift is in motion. Wheelchair door clear opening dimensions shall be a minimum of thirty-nine inches (39") by fifty-six inches (56"). Door windows shall be installed.

#### 13. Safety Equipment

- A minimum of ten (10) unit first aid kit shall be provided and conveniently mounted.
- A minimum of two and a half pound (2.5 lbs.) fire extinguisher shall be provided and mounted near the 3.2 driver's area.
- 33 A three-piece triangle warning reflector kit shall be secured in the vehicle.
- Back-up alarm that is electrically operated and produces an intermittent sound when the vehicle is shifted 13.4into reverse shall be furnished to warn others while vehicle movement is in reverse. The alarm shall meet or exceed SAE 1994B standards.
- 13.5 Safety plaques or decals shall be furnished and affixed at any hazardous area. The safety plaques or decals shall describe the nature of the hazard, level of hazard seriousness, how to avoid the hazard, and the consequence of human interaction with the hazard. Permanent plaques are preferred to decals. Type, size and location of product safety plaques or decals shall be in accordance with ANSI 535 4-1991, or latest revision thereto.
- 13.6 A combination roof ventilator and emergency escape hatch shall be provided towards the rear of the vehicle. Example: Trans-Spec or Specialty Hatch Ventilator (OR APPROVED EQUAL).
- 13.7 Fresnel lenses shall be provided on the rear window of the vehicle.

REVISED: July 2002

### Texas Department of Transportation

TYPE 1 SPECIFICATION

#### 14. Special State Law Provisions

- 14.1 The vehicle shall be equipped with two or more hazard lamps that:
- (a) are mounted at the same level on the rear of the vehicle;
- (b) are visible at a distance of 500 feet in normal sunlight;
- (c) flash; and(d) emit amber light.
- 14.2 The vehicle shall bear a sign on the rear of the vehicle stating: "Caution--children may be exiting"

#### d. Gasoline to Liquefied Petroleum Gas Conversion.

1. Conversion Features - The engine shall be fueled to operate on liquefied petroleum gas. The engine, fuel system, and all related components shall meet all applicable requirements.

- 1.1 LPG fuel system Throttle-body air/ fuel controller, single exhaust
- 1.2 LPG fuel tank: capacity 29 Gallons (underbody) with a range of 250 mile
- 1.3 Engine HD Vortec 5700 V- 8, gaseous fuel read
- 1.4 Fuel level sensor Electronic
- 1.5 LPG fill valve Side fuel door
- 1.6 Fuel selection switch An electrical fuel selection switch is to be provided on the instrument panel or in a location convenient to the vehicle operator. This switch shall allow the operator to select gasoline operation or LPG operation and shall be permanently marked. The operator shall not have to operate any other controls in switching from one fuel to the other, unless required by the conversion system manufacturer.
- 1.7 Refueling Receptacle The vehicle refueling receptacle shall be the industry standard. The receptacle must be protected with a dust cap, permanently attached to the vehicle. All conversion systems will have a remote refueling receptacle unless otherwise specified by the ordering agency. The remote fill receptacle shall be enclosed in a hinged remote fillbox unless otherwise specified by the ordering agency. The remote refueling receptacle shall be located as near to the gasoline filler location as possible.

**Shut-off Valve -** A manual shut-off valve to isolate the fuel tank from the rest of the LPG system must be provided and labeled as required by the Railroad Commission of Texas.

**Fuel Gauge** - The OBM fuel gauge is to be utilized to provide accurate available fuel readings for both gasoline and LPG selectively with the fuel in use. A separate OEM quality fuel gauge with numerical (Digital Preferred) display for LPG is to be installed and mounted so that is can be easily observed by the seated driver if the OEM fuel gauge is incompatible with the LPG system.

1.10 Filters The LPG fuel line must be filtered to prevent contamination from entering the fuel system. Preventive maintenance instructions are to be provided in accordance with

TYPE 1 SPE

CIFICATION	Texas Department of Transportation

REVISED: January 2003

2. The installation of the LPG fuel system and the vehicle operation shall be in accordance with the following:

- 2.1 Installation The installed conversion system is to present a neat, OEM quality appearance and shall be free of all defects affecting appearance, useful life, or serviceability. The installed systems must not interfere with routine maintenance tasks such as tune ups, checking of fluid levels, the replacement of spark plugs, distributor caps and rotors, or drive belts nor render inoperative the functions of the air filter, air connection, or any component of the emission control system of the vehicle unless approved under EPA guidelines. All electrical wiring is to be insulated and enclosed in a fibrous loom, plastic loom, or flexible conduit for protection from external damage and short circuits. Wiring is to be securely fastened at sufficient intervals to prevent sagging and ensure clearance of mechanical parts. Routing of the wiring through the sub-frame, body, etc., shall not interfere with normal operation or present a safety hazard. Rubber/plastic grommets are be used wherever wires, harness or fuel lines pass through metal. Workmanship shall be comparable to that of the vehicle OEM. The systems shall be installed to conform to the system manufacturer's instructions and recommendations.
  - 2.2 Connections All hose connectors and fittings shall be compatible. All electrical connections to the vehicle OEM wiring shall be accomplished with stainless steel, brass or copper connectors or soldered. Aluminum connectors are not acceptable. Interconnecting wires shall be uniquely color coded and identified in the alternative fuel system electrical schematic.
  - 2.3 Engine Tune-up Each conversion system installation is to be made only after the engine has been tuned to the OEM's specifications by the purchasing entity prior to delivery or picked up by verdor.
  - 2.4 Engine Operating Characteristics The engine, after conversion, is to operate on LPG without hesitation, stalling, power loss of more than 15%, or surging. The OEM's recommended maximum operating temperature, horse-power, engine speed, etc. shall not be compromised or surpassed. The engine shall start on either gasoline or LPG within 5 seconds after start of cranking.
  - 2.5 **Safety** The engine, after conversion, is to meet all federal and state safety rules and regulations, all applicable EPA emission standards, DPS Vehicle Inspection Rules, and TNRCC Regulation IV.
  - 2.6 **OEM Engine Speed Governor -** Any OEM engine speed governor is not to be made inoperable during conversion to LPG. It shall remain operable when the vehicle is operating on LPG as well as on gasoline.
  - 2.7 **OEM Fuel Injection System**. The fuel delivery system of gasoline engines, if used, shall be made inoperable by means which will not damage the injectors and associated components, while the engine is operating on LPG and shall not be damaged by short or long term use of LPG.
  - 2.8 **OEM Air Cunister** Whenever the OEM air canister is removed and replaced, a fully enclosed all metal air canister shall be provided. The use of silicon sealer to provide air tightness on an air canister/air filter assembly is prohibited. Modifications to OEM air canister/air filter assemblies shall be restricted to minor modifications required in the conversion system manufacturer's installation instructions.
    - Engine Electronics All electronics are required to properly interface with the original vehicle electronics to meet vehicle performance and emission objectives. The vehicle OEM engine management computer and its permanent control memory shall not be modified, removed, replaced or otherwise altered. The computer and electronic systems must be of closed loop design with adaptive learn capabilities and self-adjusting strategies built into the system allowing for the optimization of the ignition system's timing curve for LPG. The learning algorithms must enable the unit to learn its power and idle points automatically. The mixer must be fixed venturi type with no moving parts. On-Board OEM diagnostics are not to be adversely affected or over-ridden by the conversion system. Electrical Wiring is to be color coded to match the vehicle manufacturer's electrical wiring color scheme.
  - 2.10 Alternative Fuel Decals A decal is to be located under the hood, easily visible to the operator upon opening. The decal shall state that this is a LPG fueled vehicle. A second decal is to be added under the hood showing name, address, and phone number of the conversion vendor. The vehicle shall also be furnished with a diamond LPG alternative fuel decal in accordance with National Fire Protection Association # 58 (LPG gas code).

Page 9

REVISED: July 2002

Texas Department of Transportation

TYPE 1 SPECIFICATION

2.11 Anti-Tampering - Conversion system shall comply with EPA anti-tampering rules, and shall be designed so as to prohibit tampering, and shall not have an adjustable converter.

#### 3 Warranty Requirements

- 3.1 INTEGRATED CONVERSION SYSTEM All conversion system components including underhood-underdash electronic fuel management controls are warranted as an integrated system. All conversion systems are warranted against all defects in material and workmanship for a period of not less than 12 months or 12,000 miles, whichever comes first, and shall cover 100 percent parts and labor for the system. If the manufacturer's standard warranty period exceeds 12 months or 12,000 miles, then the standard warranty period shall be in effect. The warranty begins on the date the unit is accepted by the purchaser.
- 3.2 WARRANTY PERIOD RESPONSIBILITIES During the warranty period the vendor will be responsible for labor, materials, and other costs as outlined below associated with required warranty repair. It is the intent of this warranty that the vendor perform all warranty repair work. However, should the vendor fail to complete the required warranty repairs within three working days of notification of the reported failure, at the purchasing entity's option, the purchasing entity may perform warranty repairs or have them performed commercially at the vendor's expense.
- 3.3 WARRANTY REPAIRS When warranty repairs are required, the purchasing entity will notify a representative of the vendor's Texas dealer by telephone at the location and the telephone number designated by the vendor on the Warranty Certification as the point of contact. Major warranty repair work for the purpose of this specification means major repairs to the alternative fuel system and major repairs to any other components of the system. Diagnosis of the actual repairs required will be the responsibility of the vendor. The unit will be made available at the purchasing entity's facility within a 100-mile (161 km) radius of the FOB point shown on the purchase order. The repair work may be performed by the vendor or their authorized representative.
- 3.4 TRANSPORTATION COSTS If mutually agreed upon between the vendor and the purchasing entity, the purchasing entity may transport the unit to the vendor's location or authorized repair facility (within the boundaries of the state of Texas). The cost of equipment and manpower necessary to haul the unit for the round trip will be billed back to the vendor at the rental rate of the equipment and composite hourly rate for the driver in effect at the time for the equipment required. The composite hourly rate for the driver will not exceed \$2.000 per hour. Rental rate for the truck and trailer will not exceed \$0.50 per mile for the truck and \$6.000 per hour for the trailer. Payment for transportation costs as provided for in this section shall be made within 30 calendar days of the billing date.
- 3.5 **RESPONSE TIME** Warranty repair action shall begin within two working days after the vendor is notified of the need for warranty repairs. A representative of the vendor's Texas dealer will be notified by telephone with a letter or fax confirmation at the location, telephone and fax number designed by the vendor on the warranty certification as the point of contact. The vendor shall notify the purchasing entity immediately of any change in this location, telephone with a letter or FAX confirmation at the location, telephone and/or FAX number. The warranty repairs should be completed and the unit returned to the purchasing entity (or picked up by the purchasing entity at the vendor's expense as outlined above) within a reasonable period of time. For the purpose of this specification, three working days is defined as a reasonable period of time.
- 3.6 PARTS AND SERVICE. The manufacturer of the equipment furnished shall have an authorized dealer within the state of Texas. The authorized dealer shall have factory-trained personnel available for warranty repairs and the performance of service. The dealer shall also maintain an inventory of high-usage parts and a quick source of low-usage parts.
- 3.7 WARRANTY DISPUTES In the case of warranty work on an engine converted to use LPG, if there is any question on the cause of the malfunction between the vehicle EM and the vendor, it shall automatically become the vendor's responsibility to determine the cause and provide necessary repairs. If the question is not resolved within seven (7) working days from the date of notification to the vendor by the purchasing entity, the vendor will arrange, with the permission of the purchasing entity, for the vehicle to be repaired by a duly licensed technician, at an EM dealership or other facility selected by the purchasing entity, at no cost to the purchasing entity. The vendor may then negotiate with the EM if the repair is covered by the EM warranty or pay for the repairs if it is not, unless it can be determined that the malfunction was due to improper operation such as low oil, low water, etc.
- 3.8 GENERAL ENGINE WARRANTY The vendor shall warrant converted engines for a minimum of six (6) months or 6,000 miles, whichever occurs LATER against damages due to the operation of the engine on LPG. This warranty shall be equal to or exceed the OEM original warranty on the engine and shall be limited to damages caused by the alternative fuel used.



