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# SCOPE

This scope of work establishes the minimum technical requirements for the purchase of Zero-Emission School Buses by Local Education Agencies within the State of California. Prototypes or floor models shall not be accepted. Any brand names or model numbers found in the solicitation shall be considered reference only.

# APPLICABLE LAWS and INDUSTRY STANDARDS

Specifications, standards, and codes referenced in this document in effect on the opening of the Request for Proposal (RFP), form a part of this specification.

## Laws and Regulations:

* + 1. Federal Transit Administration (FTA)
		2. American with Disabilities Act (ADA)
		3. California Code of Regulations (CCR)
		4. Occupational Safety and Health Administration (Cal-OSHA) safety requirements
		5. California Vehicle Code (CVC)
		6. Safety Orders of the Division of Industrial Relations
		7. California Highway Patrol (CHP)
		8. Federal Motor Vehicle Safety Standards (FMVSS)
		9. Colorado Rack & Load Testing
		10. Kentucky Pole Testing
		11. Title 13 California Code of Regulation
		12. National Highway Transportation Safety Administration (NHTSA)
	1. **Industry Standards:**
		1. Society of Automotive Engineers (SAE)
		2. International Organization for Standardization (ISO)
		3. American Society for Testing and Materials (ASTM)
		4. American National Standards Institute/ American Welding Society (ANSI/AWS)
		5. *National Congress of School Transportation (NCST)*

# OPERATING ENVIRONMENT

The bus shall achieve normal operation in ambient temperature ranges of 10 ºF to 115 ºF, at relative humidity between 5 percent and 100 percent. Degradation of performance due to atmospheric conditions shall be minimized at temperatures below 10 °F, above 115 °F.

# TECHNICAL REQUIREMENTS

The bus shall be supplied with all equipment and accessories indicated as standard equipment in the manufacture’s published literature. All structural and non-structural components must be either steel or standard materials that meet all the requirements outlined in Section 2 APPLICABLE LAWS and INDUSTRY STANDARDS. Optional equipment necessary to meet the minimum requirements of this specification shall be included.

## FRAME/CHASSIS:

The entire body shall utilize hemmed edges on all interior panels, and be void of sharp edges, especially in the proximity of the passenger seats, entrance door, and emergency exits.

The body shall be mounted to the chassis with sufficient material to prevent separation in a vehicle accident or roll-over.

* Entire body shall be primed before painting, and all areas sealed with compound to prevent moisture penetration.
* Interior of all areas shall also be primed for corrosion resistance.
* High Voltage

Vendor shall provide complete chassis and body floor plans with dimensions showing all aspects of the bus layout, including, but not limited to length, width, wheelbase, passenger area, seat location, seat spacing, lift location, step well, driver’s seat, dash and cowl location, hood, and all overhangs. Plans shall be included in the bid package for State evaluation.

### Materials:

All materials utilized in the construction of the body shall be available to all body manufacturers on an equal, non-proprietary basis. For maximum occupant safety, all exterior body panels shall be aluminum or material of equivalent strength.

### Corrosion:

The body material shall be treated with a zinc phosphate coating (or equal) and sealed to prevent outside contaminants from reaching the basic metal of the body. No part of the bus body shall have bare steel. All parts of the body shall have primer applied. The bottom of the body shall be coated with under seal prior to mounting on the chassis. The chassis shall not be coated with under sealer except as required for attachment around the engine cowl area.

### **Design:**

The body shall be designed to meet current School Bus standards in effect for the State of California per CHP requirements. The design shall provide for maximum body life. All internal spaces shall be insulated. All seams and joints shall be caulked/epoxied to meet joint strength criteria and to seal against moisture penetration. All interior panels shall be hemmed to eliminate sharp edges.

### Frame:

The frame shall be designed to meet current School Bus standards in effect for the State of California. DOT FMVSS certified for use in school bus application. The delivered frame shall be designed to provide minimum 12-year vehicle life at maximum Gross Vehicle Weight Rating (GVWR). Provide frame mounted tow hooks.

