1.6 GENERAL DIMENSIONS

• Wheelchair Lift Location (As Applicable)	Behind rear axle, curbside
• Wheelchair Ramp Location (As Applicable)	Behind front axle, curbside
• Lifting Capacity	1000 lbs. Minimum
• Static load	2,400 lbs. Minimum
• Wheelchair envelope	30"x 54" Minimum
• Aisle Width	17.5" Minimum
• Height Overall, including all protrusions	120” Max
• Interior Height	78" (74” for Flat Floor Option) (75" for the SRW only)
• Passenger Door Width – clear opening width	32” Minimum (30” for the SRW only)
• Door Height- clear opening height	79” Minimum
• Ground Clearance excluding axles	10" Minimum
• Height of First Step - front door	12.5” Maximum
• Step Risers	10" Maximum
• Service Life	7 years or 200,000 miles
• Service Life (Type 1A & 7A only)	5 years or 150,000 miles
• Service Life (Type 8A only)	4 years or 100,000 miles

1.7 VEHICLE TYPES

- Type 1A - 138" Wheelbase, Single Rear Wheel (SRW) with 4/2 seating, Gas Engine
- Type 2A - 138" Wheelbase, Dual Rear Wheel (DRW) with 8/2 seating, Gas Engine
- Type 3A – 158" Wheelbase, Dual Rear Wheel (DRW) with 12/2 seating, Gas Engine
- Type 3B – 158" Wheelbase, Dual Rear Wheel (DRW) with 12/2 seating, Battery Electric
- Type 4A – 178" Wheelbase, Dual Rear Wheel (DRW) with 16/2 seating, Gas Engine
- Type 4B – 178" Wheelbase, Dual Rear Wheel (DRW) with 16/2 seating, Battery Electric
- Type 5A – 165” Wheelbase, Low Floor with 12/2 Seating, Gas Engine
- Type 5B - 191” Wheelbase, Low Floor with 14/2 Seating, Gas Engine
- Type 5C - 210” Wheelbase, Low Floor with 16/2 Seating, Gas Engine
- Type 6A – 212” Wheelbase, Low Floor with 14/2 Seating, Battery Electric
- Type 7A – 180” Wheelbase, ProMaster 3500 Low Floor with 10/2 seating, Gas Engine
- Type 8A - 178" Wheelbase, Ford Transit Low Floor with 10/2 seating, Gas Engine

1.7.1 Type 1A – 138" Wheelbase, Single Rear Wheel (SRW) with 4/2 seating, Gas Engine

1.7.1.1 The chassis shall be a Ford E-350 SRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.1.2 The engine shall be a 7.3 Liter V-8 with 325 HP and 450 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.1.3 Capacities

• Seated Passenger Capacity	4 Minimum (not including the driver)
• Wheelchair Positions	2 Minimum
• Front Axle	4,000 lbs., Minimum
• Rear Axle	7,000 lbs., Minimum

- Gross Vehicle Weight Rating 10,050 lbs., Minimum
- Fuel Capacity 40 Gallons Minimum

1.7.1.4 Dimensions

- Wheelbase 138”
- Overall Length (bumper to bumper) 260" Maximum
- Rear Overhang 80" Maximum
- Width Overall, excluding mirrors 98" Maximum
- Body Width 80” Minimum
- Interior Width (Measured 12-24” above floor) 77" Minimum
- Wheels 16" x 7" Minimum
- Tires LT245/75R16, Load Range E Minimum

1.7.1.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.2 Type 2A - 138" Wheelbase, Dual Rear Wheel (DRW) with 8/2 seating, Gas Engine

1.7.2.1 The chassis shall be a Ford E-350 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.2.2 The engine shall be a 7.3 Liter V-8 with 325 HP and 450 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.2.3 Capacities

- Seated Passenger Capacity 8 Minimum (not including the driver)
- Wheelchair Positions 2 Minimum
- Front Axle 4,100 lbs., Minimum
- Rear Axle 7,275 lbs., Minimum
- Gross Vehicle Weight Rating 11,500 lbs., Minimum
- Fuel Capacity 40 Gallons Minimum

1.7.2.4 Dimensions

- Wheelbase 138-139”
- Overall Length (bumper to bumper) 266" Maximum
- Rear Overhang 96" Maximum
- Width Overall, excluding mirrors 98” Maximum
- Body Width 84” Minimum
- Interior Width (Measured 12-24” above floor) 79" Minimum
- Wheels 16" x 6" Minimum
- Tires LT225/75/16, Load Range E Minimum

1.7.2.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.3 Type 3A – 158" Wheelbase, Dual Rear Wheel (DRW) with 12/2 seating, Gas Engine

1.7.3.1 The chassis shall be a Ford E-450 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.3.2 The engine shall be a or 7.3 Liter V-8 with 325 HP and 450 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.3.3 Capacities

- Seated Passenger Capacity — 12 Minimum (not including the driver)
- Wheelchair Positions — 2 Minimum
- Front Axle — 4,600 lbs., Minimum
- Rear Axle — 9,600 lbs., Minimum
- Gross Vehicle Weight Rating — 14,200 lbs., Minimum
- Fuel Capacity — 55 Gallons Minimum

1.7.3.4 Dimensions

- Wheelbase — 158-159”
- Overall Length (bumper to bumper) — 290" Maximum
- Rear Overhang — 100" Maximum
- Width Overall, excluding mirrors — 102” Maximum
- Body Width — 90” Minimum
- Interior Width (Measured 12-24” above floor) — 85" Minimum
- Wheels — 16" x 6" Minimum
- Tires — LT225/75R16, Load Range E Minimum

1.7.3.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.4 Type 3B – 158” Wheelbase, Dual Rear Wheel (DRW) with 12/2 seating, Battery Electric

1.7.4.1 The chassis shall be a Ford F-450 or GM 4500 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.4.2 The vehicle shall be powered by a battery electric Propulsion System. The Propulsion System shall be specifically adapted for cutaway bus duty cycle that includes heavy stop-and-go transit service. In addition to power required for propulsion, sufficient excess power shall be available to operate all accessories at their normal operating condition throughout the cutaway bus duty cycle.

1.7.4.3 Capacities

- Seated Passenger Capacity — 12 Minimum (not including the driver)
- Wheelchair Positions — 2 Minimum
- Front Axle — 4,600 lbs., Minimum
- Rear Axle — 9,600 lbs., Minimum
- Gross Vehicle Weight Rating — 14,200 lbs., Minimum
- Battery Capacity — 120 kWh Minimum
- Driving Range — 125 miles, Minimum

1.7.4.4 Dimensions

- Wheelbase — 158/159” Nominal
- Overall Length (bumper to bumper) — 320" Maximum
- Rear Overhang — 103" Maximum
- Width Overall, excluding mirrors — 102” Maximum
- Body Width — 90” Minimum
- Interior Width (Measured 12-24” above floor) — 85" Minimum

- Wheels 16" x 6" Minimum
- Tires LT225/75R16, Load Range E Minimum

1.7.4.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.5 Type 4A - 176" Wheelbase, Dual Rear Wheel (DRW) with 16/2 seating, Gas Engine

1.7.5.1 The chassis shall be a Ford E-450 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.5.2 The engine shall be a 7.3-Liter V-8 with 325 HP and 450 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.5.3 Capacities

- Seated Passenger Capacity 16 Minimum (not including the driver)
- Wheelchair Positions 2 Minimum
- Front Axle 4,600 lbs., Minimum
- Rear Axle 9,600 lbs., Minimum
- Gross Vehicle Weight Rating 14,200 lbs., Minimum
- Fuel Capacity 55 Gallons Minimum

1.7.5.4 Dimensions

- Wheelbase 176-190”
- Overall Length (bumper to bumper) 317" Maximum
- Rear Overhang 97" Maximum
- Width Overall, excluding mirrors 102” Maximum
- Body Width 90” Minimum
- Interior Width (Measured 12-24” above floor) 85" Minimum)
- Wheels 16" x 6" Minimum
- Tires LT245/75R16, Load Range E Minimum

1.7.5.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.6 Type 4B – 178” Wheelbase, Dual Rear Wheel (DRW) with 16/2 seating, Battery Electric

1.7.6.1 The chassis shall be a Ford F-450 or GM 4500 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.6.2 The vehicle shall be powered by a battery electric Propulsion System. The Propulsion System shall be specifically adapted for cutaway bus duty cycle that includes heavy stop-and-go transit service. In addition to power required for propulsion, sufficient excess power shall be available to operate all accessories at their normal operating condition throughout the cutaway bus duty cycle.

1.7.6.3 Capacities

- Seated Passenger Capacity 16 Minimum (not including the driver)
- Wheelchair Positions 2 Minimum
- Front Axle 4,600 lbs., Minimum
- Rear Axle 9,600 lbs., Minimum

- Gross Vehicle Weight Rating 14,200 lbs., Minimum
- Battery Capacity 120 kWh Minimum
- Driving Range 125 miles, Minimum

1.7.6.4 Dimensions

- Wheelbase 178-179”
- Overall Length (bumper to bumper) 330" Maximum
- Rear Overhang 117" Maximum
- Width Overall, excluding mirrors 103” Maximum
- Body Width 90” Minimum
- Interior Width (Measured 12-24” above floor) 85" Minimum
- Wheels 16" x 6" Minimum
- Tires LT225/70R16, Load Range E Min.

1.7.6.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.7 Type 5A - 165” Wheelbase, Low Floor DRW with 12/2 Seating, Gas Engine

1.7.7.1 The chassis shall be a GM 4500 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.7.2 The engine shall be a 6.6-Liter V-8 with 400 HP and 450 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.7.3 Capacities

- Seated Passenger Capacity 12 Minimum (not including the driver)
- Wheelchair Positions 2 Minimum
- Front Axle 4,600 lbs., Minimum
- Rear Axle 9,600 lbs., Minimum
- Gross Vehicle Weight Rating 14,200 lbs., Minimum
- Fuel Capacity 55 Gallons Minimum

1.7.7.4 Dimensions

- Wheelbase 165” Minimum
- Overall Length (bumper to bumper) 291" Maximum
- Rear Overhang 97" Maximum
- Width Overall, excluding mirrors 102” Maximum
- Body Width 96” Minimum
- Interior Width (Measured 12-24” above floor) 90" Minimum)
- Wheels 16" x 6" Minimum
- Tires LT225/75R16, Load Range E Minimum

1.7.7.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.8 Type 5B – 191” Wheelbase, Low Floor DRW with 14/2 seating, Gas Engine

1.7.8.1 The chassis shall be a GM 4500 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.8.2 The engine shall be a 6.6-Liter V-8 with 400 HP and 450 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.8.3 Capacities

- Seated Passenger Capacity — 14 Minimum (not including the driver)
- Wheelchair Positions — 2 Minimum
- Front Axle — 4,600 lbs., Minimum
- Rear Axle — 9,600 lbs., Minimum
- Gross Vehicle Weight Rating — 14,200 lbs., Minimum
- Fuel Capacity — 55 Gallons Minimum

1.7.8.4 Dimensions

- Wheelbase — 191”
- Overall Length (bumper to bumper) — 315" Maximum
- Rear Overhang — 100" Maximum
- Width Overall, excluding mirrors — 103” Maximum
- Body Width — 96” Minimum
- Interior Width (Measured 12-24” above floor) — 90" Minimum
- Wheels — 16" x 6" Minimum
- Tires — LT225/75R16, Load Range E Min.

1.7.8.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.9 Type 5C – 210” Wheelbase, Low Floor DRW with 16/2 seating, Gas Engine

1.7.9.1 The chassis shall be a GM 4500 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.9.2 The engine shall be a 6.6-Liter V-8 with 400 HP and 450 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.9.3 Capacities

- Seated Passenger Capacity — 16 Minimum (not including the driver)
- Wheelchair Positions — 2 Minimum
- Front Axle — 4,600 lbs., Minimum
- Rear Axle — 9,600 lbs., Minimum
- Gross Vehicle Weight Rating — 14,200 lbs., Minimum
- Fuel Capacity — 55 Gallons Minimum

1.7.9.4 Dimensions

- Wheelbase — 210”
- Overall Length (bumper to bumper) — 336" Maximum
- Rear Overhang — 117" Maximum
- Width Overall, excluding mirrors — 103” Maximum
- Body Width — 96” Minimum
- Interior Width (Measured 12-24” above floor) — 90" Minimum
- Wheels — 16" x 6" Minimum

- Tires LT225/75R16, Load Range E Min.

1.7.9.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.10 Type 6A – 212" Wheelbase, Low Floor DRW with 14/2 seating, Battery Electric

1.7.10.1 The chassis shall be a Ford E-450 DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.10.2 The vehicle shall be powered by a battery electric Propulsion System. The Propulsion System shall be specifically adapted for cutaway bus duty cycle that includes heavy stop-and-go transit service. In addition to power required for propulsion, sufficient excess power shall be available to operate all accessories at their normal operating condition throughout the cutaway bus duty cycle.

1.7.10.3 Capacities

- Seated Passenger Capacity 14 Minimum (not including the driver)
- Wheelchair Positions 2 Minimum
- Front Axle 4,600 lbs., Minimum
- Rear Axle 9,600 lbs., Minimum
- Gross Vehicle Weight Rating 14,500 lbs., Minimum
- Battery Capacity 113 kWh Minimum
- Driving Range 125 miles, Minimum

1.7.10.4 Dimensions

- Wheelbase 212"
- Overall Length (bumper to bumper) 324" Maximum
- Rear Overhang 96" Maximum
- Width Overall, excluding mirrors 108" Maximum
- Body Width 100" Minimum
- Interior Width (Measured 12-24" above floor) 97" Minimum
- Wheels 16" x 6" Minimum
- Tires LT225/70R16, Load Range E Min.

1.7.10.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.11 Type 7A – 180" Wheelbase, ProMaster 3500 Low Floor with 10/2 seating, Gas Engine

1.7.11.1 The chassis shall be a Ram ProMaster 3500 Front Wheel Drive cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.11.2 The engine shall be a 3.6-Liter V-6 with 276 HP and 250 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.11.3 Capacities

- Seated Passenger Capacity 10 Minimum (not including the driver)
- Wheelchair Positions 2 Minimum
- Front Axle 3,800 lbs., Minimum
- Rear Axle 5,600 lbs., Minimum

- Gross Vehicle Weight Rating 9,350 lbs., Minimum
- Fuel Capacity 24 Gallons Minimum

1.7.11.4 Dimensions

- Wheelbase 179” Minimum
- Overall Length (bumper to bumper) 276" Maximum
- Rear Overhang 96" Maximum
- Width Overall, excluding mirrors 108” Maximum
- Body Width 96” Minimum
- Interior Width (Measured 12-24” above floor) 89" Minimum
- Wheels 16" x 6" Minimum
- Tires LT225/70R16, Load Range E Min.

1.7.11.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.12 Type 8A – 178” Wheelbase, Ford Transit Low Floor with 10/2 seating, Gas Engine

1.7.12.1 The chassis shall be a Ford Transit T-350HD DRW cutaway chassis, or approved equal chassis, that meets the requirements for service life and the requirements below for capacity and dimensions.

1.7.12.2 The engine shall be a 3.5-Liter Eco-Boost V-6 with 310 HP and 400 lb.-ft. torque, *minimum*, or approved equal engine that meets the power and performance requirements specified herein.

1.7.12.3 Capacities

- Seated Passenger Capacity 10 Minimum (not including the driver)
- Wheelchair Positions 2 Minimum
- Front Axle 4,630 lbs., Minimum
- Rear Axle 7,000 lbs., Minimum
- Gross Vehicle Weight Rating 11,000 lbs., Minimum
- Fuel Capacity 25 Gallons Minimum

1.7.12.4 Dimensions

- Wheelbase 178” Minimum
- Overall Length (bumper to bumper) 300" Maximum
- Rear Overhang 96" Maximum
- Width Overall, excluding mirrors 108” Maximum
- Body Width 96” Minimum
- Interior Width (Measured 12-24” above floor) 89" Minimum
- Wheels 16" x 6" Minimum
- Tires LT205/70R16, Load Range C Min.