Cutaway Bus

August 2004

#### PUBLICATION

This specification is a product of the Texas Department of Transportation (TxDOT). It is the practice of TxDOT to support other entities by making this specification available through the National Institute of Governmental Purchasing (NIGP). This specification may not be sold for profit or monetary gain. If this specification is altered in any way, the header, and any and all references to TxDOT must be removed. TxDOT does not assume nor accept any liability when this specification is used in a procurement process by any other entity.

#### TECHNICAL SPECIFICATIONS-DEDICATED PROPANE (ULSD option available) LIFT-EQUIPPED TRANSIT VEHICLES

#### 1.0 GENERAL REQUIREMENTS

1.1 The purpose of this specification is to provide a transit quality vehicle manufactured on a standard cutaway chassis with provision for stand-up entry, a wheelchair lift and tie downs as depicted on the floor plan attached to these specifications. All body, floor and roof joints must be fightly sealed to eliminate drafts and water leaks. Vehicle shall exhibit attention to workmanship and detail. Used, shopworn, or prototype vehicles are not acceptable. Vehicles furnished to these specifications must meet or exceed all requirements herein.

# ALL VEHICLES DELIVERED IN ACCORDANCE WITH THIS SPECIFICATION MUST MEET THE REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (ADA).

- 1.2 Vehicle components, assemblies, and accessories shall be standard production items unless otherwise specified herein. These teatures include but are not limited to: adjustable instrument lights, interior sun visor, exterior backup lamps, variable speed windshield wipers, windshield defroster, coolant recovery system, etc. Standard and other common features if not specifically stated shall not be interpreted as items that can be omitted to reduce price or to provide any other bidding advantage. The vehicles and all related equipment shall be designed to permit ready accessibility to maintenance purposes with minimal disturbances of other components and assemblies. All vehicles supplied under these specifications shall be in full compliance with Federal Motor Vehicle Safety Standards (FMVSS) as established by the Department of Transportation and FTA guidelines.
- 1.3 The BIDDER has sole responsibility for, and shall provide the vehicle as specified with all certifications, wanaptes, and special equipment to the Agency as a completed vehicle.

#### 2.0 Reserved

#### 3.0 GENERAL DIMENSIONS

Wheelbase	.138" m	in.
Interior height from floor to ceiling	72" m	in.
Interior height from floor to ceiling at aisle	75" m	ín.
Height at first step	12" ma	ax.
Height at passenger door entrance	78'' <mark>n</mark>	וות.
Aisle width	16" mi	n.
Interior width at floor level	76" mi	n.

3.1 In order to assure a smooth ride, wheelbase and overall body length should be selected to avoid excessive overhang behind rear wheels, (not more than 50% of the wheelbase).

#### Cutaway Bus

August 2004

#### 4.0 SUSPENSION AND GROSS VEHICLE WEIGHT

Gross Vehicle Weight Rating	
Front Axle Capacity	
Rear Axle Capacity	
Front Springs	
Rear Springs	

- 4.1 Minimum of ten thousand and five hundred (10,500) pounds, or higher if required, to support the loaded weight of the completed vehicle including any optional equipment selected. It is the bidder's responsibility to calculate the actual loaded weight and to provide a heavier chassis, tire, wheel, spring or axle combination if required.
- 4.2 Shock absorbers shall be gas type, heaviest available as specified by chassis manufacturer.
- 4.3 Suspension system shall have conventional leaf springs on the rear and coil type springs on the front. Suspension shall be of proper design and suitable capacity. Springs shall have anti-squeak characteristics. The suspension system shall accommodate the additional weight of the lift on the curb side of vehicle.
- 4.4 Reserved
- 4.5 The rear axle and final drive must be of conventional construction, a truck-type rear axle using heavy tubes pressed into cast center section or one-piece casting.
- 4.6 Ring gear should be bolted, not riveted, to differential carrier.
- 4.7 A differential with the appropriate gear ratio to match the power train is required. The vehicle should be designed to operate at sixty (60) M.P.H. at 3500 RPM or less.

#### 5.0 ENGINE

- 5.1 Engine shall be of the latest design electronic controlled five point four liter (5.4) incorporating all features which will minimize emissions and maximize the life of the engine.
- 5.2 Engine shall be emissions certified and shall comply with all Federal and State laws and regulations with regard to air and noise pollution and safety that are in effect on the date of manufacture.
- 5.3 The noise level generated by the engine and other vehicle systems shall not exceed sixty (60) decibels at any point inside the passenger compartment, under normal operating conditions, with the windows closed
- 5.4 The engine and components are to be arranged and mounted so as to provide convenient access for servicing the engine and all of its accessories.

#### Cutaway Bus

August 2004

#### 6.0 FUEL SYSTEM: Gasoline to Liquefied Petroleum Gas Conversion.

- 6.1. Conversion Features The engine shall be fueled to operate on liquefied petroleum gas. The engine, fuel system, and all related components shall meet all applicable requirements. Conversion system shall incorporate an adaptive learn system which automatically compensates for variations in fuel composition, altitude, and temperature. Fuel system shall be computer controlled through OEM interface or using an auxiliary system. Fuel delivery shall be accomplished through computerized fuel injection.
  - 6.1.1 LPG fuel system Throttle-body air/ fuel controller, single exhaust system
  - **6.1.2 LPG fuel tank:** 37 Gas-Gallons Equivalent tank. The tank shall be a specialty tank manufactured by the Sleeger Group, Manchester Tank, or approved equal, with dimensions: 14 x 14 x 34.
  - 6.1.3 Fuel level sensor Electronic
  - 6.1.4 LPG fill valve Side fuel door
  - 6.1.5 Fuel selection switch An electrical fuel selection switch is to be provided on the instrument panel or in a location convenient to the vehicle operator. This switch shall allow the operator to select gasoline operation or LPG operation and shall be permanently marked. The operator shall not have to operate any other controls in switching from one fuel to the other, unless required by the conversion system manufacturer.
  - **6.1.6 Refueling Receptacle** The vehicle refueling receptacle shall be the industry standard. The receptacle must be protected with a dust cap, permanently attached to the vehicle. All conversion systems will have a remote refueling receptacle unless otherwise specified by the ordering agency. The remote fill receptacle shall be enclosed in a hinged remote fill box unless otherwise specified by the ordering agency. The remote refueling receptacle shall be located as near to the gasoline filler location as possible.
  - 6.1.7 Shut-off Valve A manual shut-off valve to isolate the fuel tank from the rest of the LPG system must be provided and labeled as required by the Railroad Commission of Texas.
  - 6.1.8 Fuel Gauge The OEM fuel gauge is to be utilized to provide accurate available fuel readings for both gaseline and DPG adjectively with the fuel in use. A separate OEM quality fuel gauge with numerical (Digital Preferred) display for LPG is to be installed and mounted so that is can be easily observed by the seated drug of if the OEM fuel gauge is incompatible with the LPG system.
  - **61.9** Filter An in-line disposable fuel filter shall be provided featuring welded stainless steel, high strength construction and integral fittings, 3/8" SAE 45 degree flare. Preventive maintenance instructions are to be provided in accordance with Section 50.
  - **6.1.10** Vaporizer A vaporizer shall be provided equipped with a two-stage hi-flow regulator that provides the system with a fuel at a consistent operating pressure and temperature. The vaporizer shall teature a high-efficiency heat exchanger, balanced output pressure regulation, and an integral pressure relief valve.
- 6.2. **Installation and Operation** The installation of the LPG fuel system and the operation of the vehicle after conversion shall be in accordance with the following:

### **Texas DOT Sample Specifications (Cutaway)**

#### Cutaway Bus

- 6.2.1 Installation The installed conversion system is to present a neat, OEM quality appearance and shall be free of all defects affecting appearance, useful life, or serviceability. The installed systems must not interfere with routine maintenance tasks such as tune ups, checking of fluid levels, the replacement of spark plugs, distributor caps and rotors, or drive belts nor render inoperative the functions of the air filter, air connection, or any component of the emission control system of the vehicle unless approved under EPA guidelines. All electrical wiring is to be insulated and enclosed in a fibrous loom, plastic loom, or flexible conduit for protection from external damage and short circuits. Wiring is to be securely fastened at sufficient intervals to prevent sagging and ensure clearance of mechanical parts. Routing of the wiring through the sub-frame, body, etc., shall not interfere with normal operation or present a safety hazard. Rubber/plastic grommets are be used wherever wires, harness or fuel lines pass through metal. Workmanship shall be comparable to that of the vehicle OEM. The systems shall be installed to conform to the system manufacturer's instructions and recommendations.
- 6.2.2 Connections All hose connectors and fittings shall be compatible. All electrical connections to the vehicle OEM wiring shall be accomplished with stainless steel, brass or copper connectors or soldered. Aluminum connectors are not acceptable. Interconnecting wires shall be uniquely color coded and identified in the alternative fuel system electrical schematic.
- **6.2.3** Engine Tune-up Each conversion system installation is to be made only after the engine has been tuned to OEM specifications.
- 6.2.4 Engine Operating Characteristics The engine, after conversion, is to operate on LPG without hesitation, stalling, power loss of more than 15%, or surging. The OEM's recommended maximum operating temperature, horse-power, engine speed, etc. shall not be compromised or surpassed. The engine shall start on either pasoline or LPV without 5 seconds after cranking.
- 6.2.5 Safety The engine, after conversion, is to meet all teleral and state safety rules and regulations, all applicable EPA emission standards, DFS Vehicle inspection Rules, and TNRCC Regulation IV.
- **6.2.6 OEM Engine Speed Governor** Any OEM engine speed governor is not to be made inoperable during conversion to LPG. It shall remain operable when the vehicle is operating on LPG as well as on gasoline.
- 6.2.7 OEM Fuel Injection System The first delivery system of gasoline engines, if used, shall be made inoperable by means which will not damage the injectors and associated components, while the engine is operating on LPG and shall not be damaged by the use of LPG.

**OFM Air Canister** - Whenever the OEM air canister is removed and replaced, a fully enclosed all metal air canister shall be provided. The use of silicon sealer to provide air tightness on an air canister/air filter assembly is prohibited. Modifications to OEM air canister/air filter assemblies shall be restricted to minor modifications required in the conversion system manufacturer's installation instructions.

**6.2.9** Engine Flectronics - All electronics are required to properly interface with the original vehicle electronics to meet vehicle performance and emission objectives. The vehicle OEM engine management computer and its permanent control memory shall not be modified, removed, replaced or otherwise altered. The computer and electronic systems must be of closed loop design with adaptive learn capabilities and self-adjusting strategies built into the system allowing for the optimization of the ignition system's timing curve for LPG. The learning algorithms must enable the unit to learn its power and idle points automatically. The mixer must be fixed venturi type with no moving parts. On-Board OEM diagnostics are not to be adversely affected or over-ridden by the conversion system. Electrical Wiring is to be color coded to match the vehicle manufacturer's electrical wiring color scheme.
#### Cutaway Bus

August 2004

- 6.2.10 Alternative Fuel Decals A decal is to be located under the hood, easily visible to the operator upon opening. The decal shall state that this is a LPG fueled vehicle. A second decal is to be added under the hood showing name, address, and phone number of the conversion vendor. The vehicle shall also be furnished with a diamond LPG alternative fuel decal in accordance with National Fire Protection Association # 58 (LPG gas code).
- **6.2.11** Anti-Tampering Conversion system shall comply with EPA anti-tampering rules, and shall be designed so as to prohibit tampering, and shall not have an adjustable converter.