### Guard Rail Locations:

Guard rails shall be located under window, seat cushion, floor line, body skirt. The top edges of rails shall be sealed to body, and bottom edge shall have drains.

### Bumpers:

Shall be Original Equipment Manufacturers (OEM) equipment.

### Steering:

Shall be (OEM) equipment.

### Brakes:

Shall be (OEM) equipment with anti-lock. All buses shall be equipped with spring brake mounted parking system that is able to maintain wheels locked on a minimum of 15% grade and a regenerative braking system.

### Axles:

The axles shall be rated to meet or exceed the Gross Vehicle Weight Rating (GVWR)

### Suspensions:

The suspension shall be rated to meet or exceed the Gross Vehicle Weight Rating (GVWR)

### Drive line:

OEM or standard driveline incorporating dynamic balancing is required. The drive line shall include driveline guards as required for each driveline section. Universal joints, driveline, Transmission, shall be either grease able or lubed for life.

## POWERPLANT:

### Powertrain:

The bus shall be powered by a battery electric drive system. At a minimum, the drive system shall comply with applicable local, state and/or federal emissions and useful life requirements. The drive system shall comply with local, state, and federal (maintenance) and other applicable sections.

The zero-emission drive system shall be rated for the GVWR or greater of the bus.

The bus shall be powered by a battery electric drive system. 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 traction applications.

The powertrain and battery pack shall be contained between the frame rails of the bus ***or*** in fashion that supplies sufficient protection from impact or crash. The electric powertrain and battery pack shall be sufficient to accommodate a vehicle range of 100 miles minimum while operating withing the environment described in 3.0 Operational Environment.

### Traction Motor:

The traction motor shall be able to provide and recover kinetic energy as well as retard mechanical momentum (regenerative braking). The traction motor shall be a permanent magnet or equivalent AC induction type. Traction motor speed control shall be continuously variable.

### Charging:

The bus shall be equipped with an internal DC charging architecture of no less than 400V with DC fast charging capable of a minimum 50kW. Vehicle shall be equipped with DC bidirectional charging systems that comply the ISO 15118-20 standard. The bus(es) must be able to receive a remote update enabling grid-interconnected bidirectional functions (e.g., vehicle-to-building functions connected to the utility system), upon completion of applicable requirements for safe electrical interconnection. The bus(es) shall be equipped with a CCS1 charging receptacle.

## ELECTRICAL/WIRING:

### Drivers Console:

The driver’s console shall include the following equipment within easy reach and visibility.

Premium quality switches for all functional components associated with the body, and chassis. (Rocker style preferred). Heavy-duty turn signal switch, Signal Stat 910 Webb solid-state heavy-duty flasher. Standard flasher is unacceptable.

Full gauge package; including.

* Volt
* Warning buzzers for; air, doors, emergency exits.

The driver’s console shall contain an AM/FM radio (No Cassette), Bluetooth or AUX connection, with public address (PA) system, with front and rear speaker package, to include hardwired microphone. Driver map/reading light. If a shifter is required it shall be located on dash panel, not on console or pedestal.

### Additional Wiring for State Installed Aftermarket Equipment:

Additional wiring shall be provided and installed. Two (2) 20-amp spare circuit body harness utilizing 12-Gauge wires shall initiate from the electrical panel area and be circuit breaker protected.

### 12 Volt Batteries:

Minimum, two (2) 12 Volt using sealed cables. If equipped, one (1) battery shall be dedicated for the wheelchair lift. Battery be a slider style or be mounted in a pull-out drawer utilizing stainless steel roller bearing slides. Battery box shall be sealed, vented, and pull-out tray shall be Heavy duty and designed for 20-year life. Tray shall have a latch mechanism to hold the tray in place. Tray shall have stops to prevent pullout of the vehicle. Door to have a key lock. All keyed alike. Cables shall be routed to prevent chaffing and wear. All holes shall have grommets and wiring shall be secured to prevent chaffing and wear. Primary shut off switch to be located within easy reach of the door opening.