1.7.12.5 The length of the vehicle shall be the minimum necessary to satisfy the specified seating configurations of this specification while meeting all applicable FMVSS requirements and chassis manufacturer requirements for weight distribution.

1.7.13 The wheelbase and GVWR for each vehicle type shall be selected to carry the driver, seated passengers, wheelchair, and bus body loads without exceeding the manufacturers’ recommended axle, wheel assembly and tire loads.

2 AXLES

2.1 The front and rear axles shall have a minimum gross axle weight rating (GVWR) to meet the minimum GVWR and vehicle load requirements for each vehicle type.

2.2 The rear axle ratio shall be appropriate for the GVWR to meet performance requirements.

3 SUSPENSION

3.1 The minimum RV/commercial cutaway van chassis Gross Vehicle Weight Rating (GVWR) shall be no less than specified in the vehicle types.

3.2 The vehicle shall be equipped with the manufacturer's heavy-duty handling package.

3.3 The vehicle shall be equipped with both front and rear stabilizer bars, if available from the OEM.

3.4 The heaviest duty springs, shock absorbers, wheel bearings, hubs, and spindles available for the GVWR shall be provided.

3.5 Springs shall be heavy-duty type front and rear. Front and rear springs shall have a capacity rating of at least the rating of the axles.

3.5.1 As an option, a MORryde RS Suspension System shall be provided for the rear axle, where available.

3.6 Shock absorbers shall be double acting heavy-duty front and rear, with minimum 1-3/8 inch diameter and sufficient capacity to stabilize the loaded vehicle.

3.7 The drive shaft shall be guarded to prevent it from striking the floor of the vehicle or the road and shall meet all MDOT requirements.

4 WHEELS AND TIRES

4.1 Vehicles shall be equipped with the chassis manufacturers heaviest duty steel disc, OEM white (inside and out), as required for each vehicle type. Aluminum wheels are acceptable.

4.2 Vehicles are to be equipped with tubeless, all-season, steel belted radial tires of *minimum* size as specified for each vehicle type.

4.3 One (1) full size spare tire supplied by the original equipment manufacturer (OEM), mounted on a steel disc, OEM white (inside and out) wheel, shall be provided for each vehicle.

4.4 All wheels and tires are to be interchangeable.

4.5 A Tire Pressure Monitoring System (TPMS) shall be installed as standard equipment, if available from the OEM.

5 GAS ENGINE

5.1 Engine shall be heavy-duty truck-type low emissions gasoline engine. The best available valve seats, exhaust valves and valve rotators are required. Engine shall be equipped with ETC Electronic Throttle Control and Automatic Start-Stop Technology, where available from the OEM.

5.2 The engine displacement shall be as required to meet the performance requirements for each vehicle type. All gas engines shall be compliant with EPA Clean emission standards at the time of manufacturing and ***be prepped for propane conversion,*** where available.

5.3 The engine shall be furnished with a large capacity full flow oil filter of the spin-on type. The filter shall be easily reached and replaced without removal of any major component in addition to an auxiliary oil cooler mounted in front of the engine behind the grill to help the engine oil maintain proper operating temperature, preventing oxidation and increasing the oil’s lubricating and protecting properties.

5.4 A dry-type air cleaner must be provided.

5.5 The engine compartment shall have an inside hood release/locking device.

5.6 The engine and exhaust system must meet all applicable federal standards for noise level and emissions. The exhaust shall be routed to the rear street side.

5.7 A sound reduction package from the OEM shall be included with the engine and shall be provided to include dash sound/heat absorption, external engine cover insulator and instrument panel insulation.

5.8 Chassis shall be equipped with the OEM speed control (road speed governor), preset by the chassis OEM to a maximum speed of 65 mph. An Intermotive Speed Sentinel II Programmable Road Speed Limiter or Approved Equal system that will provide the required speed limitation, shall be provided when an OEM speed control is not available.

5.9 A driver adjustable cruise control shall not substitute for the road speed governor requirement.

5.10 An automatically engaging "engine fast-idle" system with a manual override button shall be installed in the dash area or in a separate panel within easy reach of the seated driver.

5.11 A fuel line water separator and engine block heater shall be provided for the diesel engine option.

5.12 A chassis manufacturer's auxiliary engine oil cooler shall be provided. Aftermarket oil cooler shall not be accepted.

5.13 Contractor shall provide pricing for chassis manufacturers hand-held diagnostic data reader kit for reading trouble codes stored in ECM memory and for providing operating information about the engine. An aftermarket handheld diagnostic reader is acceptable if it performs the same functions as the OEM diagnostic reader. The diagnostic data reader shall also be capable of diagnosing the electronically controlled transmission. The kit shall include instruction manuals with codes, hookup cables and appropriate software to properly diagnose the bus.

5.14 Ford OEM-Grade telematics software shall be provided as standard equipment integrating vehicle data with the end users existing telematics service provider or their IT system. The software shall be simple to use, easy to configure, maximize vehicle availability and utilization and optimize operating costs.

5.15 A Fleet Telematics Modem shall be provided on-board for communication of vehicle data to the end users maintenance system.

6 TRANSMISSION (As Applicable)

6.1 The transmission shall be a multiple-speed (6, 8, 9 or 10) heavy-duty, fully automatic, electronically controlled unit with overdrive.

6.2 The transmission shall be equipped with an auxiliary transmission fluid cooler to maintain a safe operating temperature under all operating and load conditions, including stop-and-go driving conditions. The transmission cooler shall be the largest size available and installed by the OEM. All connections shall be made with threaded fittings and flared stainless steel tubing.

6.3 A transmission over-heat sensor connected to a warning light mounted in the driver's compartment shall be provided. Sensor shall activate at a temperature 5°F below the manufacturer specified maximum safe operating temperature. The built in OEM Warning Light is acceptable.

6.4 The transmission shift lever shall be interlocked with the starting motor to prevent engagement of the starter in any gear position other than neutral or park.

6.5 The transmission shift lever shall be interlocked to prevent shifting from 'Park' without the brake pedal being pressed.

6.6 The transmission shall be installed such that it is possible to remove the transmission as a unit without disturbing the engine or final drive.

7 STEERING

7.1 Vehicle shall be equipped with factory-installed power steering and an auxiliary power steering fluid cooler. Where possible, all connections shall be made with threaded fittings and flared stainless steel tubing.

7.2 Steering wheel shall be adjustable position tilt type.

8 FUEL AND EXHAUST SYSTEM

8.1 Total usable fuel capacity shall be as specified for each vehicle type.

8.2 Fuel tank(s) shall be constructed of welded steel or hardened plastic and equipped with a safety blow out plug per I.C.C. regulations and with all protective heat shields. Fuel tank shall meet FMVSS standard 301 and FMCSR 393.67.

8.3 Fuel line shall be equipped with an engine-mounted fuel filter with replaceable elements to remove particles 2 microns and larger in diameter, if available from the OEM.

8.4 Fuel cap, if equipped, shall be attached to the vehicle body or fuel tank fill tube by means of a tether or chain. Capless system is preferred.

8.5 Exhaust tail pipe shall conduct the exhaust gases from the muffler to an outlet with stainless steel or aluminized deflector directed to the rear street side of the vehicle. The exhaust outlet shall terminate behind the rear wheel and forward of the rear bumper. Exhaust tail pipe shall be properly installed with heat shields on vibration attenuation mounts and not exhaust directly under a window.

9 BRAKES

9.1 Brakes provided must feature a 4-wheel disc anti-lock braking system, power assisted, heavy-duty hydraulics, self-adjusting and must be rated to correspond to the GVWR of the chassis.

9.2 The braking system shall comply with FMVSS 105 and FMVSS 106.

9.3 Brakes shall conform to all Federal and Maryland Vehicle Safety Standards.

9.4 Parking brake shall be OEM standard mechanical system.

9.5 There shall be a parking brake warning light on the dashboard.

9.6 Routing of brake lines shall be such as to minimize corrosion from road salt, other chemicals and road hazards. Lines shall be sufficiently separated so that simultaneous failure due to accidental damage or debris impact is unlikely to occur.

9.7 Regenerative Braking (Battery Electric)

9.7.1 The vehicle shall have a regenerative braking system to aid in the reduction of wear on the brakes and to help extend the range and efficiency of the vehicle through energy recapture. The vehicle will employ regenerative braking as the accelerator pedal is completely released. Regenerative braking shall be additionally increased as the brake pedal is applied.

9.7.2 Actuation of Anti-Lock Braking System (ABS) and / or Automatic Traction Control (ATC) shall override the operation of regenerative brake. A manual override switch shall be provided on the dashboard to allow the vehicle operator to disable regenerative braking.

9.7.3 The regenerative braking system shall include a means of maintaining dynamic braking (braking retardation) as the High Voltage Battery approaches 100% SOC, i.e., designed to prevent overcharging of the High Voltage Battery.

10 COOLING SYSTEM

10.1 The radiator shall be the heaviest duty available from the chassis manufacturer and shall be equipped with a surge or overflow tank (coolant recovery kit) designed so that the coolant, propylene glycol with supplemental coolant additives (SCA) expelled is saved and restored to the cooling system.

10.2 The cooling system must provide adequate engine cooling at 100°F ambient temperature with air conditioner(s) on.

10.3 Vehicle to be provided with propylene glycol with SCA's, all season coolant, to protect cooling system to -20°F.

11 CRASHWORTHINESS

11.1 The vehicle body and roof structure shall withstand a minimum static load equal to 150 percent of the curb weight evenly distributed on the roof with no more than a 6-inch reduction in any interior dimension. Windows shall remain in place and shall not open under such a load.

11.2 The vehicle, at GVWL and under static conditions, shall not exhibit deformation or deflection that impairs operation of doors, windows, or other mechanical elements. Static conditions include the vehicle at rest with any one wheel on a 6-inch curb or in a 6-inch-deep hole.

11.3 All seats and seating shall meet Federal safety standards for: A) Seating system and layout B) Occupant crash protection C) Seat belt assemblies D) Seat belt assembly anchorages.

12 BODY, FRAME AND EXTERIOR

12.1 The design, materials and assembly shall result in a durable vehicle structure able to operate for the expected life span of the vehicle under normal paratransit operating conditions in the Procuring Agency's service environment.

12.2 The highest possible quality RV/commercial or cutaway van chassis is required for the vehicle understructure. The body, including the roof, shall be of sufficient strength to support the entire weight of the fully loaded vehicle on its top or side, if overturned when the vehicle is stationary (consistent with Section 11).

12.3 Body and roof support frame shall be a welded, all steel rollover cage, or steel reinforced with fiberglass reinforced panels (FRP), adequately reinforced at all joints or where stress concentrations may occur. Passenger compartment rollover cage must extend over driver's area. Offerors must provide evidence that the bus meets the requirements of Section 11, CRASHWORTHINESS with submission of engineering drawings of internal structure and certified testing laboratory results.

12.4 The sidewalls of the vehicle shall be constructed to provide an essentially straight or slightly curved vertical panel from floor to ceiling. Exterior wall panel(s) shall be durable aluminum alloy FRP or galvanized steel. The number of exterior panels shall be kept to a minimum to minimize the number of body panel seams. All exterior panels shall overlap the adjacent panels by a minimum one (1) inch, or other approved configuration, to prevent water or moisture from penetrating the exterior skin of the vehicle. All fixed exterior panels shall be closed end riveted, bonded, welded or securely fastened to the body structural members with a method approved by the MTA. No exposed metal screws shall be permitted.

12.4.1 Where applicable, sidewall structure shall be adequately reinforced to support attachment of wheelchair-related securements, seat belts and shoulder harnesses.

12.5 The roof shall be constructed so that there will be a minimum of 78 inches of interior headroom in the entire vehicle, with the exception of the 138" SRW, which shall be 75". The interior headroom shall be a minimum of 74" when the Flat Floor option is selected. Twisting motion of the vehicle must not cause a separation at the joints of the roof and the side panels of the vehicle. The roof panel shall be constructed of a 1-piece seamless, or 2-piece with 1" minimum overlap, construction. Roof panel shall lap side panels by a minimum of 1 inch. The overlapping panel construction is to preclude water leakage into the vehicle. Panels shall be riveted, bonded or welded to the superstructure. Other methods of assembly will be evaluated provided that the Offeror submits an approved equal, clarification and/or exception form for MTA review and approval.

12.6 Minimum OEM chassis corrosion protection warranty shall be five (5) years or 100,000 miles.

12.7 The entire body frame understructure, ***with the exception of the areas prohibited by the OEM chassis manufacturer***, is to be rust proofed /undercoated at the body manufacturer's site or at a location in close proximity to this factory. Undercoating must be applied in compliance with all supplier and applicable federal standards. The interior of doors, walls, pillars, headers, all double panel areas and all their enclosed areas, including the inner surfaces of all tubular construction for the body construction, must be treated with a rust-proofing process material such as aluminum-silicon alloy, Ashland Oil Tectyl #506G, Quaker-Kote, Bilstein 2000, PPG Corashield 7972 or Z-Tech Z-Guard or approved equal coating that will provide corrosion protection for the design life of the vehicle. Holes drilled in doorposts and edges, sills, etc. for the application of the material shall be plugged with rubber, neoprene or plastic plugs. A manufacturer's certification shall be provided, stating that all components listed above have been properly coated with a corrosion inhibiting prime coating, such as zinc coating or E-coating, prior to finish coating application.

12.8 Front and rear body caps shall be constructed of fiberglass or FRP; bonded and sealed to the vehicle body by a minimum of 1-inch overlap to prevent the penetration of moisture into the interior of the vehicle body. Fiberglass caps shall be of the sturdiest construction possible to endure the entire life of the vehicle.

12.9 All bolts and rivets used in the manufacture of the body shall be high strength metal. All bolts shall be equipped with lock washers or other acceptable devices to prevent loosening under vibration. All nuts, bolts, clips washers, clamps, and like parts shall be zinc- or cadmium-plated, phosphate coated, black oxide coated, or stainless steel to prevent corrosion.

12.10 Sheet metal screws of any type shall not be used in the construction of bodies except for attaching electrical wire moldings, exterior molding trim and end caps and or light fixtures, or for interior panels which must be removed to give accessibility to other interior or concealed components.

12.11 All exposed screws and fasteners shall be painted or finished to blend in with the surrounding area.

12.12 Mud flaps shall be provided for all wheels. In the event the tires extend beyond the side of the bus body, splash aprons and fenders shall be provided. Mud flaps shall be constructed from ¼ inch thick black thermoset plastic. The mud flap may be incorporated into the running board.

12.13 A flexible, tenacious, high-quality colored caulking compound must be applied to the top of all rub rails, all unwelded metal joints, and to any place which would allow moisture to enter through the joints of the exterior panels. This does not include the fresh air intake of the heater or

the drain openings at the bottom of the rub rails. The compound shall be applied in a neat and workmanlike manner without voids or skips. Body shall be thoroughly water tested and made tight to prevent leakage.

12.14 The front bumper shall be a chrome OEM bumper. The rear bumper shall be Romeo Rim "Help" or SMI energy absorbing type or approved equal. The rear bumper shall be constructed of urethane rubber and uniformly black in color. The rear bumper shall be anti-ride design.

12.15 Two (2) tow eyes or tow hooks are to be provided at the rear of the vehicle under the rear bumper for towing and lifting. Each towing device shall withstand, without permanent deformation, tension loads up to 1.2 times the curb weight of the vehicle within 20 degrees of the longitudinal axis of the vehicle. The rear towing devices shall allow attachment of a rigid tow bar and shall permit lifting of the vehicle, at curb weight, by the towing devices and the tow bar until the rear wheels are clear of the ground. Each towing device shall accommodate a crane hook with a 1-inch throat.

12.16 Rain gutters shall be provided to prevent water from flowing from the roof onto the side windows and passenger doors. An expanded rain gutter, of sufficient size to divert water as displaced from the roof away from the driver's immediate area, shall be provided at the driver's door. When the vehicle decelerates or is operated on a downslope, the gutters shall not drain onto the windshield or the driver's side windows, or into the door boarding areas. Rain gutters shall be fabricated of materials compatible with that portion of the vehicle body to which they are attached and shall be fastened to the vehicle body with an adhesive system and a minimum number of fasteners.