#### 6.3 Warranty Requirements

- 6.3.1 INTEGRATED CONVERSION SYSTEM All conversion system components including all electronic fuel management controls are warranted as an integrated system. All conversion systems are warranted against all defects in material and workmanship for a period of not less than 12 months or 12,000 miles, whichever comes first, and shall cover 100 percent parts and labor. If the manufacturer's standard warranty period exceeds 12 months or 12,000 miles, then the standard warranty period shall be in effect. The warranty begins on the day the purchaser accepts the vehicle.
- **6.3.2** WARRANTY PERIOD RESPONSIBILITIES During the warranty period the vendor will be responsible for labor, materials, and other costs as outlined below associated with required warranty repair. It is the intent of this warranty that the vendor performs all warranty repair work. However, should the vendor fail to complete the required warranty repairs within three working days of notification of the reported failure, at the purchasing entity's option, the purchasing entity may perform warranty repairs or have them performed commercially at the vendor's expense.
- **6.3.3** WARRANTY REPAIRS When warranty repairs are required, the purchasing entity will notify a representative of the vendor's Texas dealer by telephone at the location and the telephone number designated by the vendor on the Warranty Certification as the point of contact. Major warranty repair work for the purpose of this specification means major repairs to the alternative fuel system and major repairs to any other components of the system. Diagnosis of the actual repairs required will be the responsibility of the vendor. The unit will be made available at the purchasing entity's facility within a 100-mile (161 km) radius of the FOE point shown on the purchase order. The repair work may be performed by the vendor or their authorized representative.
- 6.3.4 **TOWING COSTS** The purchasing entity may transport the unit to the vendor's location or authorized repair facility (within the boundaries of the state of Texas), in accordance with the warranty agreement, which should allow for vendor to perform diagnostics and provide alternative remedies prior to third party towing at the vendor's expense.
- 6.3.5 **RESPONSE TIME** Warranty repair action shall begin within five working days after the vendor is notified of the need for warranty repairs. A representative of the vendor's Texas dealer will be notified by telephone with a letter or fax confirmation at the location, telephone and fax number designed by the vendor on the warranty certification as the point of contact. The vendor shall notify the purchasing entity immediately of any change in this location, telephone with a letter or FAX confirmation at the location, telephone and/or FAX number. The warranty repairs should be completed and the unit returned to the purchasing entity (or picked up by the purchasing entity at the vendor's expense as outlined above) within a reasonable period of time (three working days).
- 6.3.6 **PARTS AND SERVICE** The manufacturer of the equipment furnished shall have an authorized dealer within the state of Texas. The authorized dealer shall have factory-trained personnel available for warranty repairs and the performance of service. The dealer shall maintain an inventory of high-usage parts and a quick source of low-usage parts.

#### Cutaway Bus

August 2004

- **6.3.7 WARRANTY DISPUTES** If there is any dispute between the vendor and OEM on the cause of an LPG conversion malfunction, it shall automatically become the vendor's responsibility to determine the cause and provide necessary repairs. If the question is not resolved within seven (7) working days from the date of notification to the vendor by the purchasing entity, the vendor will arrange, with the permission of the purchasing entity, for the vehicle to be repaired by a duly licensed technician, at an EM dealership or other facility selected by the purchasing entity, at no cost to the purchasing entity. The vendor may then negotiate with the EM if the repair is covered by the EM warranty or pay for the repairs if it is not, unless it can be determined that the malfunction was due to improper operation such as low oil, low water, etc.
- **6.3.8 GENERAL ENGINE WARRANTY** The vendor shall warrant converted engines for a minimum of six (6) months or 6,000 miles, whichever occurs LATER against damages due to the operation of the engine on LPG. This warranty shall be equal to or exceed the OEM original warranty on the engine and shall be limited to damages caused by the alternative fuel used.

## 7.0 EXHAUST SYSTEM

- 7.1 The vehicles shall be equipped with an exhaust system that meets Federal and State noise level and exhaust emission requirements. The exhaust pipe shall terminate just ahead of the rear corner of the vehicle, exhausting to the street side, and shall be constructed so that it will not cause back pressure in the motor or damage to the paint, bumper, chassis or wiring components of the vehicle. Flexible tubing will not be permitted in exhaust system. An adequately sized, aluminized steel, long-life muffler shall be used.
- 7.2 The exhaust system shall be secured in place with a hanger system. No part of the exhaust shall hang below the departure angle to the rear bumper bottom.

#### 8.0 COOLING SYSTEM

- 8.1 Heavy duty to manufacturer's recommended standards. Coolant recovery system shall be factory installed. It shall be super cooling or neavy duty cooling. The cooling system shall have a permanent glycol base antifreeze to protect the system to -20° F, and shall maintain engine temperature not to exceed manufacturer's recommended normal operating temperature.
- 8.2 The cooling system shall have a high temperature warning buzzer and light and shall shut the engine off in 45 seconds from initial warning.

#### 9.0 TRANSMISSION

- 9.1 Transmission shall be an automatic shift, four (4) speed forward and a reverse gear with an auxiliary oil cooler capable of handling extreme temperature associated with transit type operations.
- 9.2 The transmission shift lever shall be interlocked with the starting motor to prevent engagement of starter in any gear position other than park.
- 9.3 The transmission shall be equipped with an interlock feature that prevents the vehicle from being shifted out of the park position until the lift doors are closed, the lift master switch is off, and the parking brake is released.
- 9.4 A backing warning signal shall be provided in accordance with section 41.5.

## 10.0 DRIVE SHAFT

A drive shaft yoke and guard shall be provided to prevent the drive shaft from dropping to the ground or from whipping through the vehicle floor if it becomes broken or separated.

11.8

August 2004

## 11.0 STEERING AND CONTROLS

- 11.1 Heavy duty power steering linkage type shall be provided.
- 11.2 The steering shall be power assist and shall incorporate a tilt feature. Steering from full left to full right turn shall be accomplished in no more than five (5) complete turns of the wheel.
- 11.3 The steering wheel shall be no less than fifteen (15") inches nor more than twenty (20") inches in diameter. The wheel ring shall be of all plastic or synthetic resin construction, molded over metal. It shall be provided with puller holes in the hub so to permit use of a standard or Universal puller.
- 11.4 All steering linkage wear points, including tie rod ends, shall be fitted with lubrication fittings and replaceable bushings or inserts.
- 11.5 The following controls, in addition to normal steering, braking, and transmission functions are to be provided:
  - 11.5.1 Column-mounted turn signal lever.
  - 11.5.2 Emergency flasher control facing driver and clearly
  - 11.5.3 Master exterior light switch including clearance or marker lights
  - 11.5.4 Switches and temperature controls for passenger compartment heaters, defrosters.
  - 11.5.5 Separate switch and temperature controls for driver heaters, defrosters.
  - 11.5.6 Heavy duty electric variable speed windshield wipers controlled by a variable speed switch or two speed wipers with intermittent feature shall be furnished. Wiper motor shall be mounted in an easily accessible location for ease in inspection, maintenance and removal. Minimum eighteen (18") und wiper blade and arm providing 1,037 square inches of wiped area with one hundred and ten degrees (110°) of wiping arc. Windshield washer reservoir shall be mounted in an accessible area and pump shall be electronically operated.

visible

- 11.6 All controls are to be within arm's reach of a five foot (5'0") driver with seat belt fastened.
- 11.7 All body switches are to be of uniform type, either push-pull or rocker type, mounted in convenient grouping in a panel near the driver.
  - All controls and switches shall be plainly and permanently marked. Painted masking is unacceptable.
- 11.9 The control panel and a supplemental driver's control panel shall be located convenient to the driver's seated position and in full view of the driver.
- 11.10 Lift power master switch shall be protected by a switch cover. No switches or instruments shall be obstructed controls, trim panels, or other appurtenances, and shall be arranged in a consistent and uniform manner.

August 2004

## 12.0 ELECTRICAL SYSTEM

- 12.1 The vehicle is to be equipped with a twelve (12) volt extreme duty electrical system. All components are to be selected and integrated to function in an environment characterized by low engine (alternator) speeds and high amperage draws (due to lights, wheelchair lift, flashers, air conditioning or heater, and other accessories operating constantly and simultaneously.)
- 12.2 An alternator of at least two hundred (200) amperes output at normal engine speed and an idle output of at least one hundred twelve (112) amperes is required. The idle output shall be achieved at an engine speed of no more than seven hundred (700) R.P.M. At no time should the ampere output be less than one hundred and ten percent (110%) of loaded draw.
- 12.3 Starter shall be capable of turning over engine with SAE 40W oil after ten (10) hour bold soak at zero degrees Fahrenheit (0°F).
- 12.4 The vehicle shall be equipped with a fast idle solenoid with manual switch, voit sensor and light that will automatically shut off when brake is applied and transmission is placed in gear. Solenoid is to be original equipment manufacturer parts (OEM) only.

#### 13.0 BATTERIES

- 13.1 Two (2) twelve (12) volt batteries delivering 1275 CCA shall be provided. Eattery cables shall be color-coded as positive and negative number two (#2) battery cables. Cables shall be sleeved with high abrasive resistant flex-guard loom and supported with lined steel clamps on a maximum of fifteen inch (15") centers. All battery terminals shall be coated with anti-corrosion and sealant protector.
- 13.2 Chassis manufacturer supplied battery that is located on the frame rail shall be mounted on a stainless steel roller mounted pull-out tray with battery hold down secured with bolts. Inside of compartment should be covered with a curable insulating material to prevent shorts. Battery compartment should be vented and the battery shall be easily serviceable without removal from vehicle by extending tray out of body. Door to compartment shall have a non-corrosive material (foam core is not acceptable) and shall be lockable with a ¼" square or hex key locks.
- 13.3 A rotary type battery disconnect switch shall be located near the driver side step well within the driver's reach and located in such a manner as to be protected from accidental disconnection.

#### 14.0 WIRING

141 All wiring shall be cross-linked polyethylene insulated, to two hundred degrees Fahrenheit (200°F), shall meet SAE standards, shall be color coded, numbered and function coded for positive identification every six inches (6"), and shall be permanently labeled in words to their function. Precaution shall be taken to avoid damage from heat, water, solvents or chafing by proper routing, clamping, and the use of grommets or suitable elastomeric cushion materials. Harnesses shall be designed to resist abrasion by the use of nylon slit flex loom that has a maximum temperature resistance of four hundred and ten degrees Fahrenheit (410°F). Harnesses shall be sectional terminating at insulated multi-pin quick disconnects or junction blocks. Heavy duty circuit board junction panel shall be provided inside the vehicle. The circuit box shall be conveniently mounted and have a secure cover. Board shall be equipped with heavy duty twelve (12) volt DC relays, and twelve (12) volt automatic reset circuit breakers and blade fuses. Inside the circuit box shall be a legend identifying each circuit and wire by color, number, function and location. This legend shall be permanently mounted to the vehicle.

14.2 All connectors shall meet the requirements of the Society of Automotive Engineers (SAE) recommended practice J878a, Types GXL and SGX.

<u>Cutaway Bu</u>	s	Aug	ust	2004
14.3	All vehicles shall be identically wired.			

- 14.4 Bidder shall furnish complete wiring diagram with wire size, maximum current flow in each wire, type of insulation, and code used. Wire diagrams must be vehicle specific, body and chassis combined, and shall correctly show all specified options.
- 14.5 Bidder shall provide one 18" x 24" copy of the wiring diagrams described above, mounted on card stock, and laminated in clear vinyl with each vehicle.
- 14.6 No "T" splices or butt connections shall be made in wiring. Harness and wiring shall terminate at appropriate junction terminals set in Bakelite, molded plastic material, or approved equal.
- 14.7 Devices such as lamps and wiring requiring periodic checking and servicing shall be readily and easily accessible. All exterior devices shall be sealed to prevent entry of water

## 15.0 INSTRUMENT GAUGES

The following instruments shall be provided:

- 15.1 Speedometer/Odometer Chassis manufacturer's standard design with trip set feature.
- 15.2 Fuel Gauge Chassis manufacturer's standard fuel gauge
- 15.3 Oil Pressure Gauge In addition to the manufacturer's standard gauge, an audible alarm **and** light shall be installed that will activate when low oil pressure is detected.
- 15.4 Water Temperature Gauge In addition to the manufacturer's standard gauge, an audible alarm **and** light shall be installed that will activate when overheating engine is detected.
- 15.5 Voltmeter In lieu of the chassis manufacturer's standard voltmeter, an additional voltmeter shall be installed with graduated charge and discharge indications.