## DOORS/WINDOWS/MIRRORS

### Side Windows:

All side windows shall be AS-3 tinted. Passenger windows shall be tinted to 26-28% light transmission. Shall be 12-Inches split sash type, designed for easy serviceability. Shall be designed so that no part of the interior paneling, air conditioning equipment, L-track, etc., is removed for window replacement.

### Driver Window:

The windshield shall be AS-1 tinted. For optimum safety, design emphasis shall be on maximum driver visibility.

### Passenger Door Window:

The passenger door window shall be AS-2 tinted.

### Windshield:

The windshield shall be AS-1 tinted. For optimum safety, design emphasis shall be on maximum driver visibility. Top 5 inches shall have dark glare resistant type band. Remainder shall be tinted to maximum allowed by CHP regulation.

### Windshield Wipers:

The windshield wipers shall be heavy-duty electric design incorporating both variable and intermittent speed control features. Wiper blades shall be approximately 20 inches long. Wipers shall return to park position when turned to off position. Washer reservoir to be a minimum one (1) gallon capacity, with spray emitting from wiper arms. Air conditioning system must not interfere with access to wiper motor assemblies.

### Entrance Door:

Preferred entrance door shall be outward opening air OR electric operated incorporating an anti-slam air control device, emergency air release valve, and inside door handle for emergency exit. Include header pad, same color as the seats. Door control to be located on drivers control panel. Door assembly shall have keyed external locks or, have provision at the bottom for a standard padlock to secure the door closed. Door actuator mechanism shall have latched easy access hinged panel, with a device to hold it in the open position. Door shall have external handle for driver to use to close door that shall be located on bottom front panel. No other latches allowed. The entrance door shall have manual air dump valve to release door air pressure for closing / emergency release.

## LIGHTING:

**Note:** All lighted shall be Light Emitting Diode (LED).

### Interior Lights:

Interior lights shall include Two (2) rows of Interior dome lights that shall be located every 6 feet (approximate) spaced equal distance from outside walls. A step well light controlled by door operation. A driver’s map light. Wheelchair lift shall have a single light directly overhead with automatic activation ora separate switch located in the ceiling, adjacent to the lift. Same circuit as other interior lights.

### Headlights:

Headlights shall include auto functioning daytime running lights.

### Exterior Lights:

Exterior light assemblies shall be sealed assembly type with sealed connectors.

To include the following:

* Clearance / I.D., Five (5) each end, plus one (1) center.
* Two (2) Red rear stoplights
* Two (2) Red rear taillights
* Two (2) Clear rear backup lights
* Two (2) Amber rear directional lights
* Two (2) Amber side directional lights (near front of body, driver’s window area.)

Shields for protection from damage shall be on the following.

* Two (2) Amber front directional lights
* Two (2) Amber front lights
* One (1) Clear rear license plate light
* Four (4) Red/Amber side marker lights

Rear exterior lights located below the roofline shall not extend past body more than 1-inch, and lenses shall be retained with screws or in a rubber molding. Snap on lenses is not acceptable.

### School Bus Crossing Lights:

School bus crossing lights shall be eight (8) LED type system meeting California Specifications. To include crossover light shields, black in color. Lens shield shall be painted black to aid in visibility. Include pilot light at driver’s console. Control system shall use Weldon module, or equal.

### Stop Arm:

Specialty manufacturing model 6500. Electrical solid state and operated by entrance door module. Location on vehicle to be determined by CHP requirements.

## SEATING:

### General Requirements:

Standard type seat mounting system. All aspects of the passenger seats and barriers including 3-point seat belts. Seats and barriers shall be minimum 30 -Inches wide. Seat color shall be determined by individual school districts at preconstruction conference.

### Passenger Seat Material:

All stanchions and barriers shall be padded. Front modesty panels both sides. Cover material shall heavy-duty automotive grade vinyl.

## WHEELCHAIR TRANSPORTATION:

The lift shall meet these minimum requirements. Location to be determined at preconstruction conference.