12.17 A stepwell shall be provided in which the first step is a maximum of ***12.5 inches*** above ground level. See Section 14 Floor and Stepwell.

12.18 Vehicle exterior shall be finished in accordance with section 32.1.

12.19 License plate holders for standard size U.S. license plates shall be mounted on the front and rear of the bus at locations to be approved by the Procuring Agency. The license plates shall be either flush-mounted or recessed so that they can be cleaned by automatic bus washing equipment without being caught by the brushes. The license plate mounting shall not allow a toehold or handhold for unauthorized riders. The rear license plate location shall be lighted. Appropriate mounting bolts or screws for the license plate holders shall be included.

12.20 Vehicle shall be equipped with a driver's side running board rated for 400 pounds repetitive use.

13 INSULATION AND FIRE SAFETY

13.1 The passenger and engine compartments shall be separated by a bulkhead constructed of fireproof and/or fire-retardant materials. The bulkhead shall serve to inhibit the spread of any engine compartment fires into the passenger-occupied section of the vehicle. The bulkhead shall be insulated with a minimum of one (1) inch thick fire-resistant fiberglass material or equivalent to minimize transmission of noise, heat and fumes. The OEM bulkhead/firewall will meet this requirement.

13.2 Materials used for insulation throughout the vehicle shall be fire resistant and have noise-absorbing properties, in addition to insulating qualities. The materials used shall not release flammable or poisonous fumes in the event of fire or exposure to heat. Materials shall be sealed to minimize entry of moisture, shall be non-hygroscopic, and resistant to fungus and the breeding of insects. Vibration compacting or settling during the life of the vehicle shall not affect any of the insulation materials' properties.

13.3 A 1-inch minimum fire-resistant fiberglass blanket insulation, high density polystyrene panels, composite panel air cells or equivalent is to be provided between the interior and exterior panels to reduce heat and cold penetration and act as a sound-deadening vibration-reducing material. The insulation shall achieve a minimum R factor of 5.

13.4 The complete roof shall be insulated with at least 1-inch-thick fire-resistant fiberglass insulation, 1½ inch thick rigid Polystyrene, composite panel air cells or 1" thick expandable spray foam insulation. The insulation shall achieve a minimum R factor of 5.

13.5 Thermal insulation shall allow internal temperatures of the vehicle to be maintained between 65° F. and 80° F. in all operating conditions. The vehicle shall be sealed so that the driver or passengers during normal operation will feel no drafts with the passenger doors closed.

13.6 All materials used in the vehicle shall meet or exceed the flammability and smoke emission requirements specified in FMVSS 302.

14 FLOOR AND STEPWELL

14.1 Plywood shall be a minimum 3/4" thick, 7-ply Marine grade plywood, installed with side "A" facing up, Greenwood Products XL Bus panels or composite panels, or approved equal flooring that meets the requirements of this section, and with all edges sealed. Preservative treated plywood shall utilize a chemical that contains no EPA listed hazardous compounds and have moisture content at or below fifteen percent. Plywood shall be of a grade that is manufactured with a solid face and back. Plywood prior to any preservative treatment shall be certified at the time of manufacturing by an industry approved third-party inspection agency such as APA-The Engineered Wood Association (formerly the American Plywood Association). The floor, as assembled, including the sealer, attachments and covering shall be waterproof, non-hydroscopic, and resistant to mold growth and impervious to insects. The underside of the floor shall be suitably sealed and completely undercoated as appropriate, with attention to the rear wheel-wells.

14.2 Floor shall be securely attached to underframe through elevator bolts and self-tapping countersunk screws or tapping plates (with a thickness equal to a standard nut) or using structural adhesive such as Manus Bond 25AM, Sikaflex 252 or Soudal SoudaSeal FC or an approved equal. Floor fasteners shall be protected from corrosion for the service life of the bus. The floor deck shall be reinforced as needed to support passenger loads. At GVWR, the floor shall have an elastic deflection of no more than 0.60 inches from the normal plane. The floor shall withstand the application of 2.5 times gross load weight without permanent detrimental deformation. All floor joints shall be sealed with mastic such as Isoclad or approved equal sealant.

14.3 There shall be no steps in the aisle area, and no passengers shall be required to step up to get to their seat.

14.4 Heavy duty, non-slip floor covering, which shall form a visually seamless floor covering contiguous with the sidewalls and bulkheads, shall be installed. The floor covering shall be Altro Transflor Meta 2 or Chroma, Gerflor Tarabus Sirius NT, or approved equal flooring that meets the requirements specified herein. Floor covering shall extend to include entrance/exit areas as well as steps, except the driver's compartment. Floor covering shall comply with all pertinent aspects of the ADA and be constructed of a skid resistant material, minimum 2.2 mm thick, and adhered to the sub-flooring. Rubber flooring is not acceptable. The occurrence of seams shall be minimized. Where seams do occur, they shall be heat welded and waterproof. The floor covering shall be essentially dark gray in color. Materials shall be color matched and subject to approval by the Procuring Agency.

14.5 All joints in floor covering shall be butt-cut type. The pieces shall meet flush in order to avoid water seepage. Floor covering shall be bonded to the floor with waterproof sealer.

14.6 Steps shall be sloped only enough to preclude water accumulation in the stepwell. Step treads and exposed vertical risers shall be of matching colored material, with integrally molded nosing, and be consistent with the passenger area.

14.7 A permanent two (2) inch wide, full width, bright yellow or white band shall mark the edge of each step. The colors shall be permanently blended into the tread covering material. Each tread shall be completely sealed around the edges with a waterproof rubber sealant.

14.8 A stepwell low voltage electric heater pad, such as Ultra Heat SH-267 or Lighthouse Warm Welcome or approved equal heater pad that will meet the requirements of this section, shall be installed on the first step beneath the floor covering, or to the underside, of the initial step to eliminate ice and snow build-up, as applicable. This is not required for ramps.

14.9 The top surface of any wheelchair securement floor plates shall not constitute a tripping hazard and meet all state and federal guidelines.

15 MIRRORS

15.1 Two (2) fully adjustable OEM, Rosco, Lucerix/Metagal, Hadley (SafeFleet) or approved equal mirrors that meet the requirements of this section, exterior left side/right side, side view mirrors shall be provided. Each head shall incorporate replaceable mirrors including: a 9 x 7-inch flat mirror (minimum), and a separate 4 x 6 inch (minimum) convex mirror. The convex mirror shall be located below the flat glass mirror so as to allow for increased driver visibility along both sides of the vehicle. The mirror housing shall be molded and feature one-point mounting, so as to provide an undistorted view of the rear corners of the vehicle. The mirrors shall be heated and remote controlled, with an LED turn signal in the mirror that can be viewed from behind the bus.

15.2 Mirror brackets are to be made from carbon tubing or anodized cast aluminum, black in color. Brackets shall be spring-loaded as appropriate, feature single point mounting and be designed to fold out of the way without damage to the mirrors or vehicle body upon contact with an obstruction or when met with resistance.

15.3 The left side mirror shall be mounted on the driver's door and be electrically and remotely adjustable. The right-side mirror shall be electrically and remotely operated. The right-side mirror shall be door mounted or fender mounted and braced from behind the fender with a stiffening plate, of a material which does not contribute to galvanic corrosion.

15.4 Interior mirror(s) shall be placed so as to allow the driver to observe passengers throughout the vehicle without leaving his/her seat and without shoulder movement. With a full load, the driver shall be able to observe passengers anywhere in the bus, including the rear wheelchair area, rear seats and anywhere in the aisle via a minimum 4" X 9" convex mirror that shall be mounted in front and over the driver. In addition, a minimum 3"x 9" rectangular rearview mirror, OEM's standard chassis rearview mirror with non-glare day/night feature as located by the OEM, shall be installed in the middle of and on the front windshield for driver's view of and through bus interior. The location of the interior mirrors shall be approved by the MTA at the PDR and shall be consistent throughout each build.

16 DOORS

16.1 The vehicle shall be equipped with four (4) doors, as applicable: A passenger entrance door with steps on the curbside front, a driver's entrance door on the roadside front, rear door(s) for

use as an emergency exit, and a minimum 42-inch wide wheelchair lift service door on the curbside of the vehicle. If the vehicle is in operation, any unsecured doors shall illuminate a warning lamp on the driver's dashboard panel. The driver's door shall be equipped with a key locking mechanism which shall be as provided by the OEM manufacturer. ***The emergency exit door and the wheelchair access door shall be locking or non-locking at the discretion of the operating agency, as a no-cost option.***

16.2 Design and operation of all doors, hatches, mechanisms, markings, emergency devices, warning lights and related equipment shall comply with all applicable Maryland State and Federal regulations.

16.3 Front Doors

16.3.1 The front passenger door shall be an outward-opening double leaf design (transit) door and shall be located on the curbside of the vehicle behind the front wheel. The clear door opening between handrails shall be a minimum of 32 inches in width, with the exception of the SRW which shall be 30". The clear door opening shall be a minimum of 79 inches in height measured from the first step to the door header. Each door leaf shall have a minimum 2-1/2-inch rubber outer edge to protect passengers in the event of an inadvertent door closing. The door portal opening shall be structurally reinforced to ensure the structural integrity of the vehicle.

16.3.2 The door shall be electrically operated from the driver's position and shall be held in the open or closed position with a passive mechanical interlock or detent. The front doors shall be equipped with an interior safety release mechanism, permitting the doors to be mechanically opened in the case of an emergency.

16.3.3 The driver's entrance door shall be the standard chassis manufacturer's equipment.

16.3.4 The entrance doors shall have an exterior weatherproof programmable numerical keypad, or remote, that can open and close the doors without the use of a key. The location of the keypad shall be approved by the MTA.

16.4 Emergency Exit Door

16.4.1 Emergency exit door(s) shall be located in the rear of the vehicle, where available. The door shall be of a single leaf design and shall be held in the open position by means of a gas strut or spring hold open to maintain a clear opening, to be approved by the MTA prior to production, in order to facilitate emergency exit operations. Minimum dimensions of the clear door opening shall be 30 inches wide by 52 inches high.

16.4.2 Opening of the rear door(s) shall activate a rear door ajar buzzer and illuminate a red warning lamp on the driver's dash panel, whenever the door is not secure.

16.4.3 The emergency door shall have upper and lower glazing and include one 11" x 14" static cling 'fisheye' wide-angle rear window lens. The door shall be openable from outside the vehicle with a black or chrome handle. ***The emergency exit door shall be locking or non-locking at the discretion of the operating agency, as a no-cost option.*** The structure of the door, mounting equipment, inside and outside trim and any exposed mechanisms shall be of durable, corrosion resistant material that is rigidly reinforced.

16.4.4 A rear emergency exit window, meeting the requirements of section 17, shall be provided if an emergency exit door is not available. The emergency exit window shall be 24" x 48" minimum.

16.5 Wheelchair Lift Service Door (High Floor Buses Only)

16.5.1 The wheelchair lift service door shall be located aft of the rear axle on the curbside of the vehicle and shall have a minimum opening of 42 inches wide by 60 inches high. The actual position

shall be determined by maximizing the passenger carrying capacity of the vehicle for at least two (2) wheelchairs and the required number of ambulatory passengers in fixed forward-facing positions.

16.5.2 The wheelchair lift service door shall be of a double leaf design, with a black or chrome handle. Doors shall be held in the open position by means of a gas strut or spring hold open. The design of the doors shall be approved by the MTA. Th***e wheelchair access door shall be locking or non-locking at the discretion of the operating agency, as a no-cost option.***

16.5.3 All exposed edges in the doorframe shall be smoothed to remove rough or sharp edges and padded with cushioning material to prevent injuries during passenger loading operations.

16.5.4 Opening of lift door shall illuminate an amber warning lamp on the driver's dash panel. This lamp shall be marked with words 'Door Ajar."

16.6 Emergency Roof Hatch

16.6.1 A Safe Fleet Advantage Hatch or approved equal roof hatch that meets the requirements of this section, with exterior hatch release handle, shall be provided as an emergency escape exit. Hatch shall be hinged so that the entire lid can be swung away from the opening by passenger operation of a release handle flush-mounted in the interior face of the hatch. The emergency escape hatch shall be permanently attached and shall measure 22-3/4 inches by 22-3/4 inches at a minimum. Hatch shall also be designed to provide emergency ventilation, ram front, with rear exhaust.

16.6.2 The escape hatch shall be installed towards the rear of the vehicle, with clear emergency escape instructions in English/Spanish.

17 WINDOWS

17.1 All window areas must comply with applicable Maryland State and Federal Motor Vehicle Safety Standards in effect at the time of manufacture of the vehicles.

17.2 Windshield shall be standard chassis manufacturer's laminated safety glass with single density tint and shade band, if available from the OEM.

17.3 The driver's entry door window shall be the standard, manual operation, roller type provided by the chassis manufacturer. Power windows are acceptable if standard equipment.

17.4 Passenger's door and rear emergency door glass shall be tempered glass with 70-80% light transmission.

17.5 Side windows shall be typical transit vehicle type T-Slider with 1/4-inch-thick Lexan glazing or approved equal, or 1/8-inch thick glass and a minimum 6 inch high horizontal ventilation section. The window shall be positioned with a slide open ventilation section mounted in the top portion of the window frame. Windows shall be mounted in extruded black anodized aluminum frames.

17.6 The slide-type unit shall be split into two sections with the forward section fixed and the rear section adjustable or three sections with the center section fixed and adjustable sliding sections in the forward and rear portions.

17.7 Side window glazing shall be a uniform gray tint acrylic, polycarbonate or tempered glass allowing approximately 30% light transmittal. Acrylic shall be gray Lucite SAR; polycarbonate shall be gray Lexan MR5-T or approved equal materials that meet the requirements of this section as well as all FMVSS safety standards.

17.8 At least four (two for the 138" wheelbase) of the panoramic windows shall be emergency exit windows, two per side (one per side for the 138" wheelbase). The emergency windows shall be located so as not to be blocked by the seat backs or folding seats. They shall be hinged at the top

or front of the frame with positive-locking emergency release latches at the bottom or sides. Metal or hard plastic plates, or window decals, imprinted with emergency operating instructions in English/Spanish shall be installed for the push-out sashes.

17.9 All windows shall be fitted with durable, firmly installed weather seals to prevent the entrance of air and water. Materials used for weather seals shall be designed to withstand varying temperature extremes, road splash and salt and other exterior elements without cracking, leaking, loosening or deteriorating.

17.10 There shall be a window on either side of the Emergency Door on the rear of the bus. These windows shall be fixed, of the maximum size practical, to allow better visibility for the driver.

17.11 A full window shall be provided in the transition panel between the windshield and the ambulatory passenger door(s) to eliminate the blind spot created by the transition panel and enable the driver to view the curb from the driver's seat. The body panel partition between the transition window and entrance doors shall be as narrow as possible to maximize the driver's view of the area around the entrance doors.

18 WINDSHIELD WIPERS

18.1 Two electric, motor driven windshield wipers, with a minimum of 2 fixed speeds and an intermittent, variable speed mode, shall be provided.

18.2 The windshield washer shall be electrically operated.

18.3 There shall be a minimum reservoir capacity for one gallon of windshield washer fluid.

18.4 The spray tips shall direct a stream of fluid into the path of travel of each windshield wiper blade each time the actuating button is operated. The stream of water must be directed so as to effectively clean the entire path of travel of each wiper blade when the vehicle is traveling at highway speeds.

19 EXTERIOR LIGHTING

19.1 All exterior lights must meet Maryland State Department of Motor Vehicles, Maryland Department of Transportation, United States Department of Transportation and Federal Motor Vehicle Safety Standards requirements. All exterior rear and roof marker bus body lights are to be LED with direct termination and come with protective lens coating for protection against scratching, UV degradation and a lifetime warranty for the entire light assembly. All exterior LED lights shall be Dialight, Optronics, SoundOff Signal or approved equal lights that meet the requirements of section 19, including the lifetime warranty for the entire light assembly.