## 16.0 BRAKES

- 16.1 Service brakes shall be hydraulic, self-adjusting power disc front and rear. Vehicle shall include a cable activated parking brake.
- 15.2 The braking system shall be heavy duty and the largest offered by the manufacturer for the GVWR specified.
- 16.3 The brakes shall be free of noise or squeal when applied.

## 17.0 WHEELS AND TIRES

- 17.1 Vehicles shall be equipped with the heaviest available ventilated wheels, 16.0" x 6.00" minimum. Rear wheels shall be dual and all wheels are to be interchangeable. Rated capacity shall equal or exceed GVWR of the vehicle.
- 17.2 Tires shall be LT225/75Rx16D radial ply, all season, with steel-cord reinforcement and highway type tread. Wheels and tires to be of adequate capacity, as determined by reference to the Tire and Rim Association Yearbook, to support the fully loaded vehicle.

August 2004

- 17.3 One matching spare wheel and tire shall be provided and shipped loose with each vehicle.
- 17.4 Mud flaps shall be included for each wheel well of the vehicle.

## 18.0 BUMPERS

- 18.1 Front bumper shall be chassis manufacturer's standard front chromed bumper.
- 18.2 Rear bumper shall be bus manufacturer's standard rear bumper equipped with an anti-ride feature.

#### 19.0 HORN

Dual 12 volt electrically operated horns shall be installed so as to be protected from wheel-wash.

#### 20.0 CRASH WORTHINESS

- 20.1 The body structure shall be built as an integral vehicle adequately reinforced at all joints and corners where stress concentration may occur to adequately carry required loads and withstand road shock. The following items are representative of the minimum requirements of the vehicle. Body assembly shall meet or exceed FMVSS 220, for roll-over protection.
- 20.2 The vehicle body and roof structure shall withstand a static load equal to one hundred fifty percent (150%) of the curb weight evenly distributed on the roof with no more than a six inch (6") reduction in any interior dimension. Windows shall remain in place and shall not open under such a load.
- 20.3 The vehicle, at GVWR and under static conditions, shall not exhibit deformation or deflection that impairs operation of doors, wheelchait lift, or other mechanical elements. Static conditions include the vehicle at rest with any one wheel on a six inch (6") curb or in a six inch (6") deep hole.
- 20.4 Upon request of Agency, the Bidder will present certified actual test results which have been conducted to ensure that the vehicle offered meets the FMVSS.

#### 21.0 BODY CONSTRUCTION

The body may be constructed of a matrix of fiberglass reinforced plastic (FRP) with an inner 21.1 thickness of resin-hardened honeycomb craft material. The matrix assembly shall be as follows: Exterior surface shall be a minimum 020" thickness of high gloss gel-coat to prevent moisture penetration and corrosion Secondary surface shall be a minimum one eighth inch (1/8") thickness of resin-hardened fiberglass reinforced plastic. The center composite layer consists of a one inch (1") thickness of resin-hardened "Vertical" honeycomb, or approved equal. laid on edge to allow a maximum column strength of each cell. Wall structure shall include a minimum of two (2) three inch (3") wide longitudinal sections of eighteen (18) gauge flat steel extending from the forward body seam to the rearward body seam to provide an additional attachment point for the integrally welded sidewall seat rail. Final surface of body structure is a minimum three thirty seconds inch (3/32") thickness of resin-hardened fiberglass reinforced plastic. Window framing in sidewall shall be a steel ladder-type assembly. Wintow pillars are minimum of one and one half inches (1 1/2") by one inch (1") fourteen (14) gauge dipped, zinc-plated tube. Top and lower horizontal ladder bridge rails are minimum one inch (1') by two inch (2'') twelve (12) gauge zinc-plated angle section. Attachment of ladder assembly to roof and lower wall section shall be grade five (5) 1/4'' x 3'' mechanical fasteners on not more than eight inch (8") center. In addition, interface of wall and roof to window ladder assembly surfaces shall include a high contact adhesive, Sikaflex 255 or approved equal to provide a one hundred percent (100%) bonding and sealing at these locations. Interior panels shall be one tenth inch (1/10") thick Melamine material having the physical properties of twenty-four (24) gauge steel. Side panels around and below passenger windows shall be same Melamine material with the color being bright white. Any barriers or modesty panels shall be medium grey. Ceiling panels shall also be bright white. Purchaser to approve color and quality prior to production from samples provided by vendor.

#### Cutaway Bus

#### August 2004

- 21.2 The body may be constructed of vertical support columns that shall be eighteen (18) gauge steel. All non-supporting members shall be sixteen (16) gauge steel tube or sixteen (16) gauge steel Cchannel. The roof structural support members shall be the equivalent of sixteen (16) gauge hot rolled steel hat section roof bows. The entire body steel cage frame (floor, walls roof, front and rear) shall be securely jig-welded together to provide an integral one-piece body structure. Fastening of roof and side walls by any other means other than welding will not be acceptable. All metal parts shall be given a thorough multiple stage anti-corrosion treatment prior to assembling. The exterior panels shall be continuous panels of twenty-five (25) gauge galvanized steel or other metal of the same mechanical properties. Exterior panels are to be riveted or welded to body framing. Sheet metal screws will not be acceptable for fastening the exterior panels. All panels shall be installed so that they will shed water: the leading panel shall be lapped over the following panel and in no case shall the sealing of the panels be dependent on caulking alone. All exterior joints and seams shall be protected by zinc chromate caulking, butyl rubber tape (or approved equal). Side panels below the floor line shall be non-corrosive ABS material and easily removable for service and repair. These panels shall be installed using methods that create a smooth surface and minimal exposed fasteners. Nuts, bolts, clips, and fasteners shall be zinc or cadmium plated or phosphate coated. Sheet netals screws are not permitted.
  - 21.2.1 All steel body parts shall be galvanized. Zinc chromate paint shall be applied to aluminum and steel.
  - 21.2.2 The primer utilized shall be compatible with finish paints. Interior surfaces of body panels and posts which are covered by trim materials shall be given protection against corrosion. In the case of interior body posts, all four (4) sides shall be treated to prevent corrosion.
  - 21.2.3 The galvannealed welce shall be wire brushed and treated with cold galvanizing compound.
  - 21.2.4 Side and end frame sections shall be designated for maximum strength. End posts shall be designated to resist shear. To increase tolerance for added strength, frame sections are to be jig-welded. Each frame section is to be tube-grid network constructed of 1" x 2" 14 gauge steel tubing to be used in all stress areas especially around the passenger entrance door and at all points where stress may occur.
  - 21.2.5 Gun installed mono-bolt fastenings of rivets shall be utilized on all exterior body panels, rubrails, and all other locations where stress is concentrated. When mono-bolts cannot be used, all ruts, bolts, clips, washers, clamps, and like fasteners on the exterior and interior of the unit shall be zinc or cadmium plated to prevent corrosion.



Roof bows shall be constructed from eleven (11) gauge and sixteen (16) gauge steel welded into a parabolic-Z structure. The longitudinal framing from front to rear shall consist of two (2) hatch-shaped members formed of sixteen (16) gauge steel. Exterior roof panels shall be 063 aluminum. The interior panel for the roof within the unit shall have strength equivalent to twenty-four (24) gauge steel. All metal parts shall be given a thorough multiple stage anti-corrostori treatment prior to assembling.

- 21.3 The vehicle shall be rust proofed with premium quality rust-proofing material. The entire body frame under-structure of the vehicle is to be fully undercoated with non-flammable resin type material, polyoleum or equivalent, applied after final assembly at the manufacturing facility.
- 21.4 Gutters shall be provided to prevent water flowing from the roof onto the side windows and passenger doors. When the vehicle is decelerated, the gutters shall not drain onto the windshield or driver's side window, or into the door boarding area. Cross sections of the gutters shall not be less than 0.25 square inches.

August 2004

## 22.0 ROOF

- 22.1 The roof shall have sufficient strength and stiffness to prevent vibration, drumming, or flexing under normal use. Roof structure shall include a minimum of three (3) longitudinal sections of eighteen (18) gauge flat steel extending from the forward body seam to the rearward body seam. All flat steel sections shall be fully integrated into the roof matrix and shall provide additional structural integrity and a secure attachment surface for ceiling panels, handrails and stanchion fixtures.
- 22.2 The roof is to be constructed to provide an aesthetically pleasing design to the vehicle. The sills, when matched, will provide a clean, clear surface at least two inches (2") wide for secure and sufficient roof mounting.

## 23.0 INSULATION

Vertical core insulation shall provide for a minimum of an "R-6" thermo-barrier and sound absorption. Side, roof, and front and rear crowns shall be insulated by the vertical core of the body assembly composite

#### 24.0 FLOOR

- 35.8 The vehicle floor assembly shall be a lateral body support, structural design, incorporating longitudinal stringers welded in a perimeter structure of steel angle iron. The entire floor assembly shall be a jig welded steel structure. Floor construction with wood studs running the length, width, and outside perimeter with foam core insulation is not acceptable.
- 24.2 The substructure shall be comprised of the following: a combination of fourteen (14) gauge steel lateral outriggers reinforced at each mounting point, eleven (11) gauge steel C-channel longitudinal support members, and a perimeter of fourteen (14) gauge steel angle welded into a ladder type structure.
- 24.3 The substructure shall be bolted through the lateral outriggers, two (2) per outrigger to the chassis through rubber isolator growneets as provided by the chassis manufacturer. Welding of any body understructure to the chassis frame will not be acceptable.
- 24.4 Over the sub floor structure shall be fastened a minimum five eighths of an inch (5/8"), seven (7) ply, marine grade plywood which is pattern cut, edge sealed, and attached with quarter inch (1/4") diameter counter sunk Tek screws. Sub floor understructure shall be completely undercoated and sealed prior to being installed on steel frame understructure.
- 24.5 Floor shall be level throughout and all joints between the floor and vertical surfaces shall be equipped with a cover of molding. Flooring shall be laid in a manner that prevents squeaks.
- 24.6 All edges of the plywood shall be sealed prior to installation to resist moisture. All floor joints will be filled and sanded level to result in a smooth, flat floor ready for installation of the flooring material. The entire floor shall be thoroughly sanded and then completely cleaned of all sanding dust and foreign material.
- 24.7 The floor in the under-seat area and wheelchair position area shall be covered with RCA #TR766, smooth rubber floor covering having a minimum thickness of .125 inch (1/8").
- 24.8 Floor covering in aisle and on steps shall be RCA #TR766, non-skid, wear-resistant, and ribbed. Minimum overall thickness shall be .1875 inch (3/16") measured from top of ribs.
- 24.9 Floor covering shall be laid without gaps or openings between sheets. Seams shall be filled with color matching material so as to be tight against any influx or seepage of water. Seams shall be covered with aluminum trim. The floor covering material shall be thoroughly cemented into position throughout the entire area and will be free of bubbles and blisters.

August 2004

- 24.10 The installation of the floor rubber shall be done in a manner so that the flooring rolls up the side wall of the vehicle to the seat track. There shall be no seams for water to penetrate the floor where the wall meets the floor.
- 24.11 The floor covering in the platform or standee area shall be three sixteenths inch (3/16") thick top ribbed single piece, with composition covering. The single piece floor covering in the platform area shall have longitudinal and transverse ribs metered at 45 ° to face the door. The vertical face and top section of the platform step edge backing shall be anchored with A.I.S.I. Type 304 stainless steel screws.

## 25.0 ROOF LINER

Interior walls shall provide a finish that is durable, easily cleaned and coordinates with the vehicles' interior color scheme. Roof liner shall be molded fiberglass, ABS plastic, or vinyl clad covered sheeting, neatly installed the full length so as to cover all protrusions.

## 26.0 WHEELHOUSE

Wheelhouse shall be constructed of sixteen (16) gauge steel, aluminum or equivalent and shall be covered with RCA transit rubber to match the specified flooring.