* Capacity 800 pounds minimum.
* Usable platform width 33-inches minimum.
* Usable platform length 50-inches minimum.
* Platform shall include automatic locking inboard safety wheel stop (minimum 6-inches height) and outboard safety wheel stops to prevent wheelchair from rolling off.
* 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.

## WHEELCHAIR SECUREMENT AREA:

The wheelchair securement system shall be installed Securement location shall be determined at preproduction meeting. Fold-away or track-mounted seating shall be provided for use when wheelchairs are not being carried. The integrated securement system shall restrain the occupant and the wheelchair separately and securely.

## SAFETY EQUIPMENT:

### Escape Equipment:

Roof shall include roof escape. Shall be operable from both the inside and outside. Wiring for warning system shall be installed in the bus, but not connected, unless CHP required. No exterior safety stripping around hatch unless required by regulations.

### Fire Extinguisher:

Bus interior shall have two (2), 5-pound fire extinguishers a shall be 2-A:10-B:C at a minimum and suitable for battery electric vehiclesCorresponding mount shall be included. Location to be determined at preconstruction.

### Safety Triangles:

Supply one (1) set of safety triangles mounted in luggage compartment.

### First Aid Kit:

Supply one (1) 24-unit First Aid Kit, mounted on front bulkhead. State to determine mounting location.

### Emergency Left Side Door:

Unless required by CHP regulations, delete left side emergency door.

## MISCELLANEOUS:

### Heating System:

All Heating systems shall not be fire fueled. All buses require an OEM integral heater capable of producing a minimum 50,000 BTU and maintaining an interior temperature of 65°F with ambient temperature of 30°F. Each vehicle shall have a front mounted integral high output heater. The heater is to be controlled by a control panel with adjustments for temperature and fan speed.All controls shall be located for ready access by the seated driver. A heat pump or similarly efficient system is recommended.

### Communication Radio:

Conduit shall be prewired for 2-way radio antennas. Final antennae make and model shall be determined by the school district at the preconstruction conference.

### Colors:

All buses should be bid with manufacturer's standard pallet, final color determinations will be made by the school district during the preconstruction conference.

### District Lettering Template:

Complete bus shall be lettered and numbered as designated by the school districts during the preconstruction conference. Front and rear SCHOOL BUS shall be 8-inches.

### Misc. Accessories:

* Registration holder
* Portable Stop Sign and holder.
* Positive locking compartment above driver area.
* Dual electric horns
* CHP Certificate holder
* Back up alarm, Ecco model SA 901, 82-107 DB or OEM equivalent.
* Review camera system STSK 1030 interior rear-view mirror, (6-inches x 20-inches nominal) or OEM equivalent.
* California compliant Child Check Mate system
* Prewiring for camera system, GPS system, and Telemetry system
* Slow speed noise generator, activation between 1 and18 mph, decibel level of 80, tested from about 2 meters (approx. 6 ft) away from the bus

## MANDATORY OPTIONS

### Storage Compartment:

A minimum of One (1)storage compartment.Storage compartments shall be the maximum bidder’s standard size. Door shall be supported in the open position using gas charged cylinders if under access door, or chains if not under door. The storage compartment(s) shall have steel full-length hinges. Compartment doors shall incorporate rubber seals to prevent entry of moisture. Compartment doors shall be lockable, all units keyed identical. Location determined by the school district during preconstruction conference.

### Booster Seats:

The bus(es) shall be equipped with a minimum of one (1) integrated Child Seats (ICS) style seats with the integrated boosters. The booster seats shall have built-in child restraint system with a 5-point harness for children 22 to 85 pounds. The booster seat shall have a sliding shoulder height adjusters accommodate children of a wide range of heights. Booster seats shall meet or exceed all applicable federal, state, and Head Start safety standards. The final location of the seats to be determined by the school district during preconstruction conference.

### Exterior Lights:

Two (2) Fog Lights

### Crime Alert Lights:

Clearance / I.D. lights shall be designed to operate in a flashing mode by the driver using a foot mounted switch (Painted Red). Flasher shall be silent type.