19.2 Headlights shall be the quartz halogen sealed beam type with Daytime Running Lights. The low beam life rating must be 600 hours minimum. LED headlights are required if available from the OEM. The headlights shall be activated automatically with auto high beam control as standard equipment.

19.3 Reflectors (amber at front and red in rear) shall be installed on each side of the vehicle, as well on the rear of the vehicle in accordance with FMVSS requirements.

19.4 Rear lamps shall consist of 4" diameter lamps. There shall be a minimum of two (2) red LED combination stop/taillights (four are preferred), one on each side, and separate amber LED turn signal lenses.

19.5 A red LED Center High Mounted Stop Light (CHMSL) shall be mounted in the center of the rear panel above the emergency door as per revised federal automobile regulations. Rear CHMSL to be a 15" minimum LED red strip light, low profile surface mount. *Rear exterior light configuration shall be submitted with proposal package for approval by the MTA*.

19.6 Two 4” diameter bright white LED backup lights shall be provided and shall be supplemented by an audible backup alarm.

19.7 A rear LED license plate light shall be provided.

19.8 There shall be an override switch to permit continuous flashing of the directional signals (hazard warning lamp system).

19.9 An aluminum, powder-coated steel or stainless-steel armored LED turn signal marker light to be mounted either at or near the vehicle beltline slightly in front of the rear axle or above the rear wheel wells and shall be amber.

19.10 Two additional 4” flashing LED amber warning lamps, shall be provided to signal passenger loading/unloading operations. They shall operate automatically whenever the passenger loading door, service door, or rear emergency doors are open and the key is in the ‘ON’ position or when the hazard warning lamps are activated. These two LED lamps shall be located at the extreme outer edges of the roof above the rear windows.

19.11 “Flasher” units for the turn signals and emergency warning lamps shall include an audible indication that these items are in operation. The sound level shall be sufficient to be noticeable above ambient vehicle sound levels at a vehicle speed of 40 mph.

19.12 A heat resistant LED lamp or lamps shall be provided in the engine compartment for night emergency repairs or adjustments. The light(s) shall be controlled by a labeled toggle switch located inside the engine compartment, which illuminates the light(s) or when the engine compartment hood opens to approximately 20% of its fully open position and extinguishes them when the engine compartment hood returns to this 20% open position.

19.13 The passenger entrance doorway and the lift doorway shall have outside LED light(s) which, when the door is open, provide at least 1 foot-candle of illumination on the street surface for a distance of 3 feet perpendicular to all points on the bottom step tread or lowered lift platform outer edge(s). Such light(s) shall be located below window level and shielded to protect the eyes of entering and exiting passengers. These lights shall automatically illuminate when the door(s) are opened.

20 INTERIOR LIGHTING

20.1 All interior lights shall be LED and must meet Maryland State Department of Transportation, United States Department of Transportation and Federal Motor Vehicle Safety Standards requirements.

20.2 An individually switched LED dome light shall be provided for the driver in the driver’s compartment.

20.3 Interior shall be illuminated with LED low profile dome lighting with a lifetime warranty so as to provide a minimum of 12 foot-candles of illumination measured at 36 inches above the floor. OEM shall supply certification, such as a test report, on vehicles built previously that the proposed lighting system meets the requirements for illumination. A minimum of six light fixtures shall be installed.

20.4 Driver courtesy light shall light when driver door is opened. All other interior lights shall operate only when ignition is in “ON” position. Stepwell and exterior front door lights shall operate only when the front passenger door is opened. A driver-controlled override rocker switch shall be provided to allow operation of all interior passenger courtesy lights when the passenger front doors are open or closed.

20.5 There shall be LED stepwell lighting which goes on automatically when the passenger door is open. Stepwell lighting shall provide at least two (2) foot candles of illumination measured on the step tread. Lighting shall be shielded so as not to distract the driver and shall be integrated into the sidewalls of the stepwell.

20.6 Separate light switches are to be provided for the driver's compartment, interior lights and exterior lights. All switches shall be made of metal or heavy-duty high impact plastic and marked with easily read identifiers.

20.7 Wheelchair lift lights, which illuminate the lift device in a 4-foot radius outside at ground level of the door opening, shall be provided in an LED design. The light shall be wired to light automatically when lift door is opened. Lift lights shall be mounted internally in lift area above the lift in the lift door headlining. All LED ADA and interior lighting to have a lifetime warranty.

20.8 Exterior LED lights at the front and lift door areas shall be provided and shall comply with the Americans with Disabilities Act. These lights will activate only when the doors are open.

21 BODY – INTERIOR

21.1 Sidewall, rear wall and ceiling trim panels shall be melamine, ABS plastic, FRP, smooth fiberglass gel coat or vinyl, applied in one or more sections. Trim molding of stainless steel, anodized aluminum, FRP or ABS plastic shall be used to cover seams. The trim molding shall be continuous except at the door openings, wheel well and fuel intake line covers and run the entire length of each seam covered. All interior panels, materials, and treatments shall be flame-retardant in conformance with FMVSS 302 and treated to be easily cleaned. *Offerors shall submit specifications of the materials proposed for approval with their requests for exceptions/approved equals.*

21.2 Panels shall be supported to prevent, buckles, vibration, drumming or flexing and particular care shall be exercised to keep the body light fixtures from weaving or bouncing when the coach is in service. The ceiling panels shall be supported to prevent sagging. All ceiling and sidewall panels shall be scuff and scratch resistant. All sharp corners, edges and protruding hazardous surfaces shall be eliminated.

21.3 All stanchions and grab rails shall be 1 - 1/4-inch stainless steel. Vertical stanchions shall be secured top and bottom with bolts or screws to ceiling and floor metal framing to prevent twisting. All stanchions shall be mounted at floor and ceiling into structural metal body member or metal plate.

21.4 There shall be a vertical stanchion, grab rail, and padded modesty panel located at the rear of entrance door. Provision shall be made for grab rails at both sides of door, within easy reach from the ground, to assist passengers in both boarding and egressing. Grab rails shall be mounted to stanchions and structural metal members or metal plates in the sidewalls.

21.5 There shall be a vertical stanchion, grab rail, and padded modesty panel located behind the driver’s seat. There shall be a shatterproof, plexiglass panel filling the area from the ceiling to the grab rail and the stanchion to the wall. The purpose of this panel is to protect the driver from being hit with objects from behind and shall be approved by the MTA.

21.6 All stanchions and guardrails shall be minimum 1-1/4 inch, thick-wall stainless steel tubing. Fittings shall be stainless steel, cast aluminum, or cast zinc corrosion resistant material.

21.7 All grab rails, stanchions, and fittings in or adjacent to the passenger compartment and in the stepwell shall be stainless steel and powdered coated or polyethylene coated safety yellow and must meet or exceed standards required by Maryland State regulations. Brackets, clamps, screw

heads, and other fasteners used on the passenger assists shall be flush with the surface and free of burrs and/or rough edges.

21.8 Driver's compartment including floor, bulkhead, dashboard and modesty panel shall have a matte black or medium to dark gray non-reflective finish. Instrument panel, switches, controls, fittings, frames and any other items in driver's compartment shall have non-reflective surfaces in order to prevent glare.

21.9 A large stainless steel or aluminum driver's coat hook with securing straps for the driver's jacket shall be provided and located directly behind the driver in a convenient location and shall support the weight of a heavy winter jacket. It shall be located so as not to restrict the driver's interior or exterior field of view, or field of view through the interior rear-view mirrors when in use.

21.10 There shall be a vertical stanchion, grab rail and modesty panel located between the lift and rear most curbside stationary ambulatory passenger seat. There shall be a shatterproof, plexiglass panel filling the area from the ceiling to the grab rail and the stanchion to the wall.

21.11 All materials used in construction of vehicle interior (except acrylic and plastic window glazing) shall be fire-resistant and meet or exceed the requirements of FMVSS 302.

21.12 Interior decals shall be as per ADA regulations, MDOT regulations, and Section 32.5 of this Specification.

21.13 All modesty panels shall harmonize with interior, both in color and design, and shall not provide a hazard to the passengers.

21.14 Overhead rails required by ADA provisions shall be at height of 71 inches to the top of the handrails from vehicle floor. The rails shall be fastened into structural metal body members or metal plates.

21.15 Overhead handrails shall be provided in all buses that shall be continuous including the wheelchair areas, as required, except for a gap at the rear doorway.

21.16 Offeror shall submit dimensional scale drawings, both top and elevation views, of the interior of the vehicle, including seats, modesty panels, securement area, driver's area, grab rails, handholds, doors, windows, and other interior details, as part of Offeror's Request for Exceptions/Approved Equals.

21.17 Driver's Storage Compartment

20.17.1 An enclosed Driver's storage compartment, with easy access from the aisle, shall be provided with a positive latching door and/or lock. The minimum size of the storage box shall be 2,000 cubic inches. The location will be approved by the MTA at PDR.

22 DRIVER'S SEAT

22.1 Driver's seat shall be a high-back bucket style seat with right-side armrest and automatically retractable lap and shoulder harness. Upholstery material shall be 32 ounces per square yard (minimum) transit cloth. Colors shall be selected from manufacturer's standard colors to harmonize with the exterior accent stripe color. An aftermarket power base, such as Norco or Adnik, is acceptable if not available from the OEM, as long as the OEM seat is not modified to install the base. The seat shall be 6-way power adjustable, and the seat back shall be adjustable to multiple positions. The driver's seat shall be adjustable for driver's ranging in size from a fifth (5^{th}) percentile female to a ninety-fifth (95^{th}) percentile male to be able to easily reach all the necessary controls to operate the bus. There shall be no interference or pinching hazard between any grab

rail and/or stanchion or any other part of the bus with the seat in any position. Level 4 vinyl upholstery, compliant with FMVSS 302, shall be available as an option.

23 PASSENGER SEATS

23.1 Given the presence of a wheelchair lift mounted in a side door behind the rear axle, the Offeror shall supply the MTA with diagrams of proposed interior configurations based upon the interior dimensions of their vehicle and the requirements of this Specification as well as the requirements of the Maryland State Department of Transportation regarding aisle widths and wheelchair tie-down standards. **Proposed seating arrangements for each vehicle type proposed, along with the weight analysis, must be supplied by the deadline for submitting Exceptions/Approved Equals Request Forms**. Proposed seating arrangements will be approved by the MTA as part of the Approved Equal process.

23.2 The underside of the seats, area between sidewall and seats, and general seat configuration shall be designed to prevent accumulation of debris.

23.3 Forward facing ambulatory passenger seating shall be Freedman GO-ES with external 3-point seatbelts, or approved equal seats, that meet all requirements of section 23, featuring a yellow molded, top mounted grab handle on each seat and flip-up armrests on the aisle side of the forward-facing aisle seats. Structure shall be based on welded stainless steel or powder coated tubing to meet the requirements of FMVSS 210. Installation of the seats shall meet the requirements of FMVSS 207. Seats covering shall be Level 4 or 5, 32-ounce anti-microbial fire block type vinyl upholstery, with heat sealed seams. As an option, the seat covering shall Level 4 or 5 Cloth. Foam shall be contoured, dense, transit grade polyurethane with a minimum thickness of one and one half (1 ½) inches. All fixed forward-facing seats shall provide at least 17.5 inches of seating support.

Top of uncompressed seat cushion to floor shall be between 19 inches and 21 inches. Color shall be selected after contract award.

23.4 Seat cover upholstery materials shall meet or exceed the applicable flammability and smoke emission performance requirements specified in FMVSS 302.

23.5 Any flip or folding seat requested as an option shall be equipped with a spring-loaded automatic latching device to prevent the bottom seat cushion from returning to the horizontal position. The locking device shall be constructed to be manually released to avoid accidental return during use. The width of the flip seat in the stored position shall not exceed eleven and one half (11 ½) inches. Additionally, flip seats shall be upholstered with the same quality and color material as the standard passenger seats. The design of the flip seat shall complement the standard passenger seats and be from the same manufacturer. The seat shall also lock in the seated position.

23.6 Each seat position shall be equipped with a self-retracting passenger restraint system, which meets current FMVSS requirements, intended to hold passengers in a secure seated position during normal operations. Seat belts shall be anchored through the floor structure, independent of the seat, or bolted to the seat frame assembly. Each restraint belt and installation shall meet all applicable FMVSS standards including 208, 209 and 210. The installation of the seat belts shall have no twisting, binding or bunching of the seat belt web material. The retractor shall be mounted to the seat frame. Seat belt extensions shall be provided with each seating position per bus.

23.7 All wall-mounted belt securement points must be mounted into a reinforced sidewall. Wall mounting into the standard sidewall is unacceptable. The belt securement system shall feature an integrated restraint tie-down system securing belts not in use.

23.8 The forward most row of seats on both sides of the bus shall be equipped with DOT/FMVSS approved child seat anchors in the aisle seating positions.

23.9 Seat Dimensions

1. Seat width per person: 17.5 inches minimum
2. Seat depth: 17 inches minimum
3. Seat back: 24 inches minimum
4. Seat back angle 10 to 15 degrees
5. Hip to knee room: 27 inches nominal (maximum available)
6. Aisle width: 18* inches minimum (maximum available)

* To be measured at seated passenger hip height.

23.9 Seating Options

23.9.1 Ordering agencies shall have the ability to add or deduct seats from the provided floor plans, such as adding a single or double flip seat, provided that the GVWR of the bus is not exceeded.

23.9.2 Ordering agencies shall have the ability to request an alternative seating arrangement, such as adding an additional wheelchair position, provided that the GVWR of the bus is not exceeded. For example - configuring a Type 3A Bus as an 8/3 in lieu of a 12/2.

24 WIRING

24.1 Original manufacturer's vehicle wiring shall remain unchanged to the greatest extent practical consistent with the requirements of these specifications. All add-on electrical components controlling the power to the bus body electrical circuits shall be located in a separate electrical junction box. The junction box shall be easily accessible through a hinged lockable door. The junction box shall be suitably sized to allow for ease of maintenance, repair and ten (10) percent additional space for the installation of future electrical components. The junction box shall be located within accessible reach of the driver. All body harnesses shall join on a terminal strip made of a high strength dielectric material. All circuits shall be protected by manual reset circuit breakers, in lieu of fuses. Circuit breakers shall be numbered and sized to provide proper overload protection for each individual circuit.

24.2 Wiring and terminals shall meet or exceed current Federal and State vehicle requirements and be amply sized for both mechanical strength as well as to carry required currents without significant voltage drops.

24.3 All wiring, including chassis manufacturer's, shall be enclosed in non-metallic loom meeting current SAE Standard J762a and be adequately supported by fully insulated "P" clamps with a minimum spacing of every 24 inches and routed for protection from heat, moisture, solvents, corrosion, road debris, abrasion and tension. Tie wrap shall be used minimally in the securement of electrical harnesses and wiring.

24.4 The bend radii of all installed electrical wires and cables shall not exceed the manufacturer's recommended minimum bend radii.

24.5 All parts of the wiring system and electrical components shall be protected from corrosion. All connectors installed on the underside of the vehicle and/or exposed to any outside element and/or have a 20 amp and high circuit breaker within its electrical circuit shall be double insulated.

24.6 There shall be no exposed or loose wiring in the driver or passenger compartment. Any bus body wiring harnesses containing exposed excess lengths shall have the excess length neatly gathered and secured to a rigid bus body or chassis frame member.

24.7 Wiring shall be of sufficient length to permit positioning, as well as replacement of terminals, twice, without excessive tension.

24.8 Protective grommets shall be provided at points where wiring penetrates metal or other material.

24.9 Battery cables shall be heavy duty and adequately sized to carry current output of the electrical system.

24.10 Grounding of components shall be through polarized, shielded terminals wired to main structural ground points. Grounding through hinged doors or covers of any type shall not be acceptable. Ground points shall be bolted to main structure free of paint, oil or rust, coated with silicone grease after fastening.

24.11 All wires shall be color coded or numbered every 6 inches maximum to correspond with the wiring diagram for ease of service and identification.

24.12 Complete wiring diagrams shall be provided with each vehicle.

24.13 Electrical components that may require servicing or replacement shall be readily accessible through access panels or covers. Installation of aftermarket electrical components and systems in the engine compartment shall be eliminated to the greatest extent possible.