## 27.0 DOORS AND STEPWELL

- 27.1 The passenger entry door and step well shall be located at right front of passenger area, located directly across from the driver's seat at a ninety (90\*) degree angle for maximum viewing on entry way.
- 27.2 The door shall be a manually operated, outward folding type, and both door panels shall be actuated together by a single manually operated door control. The control mechanism shall be of high quality and durability, designed for repeated use over an extended period. The door shall be controlled from the driver's seated position.
- 27.3 The step well and doorframe shall be formed and weld fabricated using cold rolled eleven (11) gauge steel in a two-step design. Step assembly shall be cleaned and powder coated prior to installation. It shall be the two piece transit type and shall have a minimum horizontal opening of thirty-two (32") inches and a minimum vertical opening of eighty (80") inches.
- 27.4 Both vertical closing edges of the door shall be equipped with neoprene bulb seals. At the meeting edge of each door leaf, a two (2") inch neoprene seal shall be installed so that the edges form a tight overlapping seat when closed. Seals shall overlap front over rear to provide an air and water shade.
- 27.5 To prevent accidental opening while the vehicle is in motion, the door opening system shall require at least a one hundred, twenty-five (125) pound force applied at its center in order to manually separate the leaves
- 27.6 Passenger door windows shall be installed with two (2) piece black ozone treated extruded rubber, lock and key of one (1) piece fixed design. Entrance door windows shall be glazed with three sixteenths inch (3/16") thick, thirty-one (31%) percent gray density, tempered safety glass. Each window shall be installed in the upper and lower portions of the passenger door panels in line with the passenger side windows.
- 27.7 A driver's door shall be provided to the left of the driver's area. This door shall be accessible from inside or outside the vehicle. The driver door shall incorporate an opening window and arm rest.

#### Cutaway Bus

August 2004

27.8 The steps shall be designed so that the top of the first step is no more than twelve (12") inches above the ground with the vehicle loaded. Step well is to have a minimum first step depth of nine (9") inches and a minimum second step depth of nine (9") inches and shall be at least thirty-two (32") inches in width. The surface of all entrance steps shall be covered with eighth inch (1/8") thick rubber flooring on all risers and sides and three sixteenths inch (3/16") thick ribbed rubber step treads. All step edges shall have a two inch (2") yellow safety band running the full width of each step. Step wells shall incorporate lights to illuminate step tread area and outside of step well shall be protected from splashed material by door and rubber for tight fit.

## 28.0 STANCHIONS, GRAB RAILS, HANDRAILS, and MODESTY PANELS

A one and one-quarter inch (1¼") stainless steel grab bar, a minimum of thirfy-six (36") in length, shall be securely fastened to the interior of the doorway to assist passengers in entering or exiting the vehicle. Vertical stanchions shall be provided at the aisle immediately behind the driver's seat and at the step well. A horizontal grab rail with padded modesty panel attached shall extend from the walf to each stanchion. An overhead handrail shall be installed in the roof of the vehicle on both the driver and curb sides and shall run the length of the seating area.

#### 29.0 WHEELCHAIR LIFT DOOR

Side opening double outward opening doors shall be provided for the platform type wheelchair lift. Lift shall be mounted within the vehicle body on the curb side, behind the passenger entry door. Wheelchair door frame structure shall consist of minimum eleven (11) gauge steel, cleaned and powder coated to match vehicle exterior base color. A water deflector shall be integrated into door frame structure at the top. Door panels shall be made of non-corrosive material. *Form core doors with wood frame supports are not acceptable.* Door panel hinges shall be pane type with a minimum three sixteenth (3/16") inch diameter pivot pin. Hinges and hinge fasteners shall be stainless steel to resist rust and corrosion. Door latch shall be vertical, rotating, two point type with latch rod at top and bottom. Each door panel shall have its own lockable latch assembly with two (2) keys, which shall compress perimeter door seal to prevent leaks. Latch adjustment plates shall be located at the top and bottom of the door frame structure. Door panel holders shall be gas shock type mounted at the top and bottom of the door panels to open a minimum of one hundred degrees (100°) from the closed position. Wheelchair door clear opening dimensions shall be a minimum of thirty-nine (39") inches by fifty-six (56") inches bift doors shall be interlocked by a panel door switch controlling the transmission that requires the transmission to be in the "Park" position before lift can be operated. Door windows shall be installed with two (2) piece black ozone treated extruded rubber, lock and key of one (1) piece fixed design. Windows shall be installed in the upper portion of the lift door panels in line with the pasterian structure, lock and key of one (1) piece fixed design. Windows shall be glazed with three sixteenth (3/16") inch thick, thirty-one percent (31%) gray density, tempered safety glass. Each window shall be installed in the upper portion of the lift door panels in line with the pasterian side windows shall be installed in the upp

#### 30.0 WHEELCHAIR LIFT (Braun, Ricon, or approved equal)

- 30.1 The complete wheelchair lift vehicle shall be fully automatic, including folding of platform and be electro-hydraulically powered with a minimum test-net load capacity of eight hundred (800) pounds. The lift shall be totally self-contained and installed without modifications to the vehicle body or frame inside of the curbside double service doors. The entire assembly shall be installed with adequate protection to prevent accidental injury to passengers.
- 30.2 The attachment of the wheelchair lift assembly to the vehicle shall allow easy removal and be readily accessible for repair and maintenance. The lift assembly shall be mounted in such a manner that in the fully raised position it shall not interfere with the opening of the double side doors, passenger seating, and passenger/wheelchair movement within the vehicle.
- 30.3 The wheelchair lift shall have a bridge plate designed for a smooth transition from the vehicle floor level to the lift platform level when the platform is in the raised loading position.

<u>Cut</u>	away Bu	s		August	2004
	30.4	Bridge pla bridge pla	ate and platform shall be coated to resist rusting. Platform, bridge plate, a ate and aisle shall be skid resistant.	and area t	between
	30.5	The lift pla of not less	atform shall have a usable width of not less than thirty-two inches (32") ar s than forty-eight inches (48"), less the handrail which is also required.	nd a usabl	le length
	30.6	The whee operation automatio	elchair lift cam handrail shall be permanently installed for use of occupant i. The handrail shall be twenty-six inches (26") high from lift platform. The c folding to prevent any obstructions into the vehicle passenger area.	during lift e handrail	shall be
	30.7	The overa seventeel accessor	all depth of the lift assembly in the stored position inside the vehicle shall n inches (17") when measured at the floor level from the lift entry doors. I y to the lift shall extend more than twenty-one inches (21") from the lift en	not excee No compo ity door.	d onent
	30.8	Bolting of	any part of the lift assembly directly to the vehicle's walls is not acceptable	e.	
	30.9	The insta vehicle.	llation of the wheelchair lift assembly shall not cause excessive unbalance	ed loading	) of the
	30.10	The lift pla	atform shall be designed so as to stop downward movement upon contac	t with the	ground.
	30.11	The lift pla provide a contact w	atform shall have an end barrier at least four toches (4') in height that will ramp for loading of wheelchairs. The ramp shall fold out automatically up ith the ground.	fold outw oon platfo	ard to rm
	30.12	The vehic	cle shall be equipped with the following wheelchair lift safety features:		
		30.12.1	A door cut-off switch shatt be installed which prevents the operation of I closed.	ift when th	ne door is
		30.12.2	The lift shaft be equipped with an occupant restraint system consisting of safety belt that will prevent the passenger from rolling off of the front of	of a retrac the lift.	table
		30.12.3	The maximum capacity in pounds shall be posted on the wheelchair lift the operator and wheelchair passenger.	within ea	sy view of
		30.12.4	The lift platform shall be fitted with a device to prevent the platform from leaning against door after being returned to stored position.	1 touching	j or
	30.13	Lift shall I event of a operation bleed dow is to be si that will lin and outsid	be equipped with a manual override to permit lift to be raised or lowered n a power failure or emergency. The manual override system shall provide of the lift without electrical power being supplied. The manual override h which we are to be located inside the vehicle. A detachable hand lever to de tored next to the hand pump. The bleed down valve shall have a flow com mit the maximum descent speed. Manual override instructions shall be vide the vehicle with door open.	nanually ir a complet ydraulic p operate th ipensator sible from	n the te lump and le system valve n inside
	30.14	The whee	elchair lift shall comply with all Federal ADA requirements.		
31.0 LIFT CONTROL, ELECTRICAL CIRCUITS, AND WIRING					
	31.1	The comp have one operated	plete wheelchair lift assembly shall operate from the vehicle's electrical sy hand-held lift control station with a minimum five foot (5') cable attached from inside or outside of vehicle.	stem, and so lift may	t shall ⁄ be
	01.0	<b>T</b> I I			

31.2 The control switches on the lift control shall have permanently applied labels identifying their functions.

Cutaway Bus August 2004				
31.3	The power to the lift system shall be controlled through an ON/OFF master switch located on the supplemental driver's control panel.			
31.4	When the parking brake is properly applied and the master switch is placed in the "ON" position, an electric solenoid shall be activated that will connect the lift's electrical system to the vehicle's electrical system.			
31.5	The vehicle lifts shall be protected by a one hundred, five (105) amp circuit sentry system. The electrical power cord shall be loomed to protect cable from outside elements			
32.0 WH	IFEL CHAIR SECUREMENT AND SEATBELTS			
32.1	Each wheelchair position shall be provided with restraint devices that well secure the wheelchair and its passenger while in the wheelchair. These devices shall be adjustable to accommodate varying track widths of wheelchairs. Each wheelchair shall have a four (4) point securement (2 front, 2 back) in the vehicle with recessed anchor points of sufficient strength to secure a wheelchair and/or three wheel scotter. The entire securement system shall comply with all applicable regulations including ADA.			
32.2	Securement system must safely secure manually <b>and</b> electrically operated wheelchairs, (including 3-wheel scooters), and provide ample space for foot rests and proper wheelchair securement.			
32.3	Floor mounted tracks shall be a series type "L" track floor plate (Example: Kinedyne FE200769, Heavy Duty L Track, Q-straint L-series track 6,000 or 7,000 series), Sure-Lok Solo Floor Anchor, or approved equal. These plates shall be recessed mounted in the floor with three-eighths inch minimum (3/8") diameter, SAE Grade 5 bolts, using washers and self-locking nuts with National Fine Threads.			
32.4	No anchoring points shall project more than one-eights inch (1/8") above the finished floor. For the purposes of this section, the floor is the entire passenger area of the vehicle. If the Sure-Lok Sol floor anchor is used, a profrusion of no more than one-quarter inch (1/4") is acceptable due to the reduced overall protrusion of the anchor point.			
32.5	Where mounting bolts do not pierce or attach through the vehicle frame, sub-frame, body posts or equivalent metal structure, a metal plate not less than one-sixteenth inch (1/16") thick is required.			
32.6	There shall be four (4) retractor assemblies for each wheelchair position in the vehicle to secure the wheelchair to the tracks. <b>Example: Kinedyne Sure-Loc System, FE 612 Series, Q-Straint QRT</b> <b>8200</b> or approved equal. Each retractor assembly shall consist of a heavy duty series "L" track fitting, the front left and right retractor shall be equipped with manual tension knobs for manual tightening and/or release. Each retractor assembly shall be equipped with a quick release, push- button buckle and buckle connector. All straps shall be red in color.			
32.7	Two (2) seat bets shall be provided for each wheelchair passenger. The torso belts shall be two inches (2") wide, seventy-two inches (72") long, adjustable, with a strength rating of not less than three thousand pounds (3,000 lbs.). One end of the belt shall be secured to a female seat belt fitting and the other end shall have a male seat belt fitting. The seat belt assembly shall provide for a quick-release and also provide for a snap locking to connect both ends together.			
32.8	A wall mounted height adjustable of approximately twelve inches (12") shoulder harness system shall be provided at each wheelchair securement location that is compatible with the specified restraints. The harness system shall be installed in accordance with all structural requirements established by the restraint supplier and all applicable regulations, including 49 CFR part 571.			
32.9	All belts, straps, and harness assemblies shall be supplied in bundled sets and shall include a container in which to store them.			