### Air Conditioning Systems:

Bus(es) require an OEM integral front air conditioner capable of reducing the inside temperature of the vehicle from 90°F (±2°F) to 75°F or less within 30 minutes and with an ambient temperature of at least 90°F. No tie in A/C systems will be allowed. The Air Conditioning system shall be installed in accordance with the manufacturers published installation instructions.

The air conditioning system is to be controlled by a control panel with adjustments for temperature and fan speed. All controls shall be located for ready access by the seated driver.

The evaporator and condenser must be matched to the compressor as per manufacturers recommended installation instructions. A label must be placed in the engine compartment detailing manufactures name, refrigerant type and quantity, compressor oil type and quantity. Evaporator drains must be installed to prevent puddles of water from being retained in the system.

### High Efficiency Air Purification System:

High Efficiency Air Purification System that contains a multistage High Efficiency Particulate Air (HEPA) air filtrationfilter with a MERV rating of 17 or higher.

### Entrance Door:

Door assembly shall have keyed access.

### Exterior Mirrors:

Heated mirrors and power mirrors.

### Misc. Accessories:

* Bus -Safety Rules-sign and holder.
* Roscoe back-up warning system, BSSK 1001 or OEM equivalent

### Charging:

* Onboard AC chargers

## Non-Mandatory Options

### Heat Pumps:

Heat Pump shall be the primary Heating Ventilation and Air Conditioning (HVAC) system and able to meet or exceed all the requirements in 4.11.1 Heating System: and 4.12.5 Air Conditioning:

# Line Item 1: TYPE C

## Type:

Standard Type C school bus chassis designed for school bus use in an urban environment.

## Capacity:

28-82 Passengers

## Wheel:

Shall be type for 10-hole, industry standard, hub pilot mounting, flange nut system. Six (6) wheels per vehicle.

## Tires:

All tires (6) shall be from the same manufacturer and be all season, tubeless, steel radial blackwall. The tires shall be the largest size available that meets the GVWR. The tires shall be low rolling resistance type.

# Line Item 2: TYPE C with WHEELCHAIR LIFT

## Type:

Standard Type C school bus chassis with wheelchair accommodations designed for school bus use in an urban environment.

## Capacity:

To be determined at preconstruction.

## Wheel:

Shall be Disk type for 10-hole, industry standard, hub pilot mounting, flange nut system. Six (6) wheels per vehicle.

## Tires:

All tires (6) shall be from the same manufacturer and be all season, tubeless, steel radial blackwall. The tires shall be the largest size available that meets the GVWR. The tires shall be low rolling resistance type.

## Wheelchair Transportation Requirements:

Bus layout shall be designed with the wheelchair opposite the lift.

# Line Item 3: TYPE D

## Type:

Standard Type D school bus chassis designed for school bus use in an urban environment.

## Capacity:

70-90 Passengers

## Wheel:

Shall be Disk type for 10-hole, industry standard, hub pilot mounting, flange nut system. Six (6) wheels per vehicle. The tires shall be low rolling resistance type.

## Tires:

All tires (6) shall be from the same manufacturer and be all season, tubeless, steel radial blackwall. The tires shall be the largest size available that meets the GVWR. The tires shall be low rolling resistance type.

# Line Item 4: TYPE D with WHEELCHAIR LIFT

## Type:

Standard Type D school bus chassis with wheelchair accommodations designed for school bus use in an urban environment.

## Capacity:

To be determined at preconstruction.

## Wheel:

Shall be Disk type for 10-hole, industry standard, hub pilot mounting, flange nut system. Six (6) wheels per vehicle. The tires shall be low rolling resistance type

## Tires:

All tires (6) shall be from the same manufacturer and be all season, tubeless, steel radial blackwall. The tires shall be the largest size available that meets the GVWR. The tires shall be low rolling resistance type.

## Wheelchair Transportation Requirements:

Bus layout shall be designed with thewheelchair opposite the lift.