24.14 Maximum radio suppression available from chassis manufacturer shall be provided.

24.15 All switches and controls necessary for the operation of the vehicle shall be conveniently located in the driver's area and shall provide for ease of operation and be appropriately marked. All controls and instrumentation necessary for safely operating the vehicle shall be located within easy reach of a fifth (5^{th}) percentile female through to a ninety-fifth (95^{th}) percentile male driver seated in the driver's seat with the driver's seat belt fastened. All bus body switches shall be of a uniform rocker type with illumination mounted in convenient groupings.

24.16 An in-line circuit breaker, with manual reset, of adequate capacity for circuit to mobility lift shall be provided in a location approved by the MTA in accordance with the lift manufacturer's recommendations and the requirements of FMVSS 404. The MTA prefers that the circuit breaker not be located in the chassis engine compartment. The power wire to the lift shall be securely "P" clamped and protected.

24.17 A master battery control switch shall be provided that shuts off all bus body electrical power. The switch shall be located in a separate compartment within or adjacent to the battery box or in the driver's stepwell area. The housing and location of the master battery switch shall prevent corrosion from fumes and battery acid. The location of the master battery switch shall be clearly identified on the access panel and be accessible in less than 10 seconds. The master battery switch shall be capable of carrying and interrupting the total circuit load. Opening the master switch with the power plant operating shall not damage any component of the electrical system.

24.18 All accessories and electrical equipment, with the exception of the driver's dome light, horn, headlights, taillights, parking lights, passenger door and emergency flashers shall be wired through the vehicle ignition switch. The driver's dome light, horn, headlights, taillights, parking lights, passenger door and emergency flashers shall be wired directly to the battery, so as to be operative with individual switches.

25 BATTERIES AND CHARGING SYSTEM (Gas Engine Buses)

25.1 The vehicle is to be supplied with an alternator powered 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, flashers, heater, and other accessories in constant operation).

25.2 A single OEM alternator of 220 amps minimum rated output at fast engine idle of approximately 2,000 rpm is required. Dual alternators meeting the minimum amperage requirement are also acceptable. *Aftermarket alternators are not permitted.*

25.3 Two (2) heavy-duty 78 amp-hr 12-volt batteries, with a combined 1200 CCA shall be provided. The batteries shall be lead acid premium construction and maintenance free. The positive (+) and negative (-) terminals shall be and of different size on the same battery to prevent incorrect cable installation. All battery terminals shall be coated with an anti-corrosion and sealant protector. One battery shall be mounted under the hood, or other approved location, in accordance with OEM requirements.

25.4 The second battery shall be located in an easily accessible box mounted on the curbside of the bus, ***unless the Chassis manufacturer requires otherwise***. The location of the battery box shall be approved by the MTA. This battery box shall include a slide out tray that securely locks in the stowed position. The slide out tray shall be made of stainless steel. Battery terminals shall be located for access in less than 30 seconds with jumper cables. The locking mechanism shall consist of shear pins on both sides of the battery tray, pivoting latches, spring loaded latches, or an equivalent mechanism approved by the MTA. To prevent the shear pins from being misplaced they shall be attached to the battery tray or locking mechanism with a method approved by the MTA.

25.5 Access to the battery tray shall be from outside the bus. The access door to the battery box shall swing up at a minimum 60 degrees to the horizontal plane and shall be non-locking. The mechanism to hold the door in the up position shall also firmly hold the door in the closed position, so that with the compartment door latch ***not*** in the latched position, the door shall remain in the closed position when the bus is traveling at any safe speed or making any safe type of turning maneuver. The battery box shall be sealed to prevent road debris, dust, rain, snow or other forms of precipitation from entering the box but shall not be airtight for safety reasons. The battery box construction shall be submitted to the MTA for approval prior to installation on the vehicle.

25.6 Battery cables shall be heavy duty and adequate to carry current output of the electrical system.

26 INSTRUMENT PANEL AND CONTROLS

26.1 All controls and instruments are to be within a seated driver's arm reach with seat belt fastened. All switches are to be of uniform rocker type, or approve equal, mounted in convenient groupings in a panel near the driver. Controls shall be located so that boarding passengers may not tamper with control settings.

26.2 Instruments and gauges shall be of a non-glare, illuminated type, for easy maintenance and repairs, and clearly visible to the seated driver.

26.3 The following instruments are to be provided:

- speedometer with odometer
- ammeter or voltmeter
- oil pressure gauge
- fuel tank level gauge

- engine temperature gauge and over-heat warning light
- engine hour meter as part of chassis EMC (aftermarket meter is acceptable)
- headlight-on indicator and headlight high beam indicator; » directional signal and flasher indication light(s) and sound
- A red warning light and audible alarm located on the driver's instrument panel shall be provided for the rear emergency door. The red warning light and alarm shall activate when the rear emergency door is not securely closed. The warning light shall be labeled 'DOOR AJAR'.
- A separate "DOOR AJAR" warning light shall be provided for the lift door. The 'DOOR AJAR' warning in the Intermotive System panel will meet this requirement.

26.4 The following controls, in addition to the normal steering, braking and transmission functions, are to be provided:

- column mounted turn signal lever
- emergency flasher control
- auxiliary switches for any clearance or marker lights (switches must all be of uniform type) not controlled by the OEM headlight switch
- switches and temperature controls for passenger compartment heaters and air conditioners
- separate switch and temperature controls for front heaters, defrosters, and air conditioners
- engine fast idle system (auxiliary idle control) as controlled via the wheelchair interlock mechanism, per FMVSS 404 shall be provided
- two-speed wiper/washer with variable speed, intermittent operation control
- passenger compartment light switch (es) and/or controls
- passenger door control switch

The layout of the controls and switches shall be approved by the MTA and shall be consistent throughout the build.

27 HEATING, AIR CONDITIONING AND VENTILATION SYSTEM

27.1 The heating system shall consist of both the heaviest duty available factory installed front heating unit from the chassis manufacturer and a rear, hot water type, heating unit.

27.2 The rear heater unit shall be mounted on the floor of the vehicle and shall have a minimum rating of 60,000 btu/hr. All heater coils shall be heavy duty copper or aluminum. Heavy duty quarter turn shut off valves shall be located in the supply and return lines to the passenger area heater. These valves shall be readily accessible.

27.3 The rear-heating unit shall be located so as not to interfere with aisle space, wheelchair restraint systems or seating areas (legroom), location to be approved by the Procuring Agency.

27.4 Rear heating unit hot water hoses shall be heavy duty heater hose run under the body, be supported at least every twenty-four (24) inches, and be located so they are protected from wear due to friction, road debris and road salt build-up.

27.5 The driver's heating unit (front unit) shall operate independently of the passenger area-heating unit (rear unit).

27.6 All heat controls shall be located at the driver's control panel.

27.7 Provisions shall be made for windshield defrosting.

27.8 All controls shall be conveniently mounted for easy operation by a seated driver wearing a seat belt.

27.9 Chassis manufacturers (OEM) In-dash air conditioning, heater, and defroster with maximum OEM available btu/hr rating shall be provided.

27.10 Air conditioning system(s) consist of an OEM supplied driver's area air conditioning system and a passenger area air conditioning system which are completely independent of each other.

27.11. Driver's area and passenger area air conditioning system shall be separately controlled from a control panel at the driver's area. Minimum control functions include off/low/medium/ high fan speed with and a/c, heat, defrost for the OEM supplied in-dash air conditioning system. Minimum control functions for the passenger area air conditioning system shall include a rotary fan speed switch with off/low/medium/high and a rotary thermostat control. Digital controllers are acceptable.

27.12 The passenger air conditioning system fuses, relays, and breakers shall be located in the electronic junction box.

27.13 Refrigerant hose shall be Eaton EZ-Clip, model GH-134, SAEJ2064, double braided Barrier type Goodyear, Aeroquip, Burgaflex or approved equal hoses that meet all of the performance requirements in section 27 and shall be completely enclosed in loom over the entire length of the vehicle to prevent chaffing. Refrigerant hose shall be supported at a minimum of every twenty-four (24) inches with insulated "P" clamps.

27.14 Refrigerant fittings shall be ATCO, Aeroquip, Burgaclip or approved equal fittings that meet all of the performance requirements in section 27. These fittings may be "O" ring type.

27.15 All refrigeration/heater lines and wiring shall be routed outside of the passenger area to minimize exposure to passengers in case of leaks.

27.16 Refrigerant hose, heat, and condensate lines that enter the passenger compartment shall be encased in rigid material which harmonizes with the interior of the vehicle.

27.17 Protective grommets shall be provided at points where refrigeration hoses, heater hoses, condensate hoses, and electrical harnesses (wires) penetrate metal or other materials.

27.18 All HVAC system hoses and harnesses (wires) that pass within twelve (12) inches of the exhaust system shall be shielded in a manner to prevent heat damage.

27.19 The air conditioning system shall utilize environmentally friendly R-134A refrigerant. Compressor manufacturer's specified refrigerant oil shall be utilized.

27.20 Performance

27.20.1 The air conditioning system shall be able to reduce the vehicle interior temperature from ninety-five (95) degrees Fahrenheit to seventy-five (75) degrees Fahrenheit within thirty (30) minutes when the ambient temperature outside the vehicle is maintained at ninety-five (95) degrees Fahrenheit and 40% relative humidity for at least four (4) hours.

27.20.2 The performance standards shall be met in test conditions with vehicle engine operating between 1,000 and 1,500 RPM's.

27.20.3 The front and rear heating units shall be sufficient to maintain a temperature of 60°F at knee level throughout the empty vehicle interior when outside ambient temperature is 0°F and the vehicle is traveling at highway speeds of 55 mph and during stop-and-go operation. 27.21 For Vehicles on a 138-inch nominal wheelbase:

27.21.1 A/C system shall be American Cooling Technology (A.C.T.), Trans/Air, ACC Climate Control, Mobile Climate Control or approved equal system that meets all of the performance requirements in section 27.

27.21.2 For wheelbase of 138-inch nominal, the system shall utilize two (2) engine driven compressors. One (1) is the OEM supplied compressor driven off the vehicle engine which is specific to the OEM in-dash driver's area air conditioning system. The second add-on compressor is for the passenger area air conditioning system. This compressor is driven off the vehicle engine and is nominal ten (10) cubic inch displacement and is protected by high- and low-pressure switches.

27.21.3 A/C system shall include a rear ceiling mounted evaporator rated at a minimum output of 45,000 BTU and 1200 CFM at ambient conditions of 95 degrees Fahrenheit and 40% relative humidity. The system shall operate independently of the front chassis supplied system.

27.21.4 Evaporator shall be a single slim line unit, A.C.T., Trans/Air, ACC Climate Control, Mobile Climate Control or approved equal system that meets all of the performance requirements in section 27, mounted to the roof frame structure in the top rear of the vehicle in a location that does not interfere with passengers or wheelchair occupants.

27.21.5 Evaporator shall be copper tube, aluminum fin coil or approved equal design that meets all of the performance requirements in section 27, with expansion valve, low-pressure switch, and concealed drain hoses. The drain hoses shall be protected at points where the hose penetrates metal or other material.

27.21.6 Evaporator shall incorporate a 12-volt DC motor with total minimum airflow of 800 CFM.

27.21.7 Evaporator cover shall be constructed of fire-retardant material, which conforms to FMVSS 302.

27.21.8 System shall utilize an ACT, Trans/Air, ACC Climate Control, Mobile Climate Control, or approved equal system that meets all of the performance requirements in section 27, skirt mounted 2-fan condenser, rated at a minimum 60,000 BTU, located on the street side of the vehicle, in front of the rear wheels, and installed to minimize collection of road dirt and facilitate maintenance.

27.21.9 Condenser shall be high capacity, highly efficient copper tube, aluminum fin coil, lightweight aluminum micro channel or approved equal design that meets all of the performance requirements in section 27, with filter drier and sight glass.

27.21.10 Condenser shall include minimum two (2) 10" fans with sealed 12-volt DC permanent magnet motors with minimum total airflow of 1600 CFM.

27.21.11 Condenser shall be treated with anti-corrosion material to prevent the deterioration of the condenser due to road salt and/or rust. All exposed tubing and fittings shall be coated with anti-corrosion material.

27.22 For vehicles on a wheelbase equal to or greater than 158 inches:

27.22.1 A/C system shall be American Cooling Technology (A.C.T.), Trans/Air, ACC Climate Control, Mobile Climate Control or approved equal system that meets all the performance requirements in section 27.

27.22.2 For wheelbase of 158 or more the system shall utilize two (2) engine driven compressors. One (1) is the OEM compressor driven off the vehicle engine which is specific to the OEM driver's area air conditioning system. The second compressor is for the passenger area air conditioning

system. This compressor is driven off the vehicle engine and is nominal ten (10) cubic inch displacement and is protected by high- and low-pressure switches.

27.22.3 A/C system shall include a rear ceiling mounted evaporator rated at a minimum output of 60,000 BTU and 1600 CFM at ambient conditions of 95 degrees Fahrenheit and 40% relative humidity. The system shall operate independently of the front chassis supplied system.

27.22.4 Evaporator shall be a single slim line unit, A.C.T., Trans/Air, ACC Climate Control, Mobile Climate Control or approved equal system that meets all of the performance requirements in section 27, mounted to the roof frame structure in the top rear of the vehicle in a location that does not interfere with passengers or wheelchair occupants.

27.22.5 Evaporator shall be copper tube, aluminum fin coil or approved equal design that meets all of the performance requirements in section 27, with expansion valve, low pressure switch, and concealed drain hoses. The drain hoses shall be protected at points where the hose penetrates metal or other material.

27.22.6 Evaporator shall incorporate two (2) 12-volt DC motors with total minimum airflow of 1600 CFM.

27.22.7 Evaporator cover shall be constructed of a fire-retardant material which conforms to FMVSS 302 specification standards.

27.22.8 System shall utilize an ACT, Trans/Air, ACC Climate Control, Mobile Climate Control, or approved equal system that meets all the performance requirements in section 27, skirt mounted 2-fan or 3-fan condenser, rated at a minimum 80,000 BTU, located on the street side of the vehicle, in front of the rear wheels, and installed to minimize collection of road dirt and facilitate maintenance.

27.22.9 Condenser shall be high capacity, highly efficient copper tube, aluminum fin coil, lightweight aluminum micro channel or approved equal design that meets all the performance requirements in section 27, with filter drier and sight glass.

27.22.10 Condenser shall include minimum two (2) 12” fans or three (3) 10” fans with sealed 12-volt DC Permanent magnet motors with minimum total airflow of 2400 CFM.

27.22.11 Condenser shall be treated with anti-corrosion materials to prevent the deterioration of the condenser due to road salt and/or rust. All exposed tubing and fittings shall be coated with anti-corrosion materials.

28 RADIO COMMUNICATIONS SYSTEM

28.1 Vehicles shall be equipped to *accommodate* a radio communications system. The Contractor shall supply and install the antenna ground plane, flexible conduit, wiring, and related components.

28.2 Provisions shall be made to accommodate an operator supplied radio installed in near the driver’s seat at a location to be approved by the MTA at the preproduction meeting.

28.3 An access panel shall be installed above the driver’s seat of each vehicle for access to the antenna mounting plate, if required.

28.4 The Contractor shall supply and install a flexible conduit with pull wire sufficient in size to permit installation of antenna coaxial cable between the radio location and the antenna location.

28.5 An antenna ground plane, 6” square minimum, shall be supplied and installed by the Contractor to serve as a mounting plate for the antenna. The MTA shall approve the antenna ground plane location and method of mounting.

28.6 Sufficient power supply cable(s) between the chassis manufacturer approved high power radio-connect circuit breaker and the radio location shall be supplied and installed by Contractor.

29 SAFETY EQUIPMENT

29.1 Heavy-duty OEM dual horns shall be furnished.

29.2 A Truck-Lite 92911, Ecco "Smart Alarm" model SA-917, PRECOMATIC model 1040, Magnadyne BU3100C-112A, Pana-Pacific BU3000C-102A or approved equal type back-up alarm shall be provided which adjusts the volume of the alarm signal sound to a level of at least 5dB above the background noise level.