August 2004

## 33.0 EXTERIOR LIGHTING

- 33.1 All exterior lighting; tail lights, brake lights, turn signals, collision avoidance lights and marker lights shall be Light Emitting Diode (LED) and be in accordance with Federal Motor Carrier Safety Regulations 393.12. All lights shall have wire long enough to move the light at least six inches (6") from vehicle for service. Lights shall be grounded to body framing structure. All lights shall be sealed from moisture. Fixtures which are surfaced mounted to the body shall be sealed from moisture.
- 33.2 Headlights shall be sealed beam type, high and low beam controlled with foot switch or hand switch. Headlights and headlight supports and mountings shall be sufficiently rugged to maintain adjustments under road shock and service conditions. Headlight high beam indicator shall be installed on instrument panel. An audible "headlight on" warning buzzer shall be installed to notify the operator that the lights are on with the engine turned off.
- 33.3 Tail lamps shall be mounted on the rear-end vehicle panels, so as not to be affected by engine exhaust heat. Rear tail lamps shall include a pair of amber combinational hazard and signal lights. Rear tail lamps shall also include a pair of red tail lights and red stop lights, which may be a combination of a directional signal, tail light and stop light. Lamp lens shall not protrude from body more than two inches (2"). Light shall be a sealed, single vehicle light fixture.
- 33.4 Brake lights shall not override emergency flashers or turn signals. Light shall be a sealed, single light fixture.
- 33.5 Two (2) back-up lights, one mounted on each side of the body rear cap to provide illumination for visibility when vehicle is backing up, shall be furnished tramps shall be the sealed beam design.
- 33.6 Directional signal lamps with amber lens to function with directional signals shall be provided, one on each side of vehicle approximately halfway from front to rear. Side signal lamp lens shall incorporate a brushed aluminum guard to protect lens from damage. All side signal lamps to be same height above ground.
- 33.7 Passenger entry door area shall be lighted by a booded exterior door light, mounted so that the entire ground area immediately outside the entry door is sufficiently illuminated to comply with ADA.
- 33.8 Vehicle shall be equipped with an exterior curb lamp. Light shall be positioned in manufacturer's standard location in such a manner as to illuminate the ground area in the immediate vicinity of the area of operation of the wheelchair lift. Light shall be automatically activated only when the wheelchair lift doors are opened. Illumination shall be sufficient to comply with ADA requirements.
- 33.9 Roof marker lights, red or amber, one at each corner shall be provided and protected with brushed atuminum guards.
- 33.10 Clearance marker lights, three (3) lamp cluster, surface mounted, amber in front, red lens in rear, shall be provided and protected with brushed aluminum guards.
- 33.11 Vehicle shall be equipped with daytime running lights.

## 34.0 INTERIOR LIGHTING

- 34.1 The overhead lights and the step well lights shall provide no less than five foot-candles of illumination on the entrance step area with the door open. This system shall be illuminated automatically when the door is open.
- 34.2 Driver courtesy light shall light when driver door is opened. Overhead and step well lights shall be wired to activate automatically when passenger door is opened. A separate dash mounted switch shall be provided to operate the overhead lights when the door is closed.

August 2004

- 34.3 Front step well area shall be lighted by a hooded step well light, suitably mounted so that the entire step well area of the vehicle is sufficiently illuminated. Step well light shall be on side away from wheel splash.
- 34.4 All interior lighting shall be incandescent type with the master control located on the dash or near the driver for easy operation by the driver. Lighting in the passenger area shall be mounted in the ceiling cove at the sidewall with a minimum of two (2) fixtures on each side of the vehicle. Lighting intensity for all cross seat lights shall have a minimum average of fifteen (15) foot candles at the seated passenger reading plane. In addition, an effective lighting level shall be provided for all other seated passengers. The lighting components shall be located and constructed so as to prevent the entrance of water, contaminants and insects. Lighting fixtures shall be reasonably flush with the interior walls and ceiling so as not to present a hazard to the passengers.
- 34.5 Light installation shall be designed to illuminate the wheelchair lift platform for hight operation. Light shall be positioned in manufacturer's standard location in such a manner as to illuminate the area in the immediate vicinity of the wheelchair lift. Light shall be automatically activated only when the wheelchair lift doors are open. Light switch shall have a driver override. Illumination shall be sufficient to comply with ADA requirements.

## 35.0 AIR CONDITIONING

- 35.1 The installed air conditioning system shall cool the interior of the vehicle to seventy two degrees (72°F) measured at a minimum of three points, located four feet above the floor at the longitudinal centerline of the vehicle. The three points shall be (1) near the driver's location; (2) at the mid-point of the body; and (3) two feet forward of the rear of the vehicle.
  - 35.8.4 The test conditions under which the above performance must be achieved shall consist of: (1) placing the vehicle in a room (such as a paint booth) where ambient temperature can be maintained at one hundred and ten degrees (110°F); (2) heat soaking the vehicle at one hundred and ten degrees (110°F) with windows open for at least one hour; and (3) closing windows, turning on the air conditioner and cooling the interior of the vehicle at seventy two degrees (72°F) plus or minus two degrees (2°F) within a maximum of 30 minutes while maintaining 110°F. The system shall have a dash driver's area evaporator vehicle.
  - 35.1.2 The test shall be performed at the vehicle manufacturer's recommended fast idle speed.
- 35.2 Driver's in-dash heavy-doty air conditioning shall be chassis manufacturer supplied system. Substitution of other than the chassis air conditioner is acceptable provided that the front and rear systems are compatible and warranty work is performed at one location. The system shall be separately controlled from the passenger area system and shall have a three-speed continuous duty permanently lubricated motor. Air from vehicle's dash shall have provision to divert air to defrosters. In-dash vehicle shall not interfere with removal or replacement of the engine cover or be blocked by the door control mechanism.
- 35.3 The passenger area air conditioning vehicle shall be A/C Carrier Model AC 553MAX, 67,000 BTU/hr supplied system. The system shall be separately controlled from a supplemental driver's control panel located at the driver's position. Controls shall include on and off, three (3) speed blower switch and a rotary thermostat switch.
- 35.4 Front and rear systems shall operate independently of each other.
- 35.8 Dual compressors shall be provided. Compressors shall have a nominal ten (10) cubic inches of displacement. The compressors shall be protected by high and low pressure switches. Compressors shall be driven off the vehicle's engine. Compressor will be tagged.

<u>Cutaway Bu</u>	ls		August	2004
35.6	Conder and mo aluminu cut out fans sh shall blo conden driver (i mainter	ondenser be, expar or low pr discharge . The con hot air. nted loca d dirt and	r fans nded into ressure line. The ndensers The ted on facilitate	
35.7	The rea speed of be rated tube, ex shall be filter. Th	ar mounted evaporator shall be a minimum of fifty two thousand (52,000) BT continuous duty permanently lubricated motors shall be provided. The blowed d at a minimum of five hundred and seventy (570) Cubic Feet per Minute. C xpanded into aluminum fins three (3) rows deep. Thermostatically controlled provided. Frame shall be galvanized heavy-duty metal with integral drain the cover shall be made of durable ABS plastic.	U rating. r assemb toil shall b expansic pan and t	Three- bly shall be copper on valve vashable
	35.7.1	Evaporator shall be equipped with two (2) independent drain lines, each wir maintain positive condensation drain flow.	h a cheol	k valve to
	35.7.2	Evaporator filter shall be installed in a manner that it may be routinely remore replaced for maintenance without damaging the filter.	ved, serv	riced, or
35.8	Installat authoriz the type	tion of the air conditioning system(s) shall be by the vehicle body manufactu zed factory air conditioning dealer who normally stocks, sells, installs and se e being furnished.	rer or by a rvices a v	an /ehicle of
	35.8.1	All air conditioning systems shall use 134A refrigerant.		
	35.8.2	The components of the air conditioning system shall be readily accessible f Refrigerant hoses shall meet the latest revision of SAE J-2064, double-brai and shall be completely enclosed in loom over their entire length to prevent refrigerant lines shall be supported at a minimum of every twelve inches (1) insulated "P" clamps. The use of insulated split "P" clamps is not acceptable	for mainte ded Barri : chafing. 2''), with f ble.	enance. ier type The ully
	35.8.3	Two (2) back-seated valves shall be installed at the dryer to facilitate evacu- charging of the ait conditioning system and replacement of the dryer vehicl shall also be equipped with Schrader valves to promote efficient testing and	iation and e. The sy d servicin	t ystem g.
	35.8,4	Refrigerant fittings shall be ATCO, Aeroquip, and (OR APPROVED EQUAL	_).	
	35.8.5	Air Conditioning Circuits shall be protected with auto-resetting circuit break relays. The total electric current required by the two (2) systems in high far shall not exceed sixty (60) amperes.	ers or the 1 speed n	ermal node
-1004	35.8.6	Poor quality of installation shall be grounds for immediate rejection of the c	omplete v	/ehicle.
35.9	Bidder locatior	shall submit data with bid that encompasses design criteria, evaporator on, condenser size and location, and performance and reliability studies of the	oil size a entire sy	nd /stem.
35.10	Air Con jamb or	nditioning System(s) shall have affixed a legible and durable nameplate post r under the hood with the following information:	ed on the	door
	35.10.1	Name, phone number, and address of A/C manufacturer, including inform compressor, condenser, and evaporator subsystems.	nation on	i the
	35.10.2	2 Cooling capacity (BTU/hr.) and blower capacity (CFM).		
		19		

Cutaway	Bus

August 2004

- 35.10.3 Type of refrigerant and recommended operating charge.
- 35.10.4 Type of refrigerant oil and amount.
- 35.11 Availability of Service and Repair Parts

Bidder shall provide a list of companies or individuals and their addresses who stock repair parts in the purchaser's area and who can perform service on the products furnished.

- 35.12 Instruction Books The bidder shall furnish one copy of complete installation, maintenance and operating instructions for each different model, size and type of equipment furnished to each purchaser. The instructions shall accompany the vehicle when delivered.
- 35.13 A replacement parts list shall be provided.
- 35.14 The entire rear air conditioning system shall be warranted for 24 months and shall cover 100% parts and labor.

### 36. HEATING AND DEFROSTING

- 36.1 Vehicle shall be equipped with a combination fresh air and recirculating air heaters. The heater controls shall be mounted in the dash panel and in the supplemental control panel, located conveniently to the driver's position and properly labeled. Heater hose connections shall be installed above the floor of the vehicle body and through the fire wall to the engine compartment. The length of the hot water hoses shall be as short as possible consistent with good installation practices; however, the hoses shall not be installed in such a manner so as to interfere with normal motor maintenance operations, such as the removal of the air filter. The hoses shall not dangle or rub against the chassis or sharp edges and shall not interfere with or restrict the operation of any motor function. Heater hose shall conform to SAE 2083, Class C, as defined in SAE Standard J20E, or latest revision thereto.
- 36.2 The front heater shall be a hot water type having a minimum free-flow output of the highest capacity offered by the chassis manufacturer.
- 36.3 A second hot water heater with blower fan shall have a BTU rating of at least thirty thousand (30,000) installed under a seat near the rear of the vehicle.
- 36.4 Easily accessible all brass gate valve(s) shall be furnished to cut off the flow of coolant water to the rear heater.
- 36.5 Defrosting equipment shall keep the windshield, the window to the left of the driver and glass in the service door clear of fog, frost, and snow, using heat from the heater and circulation from fans. All defrosting equipment shall meet the requirements of FMVSS No. 103 or latest revision thereto.

## 37.0 WINDSHIELD AND WINDOWS

- 37.1 The windshield is to be a one-piece design as is provided by the vehicle chassis manufacturer. Windshield shall be laminated, tinted safety glass.
- 37.2 Driver's window shall be chassis manufacturer's standard window. The window shall permit unobstructed side vision and shall have a sufficient opening to permit arm signaling. Provisions shall be made to draw in or exclude outside air from the driver's compartment.