29.3 Contractor must provide all safety equipment required by State and Federal regulations. All safety equipment supplied must meet or exceed standards specified by State and Federal regulations.

29.4 All safety equipment shall be located within easy access of the operator, in a secure position or enclosed compartment.

29.5 A twenty-four (24) unit first aid kit, approved by the Maryland Motor Vehicle Administration, shall be provided and securely mounted in an easily accessible location.

29.6 A minimum five (5) pound dry powder type fire extinguisher, with gauge and hose, U.L. approval shall be provided. A bracket to securely hold fire extinguisher inside of vehicle shall be provided. Type of bracket used, and location shall be approved by the MTA prior to installation.

29.7 Three (3) triangular emergency road reflectors in a secure storage container shall be mounted near the driver's area.

29.8 Body Fluid Cleanup Kit to include at a minimum:

1. One (1) pair of Latex gloves,
2. One (1) package of absorbent powder,
3. One (1) package of antiseptic BZK towelettes,
4. One (1) bag 24"x 24" Bio-Hazard white w/tie,
5. One (1) bag plastic brown w/tie,
6. Certi-Green surface cleaner towelette,
7. Face mask,
8. Infection control,
9. One (1) SBB-2 scoop bag w/handle scraper,
10. Two (2) towels and
11. Paper crepe.

30 SAFETY SYSTEMS

30.1 The vehicles are to be equipped with the standard OEM safety systems for each respective chassis, as a minimum:.

- GM Chassis
    - Electronic Stability Control
    - Hill start Assist
- Ford E-Series Chassis
    - Electronic Stability Control
    - Hill start Assist
    - Auto Headlight Activation with Auto High Beam Control
- Ford Transit Chassis

- Electronic Stability Control
- Hill start Assist
- Auto Headlight Activation with Auto High Beam Control
- Lane Departure Warning
- Pre-Collision Assist with automatic emergency braking
- Forward collision warning
- Post-collision braking

Additional safety features shall be offered as an option.

30.2 Backup Camera System

30.2.1 A backup camera shall be provided with a 7" diagonal minimum viewing screen. The camera shall be activated any time the bus is in 'Reverse'. The screen shall be place in the dash area in easy view of the operator and not to create a blind spot. The Color 1/3" CCD camera must be able to process images in all light conditions and have a 120-degree diagonal field of vision minimum. The system shall be weatherproof with an IP67 rating and NHTSA 49CFR Parts 571 and 585 compliant. The warranty shall be one year minimum. The location of the screen will be approved at the Pre-production meeting. An OEM system, that meets these requirements, is preferred.

31 WHEELCHAIR ACCESSIBILITY

31.1 Wheelchair Lift (High Floor Buses)

31.1.1 The wheelchair lift shall be installed in the wheelchair lift service door opening. The installation shall be adequate to withstand the stresses imposed by regular wheelchair operation on a sustained basis. All mounting fasteners shall have a minimum grade rating of eight (8). The manufacturer shall provide documentation with their proposal to demonstrate that the chassis and suspension has been designed or modified to meet the requirements imposed by the lift manufacturer and to prevent excessive leaning of the bus when lifting the maximum load of the lift.

31.1.2 The wheelchair lift shall be a Braun Century 2 Fully-Automatic Lift or a Ricon Titanium S-Series Fully-Automatic Lift or approved equal lift that meets all requirements of section 31, with a minimum continuous rated lifting capacity of 1000 pounds, tested to a minimum static load of 2,700 pounds and a vertical drop capability of 48". Either lift shall be offered as the 'standard' installation with the other lift offered as a no cost option at the discretion of the end-user. Lift shall meet all, ADA and FMVSS 403/404 requirements. The Ricon Titanium S-Series Fully Automatic Lift shall be offered as an option. The end user shall determine which lift will be installed in the bus. *The installation of the lift in the bus shall be certified by the lift manufacturers.*

31.1.3 Lift platform usable clearance area for wheelchair positioning shall be at least 34 inches wide. Collapsible yellow powder coated handrails, or handgrips as a minimum, on both sides of the platform shall be provided. The handrails shall not deform under side loads applied when supporting a standee while the lift is in motion, nor shall they structurally deform during repeated lift folding operations. Passive restraining belts shall be incorporated into handrails, space permitting.

31.1.4 The lift shall have a manual "back-up" system, which allows the operator to raise and lower the lift platform in the event of electrical failure.

31.1.5 The construction of the lift frame shall allow a vertical clearance of at least 64 inches measured from the top of the bridge plate to the bottom of the padding on the horizontal cross member of the frame.

31.1.6 The lift shall be equipped with a switch box made of durable ABS plastic and shall be conveniently mounted on the lift frame, allowing safe operation from both the interior and exterior of the vehicle.

31.1.7 The electrical wiring for the lift shall be a separate shielded cable with its own circuit breaker. It shall be supported along the chassis from the main power source to the lift connection.

31.1.8 The wheelchair lift shall be interlocked with the transmission and emergency brake in such a manner as to prevent the vehicle from moving with the wheelchair lift door in the open position and prevent the wheelchair lift from being operated until the transmission is in park and the emergency brake is completely set. A dash mounted; indicator light will come on to show the system is activated.

31.1.9 The wheelchair lift shall be equipped with a mechanical “cycle counter” which will record a full lift cycle. A full lift cycle is defined as lowering the platform to street level and raising the platform to vehicle floor level or vice versa, but not including only unfolding and folding the platform. The counter shall be conveniently located, without a cover, where both the operator and maintenance personnel can easily view it. The wheelchair lift shall be rated for a minimum of 10,000 cycles.

31.2 Wheelchair Ramp (Low Floor Buses)

A power operated ramp system rated at 1000 lbs. minimum shall be provided in the bus, at the passenger entrance door. The ramp shall comply with the requirements defined in 49 CFR PART 38, Subpart B, and must provide ingress and egress quickly, safely and comfortably for a passenger in a wheelchair from a level street or curb. The slope of the ramp shall be 1:8 maximum to the street. The use of kneeling to meet the required slope is allowable. The ramp system shall be Ricon, Braun, Lift-U or approved equal that meets all requirement of this section. If available, a manual ramp shall be provided as an option, if requested by the end user.

A lift control interlock system shall be installed that shall ensure that the bus cannot be moved when the lift is not stowed and that the lift cannot be deployed unless the interlock is engaged [to meet ADA regulation in 49 CFR Part 38, Subpart B--Buses, Vans and Systems, §38.23, (b)(2)(I)]. The interlock system shall engage when the lift operation sequence is followed. Interlock operating instructions shall be included with the bus at delivery. An indicator light (red, labeled) shall be provided at the driver's station that is activated when the lift door is open and when the lift is in operation. An interlock override system shall be installed that allows service personnel to move the bus to a safe area for repairs.

The device shall incorporate a minimal effort, manual method of lowering to ground level and raising and stowing the empty ramp if the power to the ramp fails. When stowed, the ramp shall become part of the front floorboard. The gap between the stowed ramp and the flooring shall not exceed 3/16 inches.

Ramp functions shall be fully automatic utilizing a relay logic push button control panel with each function specifically labeled. Operation of the lift shall require constant pressure on the control buttons. Release of the button shall immediately halt operation of the ramp. An inherent design feature that will prevent the ramp from being powered beyond the over center point during the deploy cycle will satisfy this requirement.

The wheelchair ramp shall operate in a temperature range of -10 degrees Fahrenheit to 110 degrees Fahrenheit. The ramp shall provide safe ingress and egress in an inward or outward facing position.

Any pinching, movement, shear areas or places where clothing or other objects could be caught or damaged shall be covered or otherwise protected to prevent passenger injury.

The ramp shall be self-contained with its own hydraulic pump unit and shall operate and meet all requirements of these specifications while using the electrical sources normally used on public transportation vehicles.

The ramp platform shall meet all Federal ADA requirements.

The loading platform shall be covered with a replaceable non-skid material. The nosing shall be yellow. During the ramp operation the loaded platform shall not deflect more than 3 degrees in any direction from the unloaded position.

The platform shall have a tested net load capacity of 1000 pounds. The mechanical and hydraulic components shall conform to FTA specifications. Two mobility aid securement locations shall be provided. The space provided shall be in accordance with these minimum specifications and the requirements of the ADA and FMVSS. The securement system shall restrain a force in the forward longitudinal direction of up to 2,500 lbs. per securement leg and minimum of 5,000 lbs for each mobility aid.

An audible and visible wheelchair ramp engagement alarm shall be installed and activate when the wheelchair ramp is in use.

All ramp equipped buses shall display the international symbol of accessibility, one each on left and right side of the bus. Location shall be determined at the Pre-Production meeting.

The ramp shall meet ADA requirements as well as these minimum requirements.

- Capacity 1,000 pounds minimum.
- Usable platform width 30" minimum.
- Usable platform length 48" minimum.
- Platform shall automatically stop at floor level.
- Platform shall automatically stop when lowered to ground level.
- Handheld controls shall be conveniently located on a flexible, cut resistant cable and shall be mounted with access from inside or outside the bus. The cable shall be routed to eliminate being pinched in any moving parts and be wrapped with a flexible exterior protective conduit.
- Platform, bridge plate, and area between bridge plate and aisle shall be skid resistant.
- Bridge plate and platform shall be coated to resist rust.
- The color of the ramp shall coordinate with bus interior colors and be approved by the MTA. The outside edges of the platform shall either be painted yellow or use 3M™ vinyl safety stripe tape to enhance visibility when extended on the ground. Sharp corners of ramp platform shall be padded (remove for ramp use) when in the stored position.
- The wheelchair ramp shall comply with all federal, Americans with Disabilities Act (ADA), and Veterans' Administration regulations.

31.3 Wheelchair Securement

The wheelchair securement system shall meet the requirements of WC18, *Wheelchair Tiedown and Occupant Restraint Systems for Use in Motor Vehicles*, for a wheelchair with a passenger using

the optional wheelchair lap belt. A test report shall be submitted prior to production that demonstrates compliance with WC18.

The wheelchair/mobility-device securement system shall be the Q'Straint QRT-360 system or approved equal securement system that meets the requirements of section 31.2 and WC18. The system shall have heavy-duty retractors that shall quickly and easily secure a wheelchair and occupant. Alternate systems proposed must include independent wheelchair/mobility-device securements and retractable passenger seatbelt/shoulder-strap restraints.

Wheelchair tie down system shall consist of four (4) floor attachment points per location for the chair. The strap configuration shall consist of a minimum of four (4) fully automatic heavy-duty retractors that can be quickly fastened to the floor attachment points and the wheelchair. The heavy-duty retractors shall be self-locking and self-tensioning. Tie downs shall utilize grade 8 fasteners of the size required by the securement system's OEM. The tie down fastener shall include, as a minimum, SAE grade 8 cap screws, SAE grade 8 hexagon nuts and hardened washers. Q'Straint supplied fasteners are acceptable.

All floor securement plates shall meet all state and federal guidelines as described in *Section 39.3.1*. Floor anchorage points shall be Sure-Lok or Q'Straint OMNI floor anchorages that are compatible with Sure-Lok or Q'Straints tie-down systems. The anchorage point shall be heavy Duty 'L' Track, ramped 'L' track or approved equal track that meets all requirement of this section, utilizing corrosion resistant steel or aluminum and usable for front or rear tie downs or shared by both. All anchorage points shall be recessed and nominally flush with the floor to prevent a tripping hazard. Recessed area shall be sealed prior to anchorage point installation to prevent the intrusion of water.

Occupant and wheelchair securement shall use an integrated system and be securely fastened. Occupant restraint system shall meet ADA requirements, WC18 requirements and all applicable FMVSS 403 and 404 requirements. Lap belt, included as part of the occupant restraint system, shall be 108 inches.

All wall-mounted belt securement tracks must be mounted into a reinforced sidewall. Wall mounting into the standard sidewall is unacceptable.

The securement configurations proposed, and the hardware utilized must comply with all applicable Maryland State and Federal Department of Transportation (ADA) regulations and guidelines.

All proposals shall include a system of storing securement equipment in an efficient, orderly manner so that the equipment is readily available when needed and secured out of the way when not being used. The storage system shall ensure that stored equipment shall remain secured in any type of vehicular accident. Storage Bags provided by the tie-down manufacturer or open boxes on the floor are acceptable. The storage system shall be approved by the MTA.

The offeror shall submit a proposed plan for providing two (2) wheelchair locations and securement with their Exceptions/Approved Equals requests. The minimum clear floor space for each wheelchair location shall be 30" x 54", except for the 138" SRW, which shall be 30" x 52" minimum.

32 PAINT, LETTERING AND DECALS

Vehicles not manufactured with exterior panels of gel-coated fiberglass or pre-primed, pre-painted steel or aluminum skins shall be painted with DuPont Imron 5000, 3.5 VOC; PPG Concept Acrylic Urethane; Sikkens Autocoat BT LV650; or approved equal paint system that meets the requirements of sections 32.1 and 32.2, in fleet white, to match the OEM cab "White" paint. The

exterior 2 mil coat of white finish shall not be required if the exterior skin is pre-finished with an approved process rendering an equivalent “White” finish. Unpainted or exposed surfaces and edges of any approved pre-finished surface exposed as a result of the manufacturing process shall require primed and painted protection. Prior to manufacture of the vehicle the Contractor shall obtain approval from the MTA of the exterior body color via submission of paint plate samples. This paint specification applies to bodies painted at the body manufacturer or any exterior body surfaces painted by a supplier to the body manufacturer as pre-finished metal or parts.

To assure a proper bond between the surface of the vehicle and successive coats of original paint for the service life of the vehicle, exterior surfaces to be painted shall be properly cleaned and primed as appropriate for the paint used, prior to application of paint. Paint shall be applied smoothly and evenly with the finished surface free of dirt, runs and other imperfections. Orange Peel shall be within commonly accepted Automotive Standards. All exterior finished surfaces shall be finished with a vinyl topcoat, which is impervious to gasoline, and commercial cleaning agents. Finished surfaces shall not be damaged by controlled applications of commonly used graffiti removing chemicals.

No welded components shall be added to the vehicle after painting.

The Contractor shall provide all decals mandated by Maryland State and Federal law, as well as bus numbers on all sides. In all instances, application procedures and materials used shall comply with the recommended specifications and practices of the material manufacturer. These decals shall be installed at locations to be approved by the MTA after contract award. The material for the decals shall be selected to last the life of the vehicle without fading.

Interior decals shall consist of Bus/Vehicle Number, Emergency Exit Door, No Smoking (International symbol type), emergency window identification and operating instructions and other identification labels required by the various governmental regulatory agencies.

33 BATTERY ELECTRIC PROPULSION SYSTEM

The vehicle shall be powered by a battery electric Propulsion System. The Propulsion System shall be specifically adapted for cutaway bus duty cycle that includes start and stop operation. In addition to power required for propulsion, sufficient excess power shall be available to operate all accessories at their normal operating condition throughout the cutaway bus duty cycle.

The Contractor shall assure that the vehicle structure can successfully accept the installation of the Propulsion System and be operated on the stated duty-cycle for a period of 7 years without a structural failure. The Propulsion System shall be designed to require no major overhaul to achieve this lifetime. A major overhaul consists of the concurrent replacement, due to wear, of major components.

The Propulsion System shall comply with applicable local, state, and/or federal emissions and useful life requirements, as a zero-emission vehicle. The Propulsion System shall be rated for the GVWR or greater of the vehicle.

The Propulsion System includes an electrical Energy Storage System (ESS), propulsion control system (PCS), power-conditioning components, drive train to the driving wheels, and an appropriately sized Traction Motor.

33.1 Propulsion Control System (PCS)

The Propulsion Control System (PCS) regulates energy flow throughout the system components in order to provide motive performance and accessory loads, as applicable, while maintaining critical system parameters (e.g., voltages, currents, temperature, etc.) within specified operating ranges.

The PCS shall monitor and process inputs and execute outputs as appropriate to control the operation of all Propulsion System components.

The Traction Motor shall be equipped with an electronically controlled management system, compatible with 12-volt power distribution. The Traction Motor control system shall be capable of transmitting and receiving electronic inputs and data from other drivetrain components and broadcasting that data to other vehicle systems. Communication between electronic drivetrain components and other vehicle systems shall be made using the communications networks.

The PCS shall have onboard diagnostic capabilities able to monitor vital Traction Motor functions, store and time stamp parameter conditions in memory, and communicate faults and vital conditions to service personnel. Diagnostic reader device connector ports, suitably protected against dirt and moisture, shall be provided in the operator's area. The onboard diagnostic system shall inform the operator via visual and/or audible alarms when out of parameter conditions exist for vital Propulsion System functions. The on-board diagnostic system shall have capabilities for storing hard and soft codes and processing data and provide detailed information/reports on various aspects of fleet usage. The information shall be retrievable via cabling or wireless transmission to a laptop.

The PCS shall protect the drive system against progressive damage. The PCS shall monitor conditions critical for safe operation and automatically de-rate power and/or speed and initiate motor shutdown as needed. The on-board diagnostic system shall trigger a visual and audible alarm to the operator when the PCS detects a malfunction, and the Propulsion System protection system is activated.

Automatic shutdown shall only occur when parameters established for the functions below are exceeded:

- Over Temp
- Inverter Fault
- Over Voltage
- Broken Wire
- Loss of Electrical Communications
- Communications Safety
- No redundant vehicle manufacturer and/or component manufacturer "detection and shutdown" circuits. By default, the component manufacturer's software shall be used to record fault codes.

A control shall be available to the operator to allow a 30-second override, which, when depressed, will allow the operator to delay the drive system shutdown but not the activation and alarm system.

33.2 Transmission

Vehicle may be proposed with or without a transmission. Demonstration of the benefits to the inclusion or absence of a transmission in the vehicle build must be definitively established in the Proposal. Transmission shall utilize synthetic transmission fluid as provided by transmission OEM.

Required Documentation:

- Motor make and model
- Motor nominal voltage
- Motor cooling system description
- Motor peak and continuous rated speed (RPM)
- Motor peak and continuous rated torque

- Motor peak and continuous rated output power (kW)
- Motor fluid specifications (Oil, coolant)
- Motor mass
- Motor efficiency
- Transmission make and model
- Transmission gearing ratios
- Transmission fluid specifications
- Differential make and model
- Differential ratio
- Differential fluid specifications

33.3 Drive Shaft

A drive shaft, if used, must comply with the following requirements:

a. The drive shaft(s) shall be the largest available and be a minimum of 3 ½ inch diameter. The drive shaft shall be easily removed from the bus without the disassembly of the universal joints. Universal joints shall be equipped with lube fittings.

b. Two drive shaft guards shall be installed to prevent contact with the undercarriage of the bus and the ground in the case of drive shaft universal joint failure.

33.4 Energy Storage System (ESS)

An overview of the design and performance of the Energy Storage System (ESS) shall be provided to Procuring Agency. The ESS shall be capable of operating in the Procuring Agency's transit environment.

The ESS shall be designed, sized, and selected to ensure that the vehicle performance specifications, compatibility with EVSE, and other related requirements are met or exceeded, bearing in mind cost benefit and reliability variables as they relate to the characteristics of the different battery types. The power source for the vehicle shall be derived from established battery technology that has a field-proven track record of safe, reliable, and durable operation in similar applications.

The ESS design, including containers, module bracing systems, thermal-management systems, battery management systems, watering/venting systems, interconnections, fusing, and traction-controller and battery charger interfaces should be completely described in the proposal.

The proposal shall include a detailed analysis of expected battery performance in the Design Operating Profile. The proposal should also include a comprehensive statement of the warranty terms relating to the battery, including explanation of all disclaimers within the warranty. The charge cycle and cycle life should be stated in the proposal.

The ESS shall be capable of withstanding the high current and voltage profiles necessary to accomplish daily recharge events without reducing the life of the High Voltage Battery. The Energy Storage System shall comply with UN/DOT 38.3 requirements for lithium batteries or similar standards for non-lithium batteries.

Design Operating Profile:

- 1,200 ft elevation
- -10°F outdoor dry bulb temperature
- 1" snow cover on roads
- Hilly terrain
- Drive cycles equivalent to the Altoona HD-UDDS and Orange County cycles, alternating.

33.5 ESS Charging Requirements

The primary charging of the Energy Storage System shall be accomplished by conductive charging as needed to meet the required duty cycle. The battery charging energy shall be provided from a stationary EVSE via a mechanical or manual conductive interface, i.e., plug. Proposal should include a description of specific charging options and typical charging times. At a minimum, the vehicle shall be compatible with DC charging via CCS 1. Compatibility with AC charging shall also be provided as an option. The charging plug shall be J-1772 compatible.

The Energy Storage System shall also make use of energy from regenerative braking.

The Contractor shall deliver the vehicle with an installed, fully-charged, functioning ESS. The High Voltage Battery shall be fully formed, installed and tested in accordance with the battery manufacturer's recommended practices.

33.6 ESS Safety

The High Voltage Battery shall be located outside the passenger compartment and in a position outside of a direct impact zone. Additionally, High Voltage Battery packs shall be load distributed within the vehicle to equalize weight between the wheels on the same axles and to achieve appropriate weight distribution between axles so as not to adversely affect handling of the vehicle.

The vehicle body shall be purpose-designed and constructed to ensure passengers and the operator will not be exposed to hazardous electrical current either in normal operation or in the event of a vehicle accident. System safety analysis and test data shall be provided to the Procuring Agency. The ESS shall be designed and built to prevent gassing or fumes from the High Voltage Battery from entering the interior of the vehicle, i.e., a vent path to the exterior.

The ESS and associated vehicle systems shall conform as applicable to:

• UNECE R100: Uniform provisions concerning the approval of vehicles with regard to specific requirements for the electric power train

• UN 38.3 Recommendations on the Transport of Dangerous Goods: Lithium Metal and Lithium Ion Batteries (or section of UN 38 appropriate for proposed battery chemistry)

Proposals shall include complete descriptions of all safety standards followed in the design and manufacture of the battery system, safety testing procedures used to validate the safety of battery operation in this application, and documented results of safety testing to confirm that standards have been met.

33.7 Battery Management System (BMS)

At a minimum, the battery management system (BMS) must perform the following functions:

- The BMS must be capable of monitoring the voltage level of individual cells within the High Voltage Battery. The BMS must be able to read and store individual battery or block voltages at a frequency of 1 data point per block every 15 seconds. The system must also monitor High Voltage Battery temperatures using no fewer than 2 thermocouples placed in and around each battery pack sampled at the same 4 samples per minute frequency.
- The BMS must be capable of communicating when a battery fault (as defined by the battery manufacturer) has occurred and must be able to identify and communicate the faulty battery in order to perform maintenance.
- The BMS must be capable of engaging prudent safety interlocks when an unsafe battery condition has been detected.
- The BMS must be able to monitor the battery state-of charge and update a gauge viewed by the operator at least once every 15 seconds.

- The BMS must be able to communicate all data to the vehicle level information system for storage and communication.

33.8 Battery Thermal Management

Battery thermal management must be powered from an onboard source at all times. Thermal management must be continuously monitored with appropriate safety interlocks installed to react to adverse conditions as stated in SAE J1772.

High Voltage Battery temperatures must never exceed the manufacturer's recommended range during operation in the design operating profile and specified ambient conditions. High Voltage Battery cooling must be sufficient to prevent the temperature from exceeding the High Voltage Battery manufacturer's recommended maximum temperature when the ambient temperature is above 105 degrees F for a period of 16 hours of normal vehicle operation.

33.9 High Voltage Battery Cycle And Safety Testing

Proposals shall include complete descriptions of all life-cycle testing procedures used to validate the life of High Voltage Battery used this application at the proposed charging rates, charge durations, and expected ambient temperatures and operating profiles. Proposers shall include documented results of life cycle testing. Proposers shall include certification of High Voltage Battery life cycle testing by independent testing agency.

33.10 Battery Degradation

The Contractor shall provide a plan for replacing or reconditioning batteries if it has been determined that the batteries have degraded beyond their Warrantable End of Life (WEOL). The Contractor must clearly define WEOL and the method by which battery capacity is measured to determine WEOL. The Contractor must define the capacity to which the entire battery pack is restored such that it will remain above the WEOL for the remainder of the warranty.

The Contractor shall provide a plan for reuse or recycling of replaced battery cells and/or battery packs both during and after the warranty period. Plan shall conform with the requirements outlined in Section B "Energy Conservation" of the VPTA General Contract Provisions.

33.11 Required ESS Documentation

Proposals shall include the following documentation, at a minimum:

- Plan of vehicle layout showing location of battery pack(s)
- Battery Cell make and model
- Battery System mass
- Battery System certifications (SAE, ISO, UN)
- Energy capacity retention curves including state of charge and resting state of charge assumptions
- Nameplate system DC power capacity
- Nameplate system DC energy capacity
- Modules per rack
- Rack voltage
- Cells per module
- Module cell wiring (series/parallel configuration)
- Nameplate module capacity (Ah)
- Nominal module voltage
- Cell chemistry (e.g. NMC-811)
- Nameplate cell capacity (Ah)
- Nominal cell voltage

- Maximum charge rate
- Maximum discharge rate
- Battery Management System (BMS) Manufacturer/Model
- BMS location (e.g. module, rack.)
- Thermal operating ranges (Charge, discharge, storage)
- Type of thermal management (e.g. passive, forced air, liquid)
- Maximum heat rejection requirement
- Water and dust resistance (IP class)
- Routine battery state of health test procedure description
- Fire detection and suppression systems (describe sensors & controls)
- Decommissioning strategy

33.12 Electrical System

The vehicle shall be supplied with a 12-volt extreme duty electrical system, powered by a DC-DC converter. The electrical system shall be designed to provide and distribute 12-volt DC power to all low voltage electrical components in the bus. All add-on components must be "Plug and Play" to the wiring harness. All primary connectors must be color coded to ensure proper connection. All Primary connector circuit labels must be "hot-stamped" into the connector housing. Selection of components shall be made to maximize function in an environment characterized by high amperage draws. Electrical system shall comply with relevant sections of 49 CFR Part 393.

33.13 Low Voltage Electrical Charging System

The High Voltage System shall maintain the charge on the low voltage batteries via a DC-DC converter. The vehicle shall be equipped with a 150 AMP, 12 VDC DC-DC power converter, suitably rated to handle the electrical load requirements. Rated DC amps shall be achieved at the DC-DC power converter's designed maximum temperature.

33.14 Low Voltage Batteries

a. Low Voltage Battery shall be maintenance free 12-volt DC type Glass Mat Group 31 Top Post (3/8" stud w/stainless steel nuts). Battery shall have a minimum of 180 minutes Reserve Capacity.
b. The positive and ground battery cables shall be continuous run without any splices.
c. Batteries shall be mounted below the stepwell of the passenger entrance door in a 304 stainless steel enclosed battery compartment, restrained by a nylon strap and easily accessed via the removal of six screws. Battery compartment shall be completely sealed to keep out foreign material.

33.15 High Voltage Electrical System

All high voltage components and wiring shall be clearly differentiated and appropriately labeled. The high voltage electrical system shall comply with UNECE R100.

34 OPTIONAL EQUIPMENT ITEMS

The MTA or the Operating Agency may choose to exercise all, some or none of the following options. Offerors are required to submit proposals on all optional equipment items as described below:

34.1 Option 1: Electronic Destination Signs

34.1.1 Twin Vision LED, Transign LED Destinator or approved equal destination signs that meets the requirements of this section shall be provided. The front sign shall be the largest practical mounted in the top center of the front of the bus. The side sign shall be largest practical mounted

in the first window behind the passenger door. Final destination sign locations shall be determined during the pre-production meeting. Defrosting glass or fan shall be provided with the top center destination sign.

34.2 Option 2: Fire Suppression System

34.2.1 An automatic fire suppression system shall be provided on each bus, Fogmaker, Amerex V-25, Kidde KVS or approved equal system that meets the requirements of this section. The fire system shall include a minimum of three sensors and three nozzles, a control panel and a manual actuator. At least one temperature sensor and one nozzle shall be in the battery compartment. Contractor shall provide proposed specific configuration and mounting details for the MTA's approval at the Pre-Production Meeting before the vehicles are built.

34.3 Option 3: Farebox Accommodation

34.3.1 Accommodation for a Diamond SV or equivalent fare box shall be made as far forward as practicable and shall not obstruct passenger traffic. As a minimum, the accommodations shall include a mounting point and power wires.

34.3.2 A horizontal passenger assist shall be located across the front of the vehicle and shall prevent passengers from sustaining injuries on the fare collection device or windshield in the event of a sudden deceleration.

34.4 Option 4: Farebox

34.4.1 The contractor shall provide and install a Diamond RV Farebox, or approved equal that is equivalent in form, fit and function. Location shall be approved by the MTA. A spare vault shall also be provided.

34.4.2 The contractor shall provide and install a Diamond SV Farebox, or approved equal that is equivalent in form, fit and function. Location shall be approved by the MTA. A spare vault shall also be provided.

34.5 Option 5: Full Camera System

34.5.1 The contractor shall provide and install the most recent model AngelTrax, Apollo or Seon Trooper TL five camera system, or approved equal system, as selected by the end user, that meets the requirements Attachment W. Final location of the cameras shall be determined at the Pre-Production meeting.

34.5.2 The contractor shall provide one complete viewing station consisting of, at a minimum, the Computer Equipment and software necessary to view the images from the camera system that is compatible with the AngelTrax, Apollo, Seon Trooper TL or any approved equal, as selected by the end user. The Viewing Station shall meet the requirements specified in Attachment W.

34.6 Option 6: Dual-Vision Camera System (In Lieu of Full Camera System)

34.6.1 A Rosco Dual-Vision XC or approved equal system that meets the requirements of this section, windshield mounted two (2) camera system with forward facing and inward facing views shall be installed. The system shall provide continual audio and visual recording, 24-hour surveillance and post route GPS tracking onto a minimum 32 gig SD card. The video recording shall be a continuous loop recording that operates with the ignition and will note events that will be protected from being overwritten. The camera will provide up to 160 hours of continuous video recording minimum with G-Force, Panic & Speed Event recording & tagging. The SD card shall be an integral part of the camera and must be located in a self- locking port to hinder tampering or theft. Videos must be able to be converted to .avi files for data transfer via e-mail. It shall be a self-managed system, with software provided to manage, sort and report data with capability to

output Excel Reports. SD Cards must be able to be read from any computer with USB/SD Card Reader capabilities. Integrated GPS tracking shall be viewable from the SD card using Google Maps Routing & Tracking, with internet access and no additional fees.

34.6.2 Two spare 32 GB SD cards shall be included with the system.

34.7 Option 7: Passenger Stop Request

34.7.1 Controls shall be provided adjacent to the wheelchair securement locations and seats for requesting stops and which alerts the driver that a passenger wishes to disembark. This shall include both audible (chime) and visual (stop request) system.

34.7.2 For ambulatory passengers, the audible controls shall be mounted at a height easily accessible for the passengers to use. For mobility-impaired passengers, the controls shall be mounted no higher than 48 inches and no lower than 15 inches above the floor.

34.7.3 All controls shall be operable with one hand and shall not require tight grasping, pinching or twisting of the wrist. The force required to activate the controls shall be no greater than 5 foot-pounds.

34.7.4 Offeror shall submit details of stop request system for the MTA's approval at the time of pre-production meeting.

34.8 Option 8: Flat Floor (High Floor Buses)

34.8.1 The interior passenger compartment shall be continuously flat from the vestibule area to the rear wall to accommodate additional wheelchair positions. When fastening the floor understructure to the bus body understructure, no fasteners shall protrude more than one half (1/2) inch below the underside of the floor structure above the rear tires. (Not applicable for the 138" SRW)

34.9 Option 9: Manually Operated Passenger Door

34.9.1 In lieu of an electrically operated passenger door, the passenger door shall be manually operated. The mechanism and supports must be of a heavy-duty design.