#### Cutaway Bus

August 2004

- 37.3 Side windows shall be provided the full length of the vehicle. These windows shall be thirty-six inches (36") tall and twenty-four inches (24") wide, transit type upper T-slider ventilating design windows. The upper T-slider shall have a positive lock in the closed position. The glazing shall be a minimum of one eight inch (1/8") thick with thirty one percent (31%) gray density, tempered safety glass. *Tinted window film is not acceptable.* Windows shall be installed in black powdered or anodized aluminum frames with an interior clamp ring attachment design.
- 37.4 At least one (1) window on each side and the rear window of the vehicle shall be equipped with emergency release latches to provide emergency exits. Release instructions shall be provided at or near the release handles. An audible alarm shall be activated when any emergency window is opened. Emergency egress windows shall be designed to meet FMVSS 217.

## 38.0 MIRRORS

38.1 Exterior

Rearview mirrors shall be #304 stainless steel. Mirror shall be fully adjustable, a minimum of seven inches by nine inches (7" x 9"). Additionally minimum five inch (5") convex mirrors shall be mounted with brackets on the top of the main mirrors on the left and right sides.

38.2 Passenger Mirror

An additional mirror shall be furnished for the driver to view the passengers. The mirror shall have a minimum of ninety six (96) square inches of clear vision. Dimensions shall be approximately six inches (6") by sixteen inches (16") of reflective surface area.

38.3 Sun Visor

Chassis manufacturer's standard subvisor shall be provided at the driver's position.

## 39.0 SEATS AND SEAT LAYOUT

The seating arrangements and configuration will be as per the attached floor plan. All seats, excluding flip seats shall be recessed track mounted with inverted T-type pedestal support legs and hardware. Seat tracks shall be welded to the body structure and shall not rely on screws alone. Floor anchorage shall be neet and of a non-tripable design. The seat frames shall be cold roll one inch (1') steel tubing and be sixteen (16) gauge or metal of equal mechanical properties. The front seat cushions shall have foam padding and be individually wedged to each passenger for occupant's confort and retention. The indentation load deflection shall be sixty five (65) to eightly five (85) pounds. Seat cushion shall meet the flammability requirements of FMVSS-302. Seats shall be covered with Hercelon fabric or vinyl fabrics. Color combination shall be determined by the purchaser from samples provided by the bidder. All seats shall be manufactured by Freedman Seating Company, CE White, American Seating or approved equal. The agency reserves the right to pre-approve seat colors.

- 39.1 Ambulatory Passenger Seats
  - 39 1.1. Forward facing seats shall be provided that has a minimum width of seventeen and one half inches (17.5") per passenger seat.
  - 39.1.2. Passenger Seats shall have a minimum of twenty-nine inches (29") of hip to knee room.
  - 39.1.3. Aisles shall not be less than sixteen inches (16") wide.
  - 39.1.4. Aisle seats shall include an energy absorbent grab bar three quarter inch (%'), twenty (20) gauge steel covered with custom molded, wear and vandal resistant eight (8) pound density, self-skinning polyurethane foam. Grab bar shall be located at the top of the seat frame except in the rear-most row.

Cutaway Bus August 2004						
	39,1.5.	Flat-woven fabric shall be one hundred percent (100%) polyester face shall be twenty-three (23) ounces per linear yard. Fabric shall be able minimum of two hundred and fifty thousand (250,000) double rubs (A Wyzewbeek Method). Color fastness to light shall be three hundred ( (MTCC-16-1977 Carbon Arc). Fabric shall be Level 3, puncture resis soil and stain resistance. Agency reserves the right to pre-approve all	<ul> <li>Minimum weight</li> <li>to withstand a</li> <li>STM 3597-77</li> <li>300) hours minimum tant, and treated for colors.</li> </ul>			
	39.1.6.	Vinyl material shall be expanded, thirty-six (36) ounces / linear yard m transportation grade, able to withstand a minimum of fifty thousand (5 (ASTM 3597-77 Wyzewbeek Method). Color fastness to light shall be (300) hours minimum (MTCC-16-1977 Carbon Arc). Material shall be resistant, treated for soil & stain resistance. Agency reserves the righ colors.	inimum, i0,000) double rubs : three hundred : Level 3, puncture- it to pre-approve all			
	39.1.7	Seat backs shall be high impact ABS material which are recessed to one half inches (1-1/2") of additional passenger hip to knee room	provide one and			
39.2	Flip Seats / Fol	daway Seats in Wheelchair Lift Equipped Vehictes				
	Each wheelcha position is not o devices shall be other passenge arrangements a The type of flip-	ir position will have flip-seats installed as per the floor plan for use whe occupied by wheelchairs. Flip-seats shall be provided with seat belts. S e of high quality, easy to latch and unlatch. The seats shall be of the sa er seats. The bottom of the flip-seats shall be aluminum, ABS or carpet and configuration shall be as per, the required floor plan referenced on -seat shall be indicated on the floorplan.	n the wheelchair Seat belt locking ame design as the ed. The seating the invitation for bid.			
39.3	Passenger Sea Ambulatory Pas belt assembly a	itbelts ssenger seats and wheelchair positions shall be equipped with retracta and shall be provided for each seated and wheelchair passenger. Non-I	ble "A" type one seat retractable lap belts			
	shall be provide	ed for flip and foldaway seats				
	39.3.2 Each	seat shall include retractable seat bets in which the retracting mechani Back reading and the seat bets in which the retracting mechani	sm attaches directly			
	39.3.3 Each	seat belt shall have a push button release mechanism.				
40.0	39.3:4 Final a seat, I made	approval of the interior layout including passenger seating, wheelchair j location of stanchions, hand holds, driver's barrier, modesty panels, and by Agency	positions, driver's d cargo rack will be			
40.0	Driver's seat sh "Fore and Aft". an emergency be mounted to	all be an adjustable pedestal type or the platform type giving approxim Seat shall be provided with an armrest and shall recline. A three (3) looking retractor shall include a flow-through style tongue for comfort. the seat frame.	ately four inches (4'') point safety belt with The lap portion shall			
41.0	SAFETY EQUI	PMENT				
	41.1 First Aid K	(it				
	The first aid kit mounted near t	shall be a OSHA 50 First Aid Kit and a one way airway apparatus. The the driver's seat	kit shall be securely			

22

August 2004

## 41.2 Fire Extinguisher

A ten (10) pound rechargeable, type 210 ABC extinguisher with metal head, shall be bracket mounted and easily accessible near the driver's seat.

## 41.3 Web Cutters

To be provided for each vehicle and stored in the driver's compartment described in 41.9.

#### 41.4 Reflectors

Three (3) triangle reflectors with storage container shall be securely mounted near the driver seat.

#### 41.5 Back Up Alarm

Back-up alarm that is electrically operated and produces an intermittent sound when the vehicle is shifted into reverse shall be furnished to warn others during vehicle movement. Alarm shall be in compliance with SAE J994B with respect to acoustical performance for Type B device (IE107db) (A) and plus or minus 4db with a supply voltage of fourteen (14) volts.

#### 41.6 Fresnel Lens

Fresnel lenses shall be provided on the real window of the vehicle

#### 41.7 Storage Compartment

A driver's storage compartment shall be located above the driver's seat above the driver's door. The compartment shall be at least twelve inches (12") wide, twelve inches (12") tall and eight inches (8") deep.

## 42.0 EMERGENCY EXITS

- 42.1 A heavy duty emergency door shall be provided at the rear of the vehicle. The door frame structure shall consist of minimum eleven (11) gauge steel, cleaned and powder coated to match vehicle exterior base color. A water deflector shall be integrated into door frame structure at the top. Door panels shall be made of non-corrosive material. *Form core doors with wood frame supports are not acceptable.* Door panel hinges shall be plane type with a minimum three sixteenth (3/16") inch diameter pivot pin. Hinges and hinge fasteners shall be stainless steel to resist rust and corrosion. Door latch shall be vertical, rotating, two-point type with latch rod at top and bottom. The door panel shall have a key lockable latch assembly consisting of a pistol grip twist handle located at the inside center of the door panel. Door latch shall compress perimeter door seal to prevent leaks. Latch adjustment plates shall be located at the top and bottom of the door frame structure. Door panel holder shall be a gas shock type mounted at the top allowing door panels to open a minimum of one hundred degrees (100°) from the closed position. Door windows shall be installed with two (2) piece black ozone treated extruded rubber, lock and key of one (1) piece fixed design. Two windows shall be installed on the back of the vehicle, one on each side of the emergency door. The windows shall be glazed with three sixteenth (3/16") inch thick, thirty-one percent (31%) gray density, tempered safety glass. Door window height shall match the top of the emergency door.
- 42.2 A combination roof ventilator and emergency escape hatch shall be provided towards the rear of the vehicle. (Trans-Spec Ventilator Hatch, Specialty Manufacturing Co. (or approved equal)).

August 2004

## 43.0 PAINTING

The vehicle body shall be white with one eight inch (8") painted stripe (vinyl tape is not acceptable) located nine inches (9") below the windows. Color of stripe to be determined by agency at time of purchase order to vendor.

## 44.0 DECALS

Decals shall be furnished as follows:

- 44.1 "NO FOOD, DRINK, OR TOBACCO USE ALLOWED" at the centerline of hight of center on the front header.
- 44.2 "WATCH YOUR STEP" to be mounted on the front top riser step.
- 44.3 "WELCOME ABOARD" to be mounted on the front lower riser step.
- 44.4 Safety decal(s) shall be furnished and shall be affixed at any applicable area; emergericy exit, steps, wheelchair lift, etc. The vehicle shall be equipped with a sign or decal on the rear of the vehicle station "Caution Children may be exiting". The decals shall include necessary warnings and precautions. Permanent decals are required.
- 44.5 The vehicle shall display the international symbol of accessibility on the rear, left side, and on the right side of the vehicle on the lift door.
- 44.6 The maximum capacity in pounds shell be posted on the wheelchair lift within easy view of operator and wheelchair passenger.
- 44.7 Plaque or decal indicating vehicle height to be posted within easy view of the driver.

#### 45.0 DELIVERY

All vehicles must be serviced prior to delivery in accordance with the manufacturer's "New Vehicle Predelivery Service" requirements and with Part II, Paragraphs 3.3 and 3.4 of this specification.

## 46.0 REGISTRATION

Successful bidder shall provide necessary documents to enable the purchaser to register the vehicle in the State of Texas. Necessary fees and state taxes will be paid by the purchaser; do not include such fees and taxes in bid proc

## 47.0 MANUALS

A line setting sheet and manual(s) containing operating and servicing instructions for the vehicle and lift shall be provided with each vehicle. The manual(s) shall be as detailed as possible outlining all necessary operating and servicing instructions for each vehicle and lift including the vehicle's driveline components. Necessary warnings and safety precautions shall be included. In addition, manual(s) containing illustrated parts lists, operating and servicing instructions for related and special equipment supplied with the vehicle and lift shall be provided with the vehicle.

#### 48.0 WARRANTY

The vehicle shall be warranted against defects in material and workmanship for a period of not less than twelve (12) months or twelve thousand (12,000) miles, whichever occurs first and shall cover one hundred percent (100%) parts and labor for the vehicle. If the manufacturer's standard warranty exceeds twelve (12) months then the standard warranty period shall be in effect. Bidder shall furnish manufacturer's warranty to the purchaser at time of delivery.

#### Cutaway Bus

August 2004

## 49.0 PARTS AND SERVICE

The bidder providing the vehicle shall be an authorized dealer for the vehicle manufacturer and hold the required current license(s) with the Texas Motor Vehicle Commission. The dealer shall have factory-trained personnel available for warranty repairs and the performance of service. The dealer shall also maintain an inventory of high-usage parts and a quick source for low-usage parts. The using purchaser will assume the expense for replacement filters, fuel, cleaning, painting and other minor items normally consumed in day to day operations. The purchaser will assume responsibility for cost of repairs resulting from collision, theft, vandalism, operator negligence and/or acts of God.