34.10 Option 10: Passenger Seat Sneeze Guards

34.10.1 Freedman 'Passenger Guards', or approved equal, shall be installed on each seat. The guards shall:

- Be made from soft, clear vinyl that is replaceable, easy to clean as well as UV and mildew resistant.
- Include a high visibility 'Do Not Touch' sticker or decal.
- Be easy to replace, but not removable by riders.
- Be of a flexible material that does not present a laceration hazard.

34.11 Option 11: Strobe Light

34.11.1 A roof mounted strobe light, with a brush guard, shall be installed towards the rear of the bus. The brush guard shall be designed to prevent the strobe light from damage by branches by allowing them to pass over the light. The design of the brush guard shall be approved by the MTA at the Pre-Production meeting.

34.12 Option 12: Public Address System

34.12.1 Vehicles shall be equipped with public address system permitting the driver to announce stops and provide other passenger information.

34.12.2 The vehicle shall be equipped with a minimum of four (4) interior speakers and one (1) exterior weatherproof speaker, which shall provide for clear, audible messages. A separate volume control shall be provided within easy reach of the driver. The system shall be muted when not in use.

34.12.3 The microphone shall be a handheld microphone located adjacent to the driver. The handheld microphone shall be secured within the driver's range of vision and easy reach. As an option, the microphone shall be hands free with a foot operated trigger.

34.12.4 Successful Offeror shall submit details of public address system for the MTA's approval at the time of pre-production meeting.

34.13 Option 13: Diagnostic Equipment

34.13.1 A Panasonic Toughbook or approved equal, shall be provided with the required software to maintain the bus.

34.13.2 An engine diagnostic reader/scanner compatible with ODT II shall be provided.

34.14 Option 14: Training

34.14.1 The Contractor shall provide a program to educate, train and teach personnel in all details of the bus, as required, to enable the MTA to safely and satisfactorily operate, service and maintain the buses. One objective of the program shall be to develop within the property the capability to perform similar training under its own training program subsequent to the Contractor's involvement. The training program shall be 40 hours minimum.

34.14.2 The Contractor shall submit a Training Plan with the Technical Proposal in accordance with the specification's requirements. The Training Plan will provide detailed information on the Offeror's training program and the manner in which it proposes to meet the property's training requirements. In addition, the Training Plan shall include the number of classroom and field instruction hours that the Offeror recommends for each system on the bus; the qualifications of the instructors; a list of training aids to be used and furnished; and a brief description of the scope of instruction to be covered.

34.15 Option 15: Passenger Counters

34.15.1 A Denominator 4-digit single tally passenger counter with a maroon key top and base plate shall be provided and installed within easy reach of the driver. The location will be approved by the MTA.

34.15.2 A Denominator 4-digit four tally passenger counter with 4 different color key tops and base plate shall be provided and installed within easy reach of the driver. The location will be approved by the MTA.

34.16 Option 16: MORryde Suspension System

34.16.1 A MORryde RS Suspension System shall be provided for the rear axle. The suspension system shall be adjusted to compensate for the wheelchair lift on the right side.

34.17 Option 17: Driver's Barriers

34.17.1 Type 1 Driver's Barrier – Fixed Door with Sliding Glass System.

34.17.2 Type 2 Driver's Barrier – Full Fixed Door.

34.17.3 Type 3 Driver's Barrier – Sneeze Shield or Farebox Style Barrier.

34.18 Option 18: AM/FM Radio Delete

34.18.1 The AM/FM Radio shall be deleted, if available as an option from the OEM.

34.19 Option 19: Paint - Optional Designs

34.19.1 The bus shall be painted a full body color, including the roof, other than OEM white. An example would be a bus painted all blue.

34.19.2 The bus shall have a single color 6-inch stripe installed at the beltline on the entire bus, including the rear of the bus. The color will be selected by the end user.

34.19.3 Lettering/Decals shall be applied to both sides of the vehicle to include the agency logo in addition to the name.

34.20 Option 20: Propane Conversion (Gas Engine Vehicles Only)

34.20.1 A Propane Conversion kit shall be installed on the bus to convert the fuel system to propane autogas. The system shall be compliant with all EPA, FMVSS and NHTSA standards. The installer must be Ford QVM certified. The Propane tank shall be 50 usable gallons minimum. The system shall be Roush CleanTech Generation 5 or approved equal.

34.21 Option 21: Baltimore MTA Mobility Option

34.21.1 Chrome or polished aluminum diamond plate, twelve (12) inches in height, shall cover the interior sidewalls rising from the floor in the mobility aid securement area.

34.21.2 The contractor shall supply and install all exterior decals, including Bus Numbers, as shown on the following Layouts:









The location of the bus numbers shall be determined by the MTA at the time of ordering.

34.21.3 There shall be two additional interior lights.

34.21.4 There shall be an additional LED light above the passenger door.

34.21.5 The Center High Mounted Stop Light shall be 4” round. If available, the light shall include a strobing module for continuous strobing whenever the brake pedal is depressed.

34.21.6 The interior mirror shall be 6” x 30”, or the maximum size available.

34.21.7 There shall be transition stone guards installed on the bus body just aft of the running boards.

34.21.8 Stainless Steel grommet covers shall be installed on all 4” signal lights on the rear of the bus, if available.

34.21.9 There shall be a ‘Lift Enable’ switch installed in the dash.

34.21.10 The control pendant for the wheelchair lift shall be permanently mounted on the inside of the forward lift access door panel in an appropriate housing within easy reach of the operator. The lift manufacturer’s location is acceptable.

34.21.11 Boxes suitable for storing the wheelchair restraints shall be supplied. A battery box is an acceptable storage box. There shall be one box for each wheelchair position.

34.21.12 All stanchions shall be stainless steel, powder coated safety yellow.

34.21.13 Wall grab handles, 6” minimum, shall be installed in the Wheelchair area in a location suitable for assisting a passenger in a wheelchair to maneuver. The grab handles shall be designed and made to match the stanchions.

34.21.14 A Motorola APX4500 dual-band radio shall be installed on an extra heavy mounting duty mounting system. The system shall include the radio, a palm mic, power cable, speaker, remote mount hardware, the control head, and a three-year warranty. The radio shall be compatible with the state of Maryland 700/800 MHz radio system.

34.21.15 The keypad and/or remote for the passenger door shall be deleted.

34.21.16 There shall be no flip-up arm rests on the passenger seats.

34.21.17 One additional spare set of wheelchair tie-downs shall be supplied with each bus.

34.21.18 A roof mounted strobe light, with a Brush Guard, shall be installed towards the rear of the bus. The brush guard shall be designed to prevent the strobe light from damage by branches by allowing them to pass over the light. The design of the brush guard shall be approved by the MTA at the Pre-Production meeting.

34.21.19 Conspicuity Tape shall be installed on the rear of the bus in a location approved by MTA Mobility.

34.21.20 Four (4) sets of keys shall be provided with each vehicle.

34.21.21 The AM/FM Radio shall be deleted, if available as an option from the OEM.

34.21.22 The location of all equipment shall be approved by the MTA at the preproduction meeting.

34.22 Option 22: Ranger MDC System (MTA Mobility Only)

34.22.1 A Ranger MDC system shall be installed. The Ranger MDC shall be the most recent version approved, currently 4.4, and in use by MTA Mobility, as supplied by Trapeze. The Ranger MDC system shall include all software, licenses, wiring, mounts and components required to utilize all functions available on the current version of the Ranger MDC.

34.23 Option 23: Recaro Driver’s Seat

34.23.1 The driver’s seat shall be Recaro with a Norco power base or approved equal. The MTA shall select the fabric (Level 4) at the time of ordering.

34.24 Option 24: Charger for Battery Electric Buses

34.24.1 An SAE compliant charger that meets the requirements of this specification shall be provided.

34.25 Option 25: Seating Options

34.25.1 - Additional Wheelchair Position

34.25.2 - Single flip seat

34.25.3 - Double flip seat

34.25.4 - Extra-long retractable seat belts (in lieu of standard)

34.25.5 - Cloth fabric (Level 4 or 5) on Passenger Seats

34.25.6 - Vinyl fabric (Level 5) on driver's seat.

34.26 Option 26: Wheelchair Ramp/Lift Options

34.26.1 – A manually operated ramp shall be provided, in lieu of a power ramp

34.26.2 - Additional Q'straint QRT-360 Fully Automatic tiedown system

34.27 Option 27: Bike Racks (Not available with Option 28)

34.27.1 - The vehicles shall be equipped a Sportworks Apex 2 S/S (stainless steel) Bike Rack or approved equal that meets the requirements of this section, two position bike rack with a quick release mounting bracket mounted on the front bumper. The wheel trays shall accommodate a large array of bikes with up to 29" diameter wheels, 3.2" wide tires and a 48" wheelbase. The bike rack must be easily removable for towing.

34.27.2 - The vehicles shall be equipped a Sportworks DL2 or DL2 NP S/S (stainless steel) Bike Rack or approved equal that meets the requirements of this section, two position bike rack with a quick release mounting bracket mounted on the front bumper. The rear position is standard to accommodate bicycles with 20"-29" diameter wheels, up to 3.2" wide tires, and up to a 44" wheelbase. The bike rack must be easily removable for towing.

34.28 Option 28: Driver Assist/Safety Packages (Not available with Option 27)

All available/optional safety/technology systems offered by the respective chassis manufacturer shall be provided as a minimum, as follows:

34.28.1 GM Chassis

- Forward Collision Alert
- Lane Departure Warning

34.28.2 Ford E-Series Chassis

- Driver’s Assist Technology Package, including the following: Automatic Emergency Braking (AEB), Distance Alert/Distance Indication, Post-Collision Braking, Adaptive Cruise Control, Lane Departure Warning, Driver Alert System and Auto-High Beam Control

34.28.3 Ford Transit Chassis

- Blind Spot Assist
- Front Sensing System

35 QUALITY ASSURANCE

35.1 The Contractor shall assume all responsibility for maintaining quality of components and equipment supplied on these vehicles.

35.2 The MTA shall have the right to inspect the vehicles during production and a final point of assembly, prior to delivery.

35.3 The MTA reserves the right to carry out a quality assurance inspection upon delivery, prior to acceptance, of the vehicle and may refuse delivery should defects be found as determined by the Administration.

35.4 The MTA may be represented at the Contractor's facility by resident inspector(s). They shall monitor in the plant assembly of small buses built under this procurement. The resident inspector(s) shall be authorized to approve the pre-delivery acceptance tests and to release the coaches for delivery. Upon request to the quality assurance supervisor, the resident inspectors shall have the access to the Contractor's quality assurance files related to this procurement. These files shall include drawings, material standards, parts lists, inspection processing and repairs and records of defects.

35.5 The presence of these resident inspectors in the plant shall not relieve the Offeror of its responsibility to meet all of the requirements of this procurement.

35.6 The MTA shall conduct a water leak test. All windows and doors, both the chassis manufacturers and those altered or placed on the vehicle by the conversion company, shall be tested by the MTA's quality assurance inspector(s) for leaks. All vehicles shall endure this test prior to acceptance.

35.7 Final quality assurance inspections shall be conducted at the Contractor's location.

35.8 The Offeror shall provide office space for the resident inspectors in close proximity to the final assembly area. This office space shall be equipped with desks, outside telephones, and chairs to accommodate the resident inspector's staff. The office space shall be properly heated and air-conditioned.

35.9 The successful Offeror shall deliver vehicles to the User Agency. As part of delivery, Offeror shall instruct user on vehicle operations including all standard and add on equipment.

37 MANUALS AND PARTS INFORMATION:

37.1 The following hard copies of manuals/parts lists shall be provided:

- Two (2) operator's manuals for EACH bus delivered, as required for the body and chassis
- One (1) illustrated parts manual for EACH bus delivered, both chassis and body
- One (1) maintenance manual for EACH bus delivered, both chassis and body, including electrical schematics showing location of fuses and components
- One (1) copy of all utilized vendor parts and maintenance manuals for EACH bus delivered
- One (1) CD-ROM, DVD or flash drive containing all of the manuals and parts lists for EACH bus delivered

38 RADIO

38.1 The vehicle shall be equipped with the chassis manufacturer's AM/FM Stereo Radio or AM/FM/CD Stereo Radio, plus six (6) speakers; two (2) in front and four (4) in rear shall be provided. The use of aftermarket radios of equal or superior quality may be used if not available from the OEM, with approval of the MTA.

39 SPECIAL TOOLS

39.1 The Offeror will define in its Technical Proposal a complete listing of all Special Tools, Programming and Diagnostic and Test Equipment, including all software applications, required for maintenance and repair of the bus.

40 AMERICANS WITH DISABILITIES ACT REQUIREMENTS

40.1 *These requirements are in addition to those previously described in these specifications. This section is a synopsis of what is required by the Americans with Disabilities Act in an effort to make buses accessible to persons with disabilities. The successful Offeror is solely responsible for any additions, deletions, omissions or interpretations of the Act as it relates to constructing a vehicle*

for this contract. All paratransit vehicles are required to be fully compliant with these requirements.

40.2 Mobility Lifts

40.2.1 Lift-equipped vehicle shall use an interlock between the lift controls and vehicle braking system, transmission or door, or shall provide other appropriate mechanisms or systems, to ensure that the vehicle cannot be moved when the lift is not stowed, and the wheelchair lift cannot be used unless the interlocks or alternate systems are engaged.

40.2.2 In the event of a power or equipment failure the lift shall be designed to deploy no faster than 12 inches per second.

40.2.3 Each lift platform shall have a barrier that prevents a wheelchair from rolling off the edge closest to the vehicle until the platform is in its fully raised position. Each side of the lift platform shall have a 1 and 1/2-inch (minimum) barrier. The existing loading edge barriers are sufficient.

40.2.4 Lift platform surfaces shall be free of any protrusions over 1/4 inch high and shall be slip resistant.

40.2.5 Lift platform shall move at a rate that does not exceed 6 inches per second during lowering and lifting and 12 inches per second during deployment and stowage.

40.2.6 Each lift platform shall be equipped with handrails on two sides, which move in tandem with the lift and shall be graspable and provide support to standees throughout the entire lift operation. Handrail specifications are as follows:

40.2.7 A usable component (handle) at least 8 inches long with the lowest portion 30 inches (minimum) above the platform and the highest portion 38 inches (maximum) above the platform.

40.2.8 A grasping surface with a diameter of 1 and 1/4 to 1 and 1/2 inches and corner radii of not less than 1/8 inch.

40.2.9 A minimum of 1- and 1/2-inches knuckle clearance from the nearest adjacent surface shall be provided.

40.2.10 The boarding edge of lift platform shall have a band of color(s) running the full width of the step or edge, which contrasts from the lift surface.

40.3 Securement Devices

40.3.1 WC18 requires that wheelchair tie down/securement systems of complete WTORS must be dynamically strength tested on an impact sled using a 30-mph/20-g crash pulse, a 187-pound (85 kg) surrogate wheelchair, and a 170-lb (76-kg) midsize adult male crash-test dummy. However, one of the most significant changes in WC18 is that wheelchair tie down/securement systems must be able to withstand the increased forces generated in an additional test in which the 170-lb crash-test dummy is restrained by a lap belt that is anchored to the surrogate wheelchair rather than to the vehicle.

40.3.2 The securement system shall be located as near to the accessible entrance as practicable and shall have a clear floor area of 30 inches by 54 inches. Flip seats may be installed in the securement area but shall not obstruct the clear floor area.

40.3.3 Each wheelchair placement shall include a passenger seat belt and shoulder harness.

40.3.4 The wheelchair securement devices shall secure the wheelchair in a forward-facing manner.

40.4 General

40.4.1 Floors in wheelchair securement area shall have slip resistant surfaces.

40.4.2 Each vehicle shall contain a sign(s) that indicates that seats in the front of the vehicle are priority seats for persons with disabilities. Each securement location shall have a sign designating it as such. Characters on these signs shall meet the following requirements:

- A width to height ration between 3:5 and 1:1.
- A stroke width to height ratio between 1:5 and 1:10.
- A minimum height of 5/8 inch.
- Spacing between characters of 1/16 the height of the upper-case letters.