## 50.0 INSTRUCTION ON SAFETY, OPERATION AND PREVENTIVE MAINTENANCE

The bidder shall provide the purchaser sufficient instruction on safety, operation and preventive maintenance of the vehicle after it has been delivered and is ready for operation. If the vehicle is furnished with either conversion option for liquid petroleum gas (LPG), The following additional training is required: Instruction on any changes to the information provided in the owner's manual as a result of the conversion, instruction on the care and maintenance of the conversion components. Alternative fuel instruction should be approximately two hours of fueling and vehicle operation training and four hours of diagnostic and maintenance training.

August 2004

## OPTIONAL EQUIPMENT

The below listed equipment shall be furnished when specified on the Invitation to Bid. If not specified, it is not required and should not be included in the bid price.

#### OPTION 1, 158" Wheelbase

In addition to increased seating capacity, this vehicle shall have a GVWR of 14,050 and an increased fuel capacity of 43 gas-gallon equivalence. This will be accomplished through the use of the specified 37 GGE tank and an additional tank, 12 X 38 (specialty) manufactured by the Sleegers Group, Manchester Tank, or approved equal. Engine shall be 6.8L.

## OPTION 2, 176" Wheelbase

In addition to increased seating capacity, this vehicle shall have a GVWR of 14,050 and increased fuel capacity of 50 gas-gallon equivalence. This will be accomplished through the use of the specified 37 GGE tank and an additional tank, 12 X 50 SEUO manufactured by the Sleegers Group, Manchester Tank, or approved equal. Engine shall be 6.8L.

OPTION 3, Larger Engine Engine shall be 6.8L.

#### **OPTION 4, Clean Diesel - LEV (low emission vehicle) Certification**

6.0 L Powerstroke® Diesel Engine (or approved equal). The requirements of section 6.1 & 6.2 are waived if this option is selected. The vehicle shall be equipped with a 55 gallon tank if this option is selected.

OPTION 5, Clean Diesel ULEV (ultra low emission vehicle) Certification

6.0 L Powerstroke® Diesel Engine (or approved equal) and the exhaust system shall be equipped with a particulate trap. A list of approved retrofit products can be found at the EPA web site: http://www.epa.gov/otag/retrofit/retroverifeedist.htm

This option should be selected if the vehicle will be operated in an area of air quality non-attainment.. (Note: EPA list is provided as a reference for particulate traps only.) The requirements of section 6.1 & 6.2 are waived with the selection of this option. The vehicle shall be equipped with a 55 gallon tank if this option is selected.

## **OPTION 6, COMMON KEYING**

All vehicles shall be keyed alike, with the same key operating the driver's door and ignition switch on all vehicles. One key shall operate all remaining locks on all vehicles, (excluding fare box keys). There shall be a maximum of two (2) keys to gain access and operate the vehicle. Bidder will supply two (2) complete sets of keys for each vehicle ordered

## **OPTION 7, CRUISE CONTROL DELETE**

For agencies that do not want the standard cruise control due to safety concerns, this feature shall not be installed on the vehicle.

#### OPTION 8, reserved

#### **OPTION 9, WHEEL INSERTS**

Four (4) stainless steel, bolt-on wheel inserts shall be provided. The set shall be installed on the front wheels and rear dual wheels and be complete with all lug nut covers and centerpieces. *Clip-type securement of wheel inserts are not acceptable*.

August 2004

## OPTION 10, REAR BUMPER

Rear bumper shall be black "Help" energy absorbent bumper as produced by Romeo Rim, Inc. (or approved Equal) and shall be equipped with an anti-ride feature. Bumpers shall be securely fastened to the chassis frame to adequately absorb shock from impact. In no case are the bumpers to be fastened directly to the body and allow shock from impact to be transmitted to the body of the vehicle.

## **OPTION 11, INTERIOR READING LIGHTS**

Interior reading lighting shall be provided in the passenger area mounted in the overhead luggage bins. Lighting intensity for each seat shall have a minimum average of fifteen (15) foot candles at the seated passenger reading plane. The lighting components shall be located and constructed so as to prevent the entrance of water, contaminants and insects. Lighting fixtures shall be operated by an on/off switch at each fixture as well as an override in the master control panel near the driver for override operation by the driver.

#### **OPTION 12, Reserved**

#### **OPTION 13, REMOTE CONTROLLED MIRRORS**

Mirrors shall be remote controlled. The mirror glass shall be nine and three-quarters inch (9-3/4") in height by eight and five-eighths inch (8-5/8") in width. All parts including the mirror glass shall be replaceable. A remote control switch shall be provided and located in the operator's compartment, switch must be capable of controlling both right and left mirrors. Example: Ramco Mirrors Model #5500 w/o defrost feature.

## OPTION 14, HIGHBACK PASSENGER SEATS

In lieu of the mid back seats with ABS seat backs and padded grab handles specified in paragraph 23.0, High back reclining passenger seats with an armrest on each seat shall be furnished for each of the seated passengers. All of the other requirements specified in paragraph 23.0 shall be provided.

## **OPTION 15, COMMUTER SEATING PACKAGE**

The seating arrangements and configuration will be as per the attached floor plan. All seats shall be recessed track mounted with stainless steel inverted T-type pedestal support legs and hardware. The seats shall be high back reclining with footrest and acjustable fold down armiest on each seat. The armrest, recliner mechanism and setback cushion shall boil directly to the seat trame. The front seat cushions shall have foam padding and be individually wedged to each passenger for occupent's comfort and retention. **Example: Freedman Coach Seat (OR APPROVED EQUAL)**.

## **OPTION 16, UPGRADED DRIVER'S SEAT**

A Magnum 200 (or approved equal) driver's seat provided by Freedman seating, or other supplier. A three (3) point safety belt shall be mounted to the seat frame and shall be equipped with an emergency locking retractor that has a feature that prevents it from progressively tightening the belt around the driver. Seat material shall be the same as the passenger seats.

## OPTION 17, ELECTRIC POWERED PASSENGER ENTRY DOOR

In lieu of the manual door in paragraph 29.5, the passenger entry door panels shall be actuated together by a single electric powered overhead actuator. Actuator shall be equipped with an emergency manual release lever to allow manual opening in case of an emergency.

## **OPTION 18, LIFT PLATFORM COVER**

Removable vinyl cover shall be provided for lift platform when in stored position.

August 2004

## OPTION 19, DESTINATION SIGNS (REQUIRED ON FIXED ROUTE BUSES)

Changeable Destination twelve (12) volt motor driven movable mechanism signs shall be furnished on the curb side above the passenger window and at the front of the vehicle above the windshield. Front sign curtain to be approximately 36 inches wide. Sign curtains to be illuminated. Front bulkhead or sign box shall have door to open for viewing sign curtain position. Door shall be positioned for ease of driver operation. Sign shall comply with ADA requirements. Example: Trans Sign, Model D-3110, or approved equal.

### OPTION 20, PUBLIC INFORMATION SYSTEM (REQUIRED ON FIXED ROUTE BUSES over 22 feet long)

Driver activated PIS to announce stops and other passenger information. The system stall include four (4) speakers spaced throughout the vehicle above the passenger seating area enabling sound to reach each passenger. The system shall be integrated with AM/FM radio system so that the PIS will override the radio when activated.

## OPTION 21, STOP REQUEST CHIME (REQUIRED ON FIXED ROUTE BUSES over 22 feet long)

A chime shall be provided that is activated by a pull cord. The pull cord shall be above the passenger windows within reach of each passenger.

## **OPTION 22, AM/FM RADIO & CASSETTE PLAYER**

Radio shall be a standard brand AM/FM transistor radio with cassette player. Antenna shall be furnished & mounted.

## **OPTION 23, FAREBOX**

Fare box shall be mounted with trip handle toward driver, it shall be mounted on a stanchion, adequately braced, located near the driver and easily accessible to passengers entering bus. An amber or indirect fare box light shall be connected to the dash instrument lights. Two interchangeable, lockable fare box vaults and fare box, keyed alike, with a double set of keys for each lock shall be supplied. Vault and fare box exteriors shall be marked with key reference. Vehicle shall be provided with wining and structural support to install the fare box. Wiring for fare box circuit shall be two (2) No. 14 insulated wires in vinyi ubing, one energized directly from a battery positive feed protective circuit breaker and the other to ground.

Example: Main Fare box Model Treasury 1, Diamond, (or approved equal)

## **OPTION 24, PLEXIGLASS PANEL**

A smoked Plexiglas 3/8 inch thick panel behind driver from top of driver's seat to within 6 inches of ceiling to be provided. Stanchion and panel shall not impair driver's seat adjustment.

## OPTION 25, GROUND PLANE

A ground plane shall be installed during construction of the vehicle in anticipation of installation of a twoway racio. Coaxial feads shall be furnished. For additional information, contact the ordering agency.

## **OPTION 26, BILINGUAL SIGNS & DECALS**

All safety and passenger assistance signs and decals shall also be provided in Spanish.

### **OPTION 27, EXTERIOR SIGN RACKS**

Standard anodized aluminum ad racks measuring thirty inches (30") by ninety-six inches (96") shall be mounted on the left side of each vehicle.

August 2004

## **OPTION 28, INTERIOR AD RACKS**

Interior Ad Racks will be provided on each side of the vehicle interior. Racks will allow for slide-in placement of advertising copy and accommodate a minimum of nine (9), 11" x 14" plastic placards with advertising messages on EACH SIDE. Racks are not required to be back-lit but will be adequately illuminated for visibility of messages to passengers at all times.

OPTION 29, INTERLOCK MONITOR

In addition to the required interlock system, vehicle shall be equipped with a dash-mounted display panel provided by Intermotive Products which assists the operator in diagnosing interlock problems. This will require the use of the Intermotive Products interlock system.

OPTION 30, MorRyde Suspension An enhanced rear suspension, (MorRyde or approved equal) will be provided.

OPTION 31, QRT Deluxe Wheel Chair Securement In lieu of the specified securement system, the QRT deluxe model (8100 series) (or approved equal) will be provided..

OPTION 32, Sure Lok RTT System

In lieu of the specified securement system, the Sure Lok Rapid Transit Tie-Down (RTT) system (or approved equal) will be provided.

OPTION 33, Child Safety Restraint Systems

This option should be selected by any agency providing Head Start transportation services in accordance with 45 CFR1310.2. The vehicle shall be equipped for the use of height- and weight –appropriate child safety restraint systems.

# Florida DOT Price Escalation Formula (2015)

Florida Department of Transportation Public Transit Office

Part 1

# EXHIBIT 5

## FORMULA FOR COMPUTATION OF SECOND STAGE PRICE ESCALATION

Escalation will be calculated based on the following formula which utilizes the U.S. Department of Labor/Bureau of Labor Statistics Producer Price Index (PPI) (Industry) Category PCU3362113362117 "Buses and Firefighting vehicles, complete, produced on purchased chassis:" \*\*\*, not seasonally adjusted. In no event will the prices for any purchase release exceed, by more than 5%, the price(s) that would have been in effect twelve (12) months prior to the date of the release or the base price of the purchase order release if less than twelve (12) months after the initial contract award.

Index Point Change PPI Index: Future Recomp Month			Examples			
I ese PPI Indey: Base Award Month						
Equals Index Point Change						
Index Percent Change Index Point Change			Examples 3.5			
Divided by PPI Index: Base Award Month						
Equals			0.0254			
Results multiplied by 100 equals Percent Change						
Total price of standard bus	=	\$42,850.00				
Minus price of chassis	=	\$27,050.00				
Equals total second stage price	=	\$15,800.00				
"Certain Dollar Amount" =	led by 100					
Certain Dollar Amount =	15,8	00 / 100 = 158				

Price of second stage will change \$158.00 per 1 percent movement in the producer price index (PPI)

In this example, 2.54% times \$158.00 equals \$401.32. This could be added to the total cost of the add-ons per bus. Chassis increase would be added separately per instructions in Section 1.2. Once recompilation of second stage pricing is completed, the last recomp month becomes the new award month.

\*\* = If discontinued, Category PCU3362113362119 "other Trucks/vehicles, complete, produced on purchased chassis:" will be used.

<u>NOTE:</u> These figures provided for illustrative purposes only.

TRIPS-15-CA-RFP

62

February 2015