Town of East Haven
Bid 19-28
Fire / Rescue Pumper

SEALED BIDS MAY BE SUBMITTED TO THE OFFICE OF THE DIRECTOR OF FINANCE, 250 MAIN STREET, EAST HAVEN, CONNECTICUT 06512, UNTIL OCTOBER 17, 2019 AT 10:30 AM WHEN THEY WILL BE OPENED.

The East Haven Fire Department seeks bids for 2019 Fire Rescue Pumper. Specifications and forms on which bids must be submitted may be obtained at the Finance Office on or after September 30, 2019 or for viewing and/or printing from the following Town website:

https://www.townofeasthavenct.org/purchasing-department/pages/bid-opportunities

There is no charge for the bid packet.
Bids must be submitted in triplicate – one (1) original and two (2) copies.

The Director of Finance reserves the right to reject any or all bids or to waive defects in same if it is deemed in the best interest of the Town to do so.

It is the sole responsibility of the Bidder to assure the bid is received by the proper authority prior to the bid opening time. Bids received after this time will be considered informal and will be rejected. No Bidder may withdraw their proposal within thirty (30) days of the date of the bid opening.

Minority and female-owned companies are invited to participate and will be afforded full opportunity to submit bids and are encouraged to do so.

The Town of East Haven is an Affirmative Action Equal Opportunity Employer.

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Paul S. Rizza
Finance Director

Town of East Haven Bid 19-28 Fire / Rescue Pumper	Bidder Complies	
	Yes	No

NOTICE TO BIDDERS

- Please clearly indicate any substitutions contained in your bid and which alternates or combinations of same are included in your bid.
- All prices are to be FOB East Haven, Connecticut.
- Delivery time may affect award of bid.
- Available manufacturer's service/operating literature and warranties to be provided for each and every component of this unit at time of delivery.
- The Town of East Haven will hold the successful bid prices firm for a period not to exceed one (1) year from the date of award such that additional vehicle(s) may be purchased under the same set of specifications and conditions.
- This bid may be extended two (2) times. Each time for a period of one (1) year provided that both parties are in agreement.
- Envelope(s) must be plainly marked BID, with the purpose and time of opening.
- Bids must be submitted on the bid sheet.
- Bidder will indicate estimated delivery time frame in weeks from the order date on the bid sheet.
- If successful bidder requires pre-payment a performance bond will be required. FEMA will only allow up to a 25% pre-payment.
- Proof of all certifications, licenses and insurances shall be submitted with this bid application, if applicable.

INTENT OF SPECIFICATIONS

It shall be the intent of these specifications to provide a complete apparatus equipped as hereinafter and as specified with a view of obtaining the best results and the most acceptable apparatus for service in the Department. These specifications cover only the general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment and appliances with which the successful bidder shall conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor. The manufacturer shall provide loose equipment only when specified by the customer. Otherwise, in accordance with the current edition of NFPA 1901 standards, the proposal shall specify whether the fire department or apparatus dealership shall provide required loose equipment.

Bids shall only be considered from companies that have an established reputation in the field of fire apparatus construction and have been in business for a minimum of twenty-five years.

Each bidder shall provide satisfactory evidence of their ability to construct the apparatus specified, and shall state the location of the factory where the apparatus is to be built. They shall also show that they are in a position to render prompt service and to furnish replacements parts.

Due to the severe service requirements the department will impose on the apparatus as specified, each bidder shall provide a list of at least six (6) departments serving populations of over 250,000 in which similar apparatus utilizing the brand of chassis proposed have been in service for over one year. This list shall include contact names and phone numbers.

Each bid shall be accompanied by a detailed set of Contractor's Specifications consisting of a detailed description of the apparatus and equipment proposed, and to which the apparatus being furnished under contract shall conform. These specifications shall indicate size, type, model and make of all component parts and equipment. {No Exceptions}

QUALITY AND WORKMANSHIP

The design of the Apparatus shall embody the latest approved automotive engineering practices. The workmanship must be of the highest quality in its respective field. Special consideration will be given to the following points:

Accessibility of the various units, which require periodic maintenance; and ease of operation (including both pumping and driving); and symmetrical proportions. Construction shall be rugged and ample safety factors shall be provided to carry loads as specified and to meet both on and off road requirements and to speed conditions as set forth under Performance tests and requirements. Welding shall be employed in the assembly of the apparatus in a manner that will not prevent the ready removal of any component part for service or repair.

All steel welding shall follow (American Welding Society) requirements for AWS D1.6:1999 Structural Welding Code for welding stainless steel structural assemblies. All aluminum welding shall follow (American Welding Society) requirements for AWS D1.2/D1.2M:2003 Structural Welding Code for any type structure made from aluminum structural alloys. All sheet metal welding shall follow (American Welding Society) AWS D9.1M/D9.1:2006 Structural Welding code for Arc/Braze requirements of non- structural materials. All pressure pipe welding shall follow (American Society of Mechanical Engineers) ASME IX/ ASME B31:2010 requirements to the qualification of procedures in welding and brazing, in accordance with the ASME Boiler and Pressure Vessel Code and the ASME B31 Code for Pressure Piping. Flux core arc welding to use alloy rods, type 7000, (American Welding Society) AWS standards A5.20-E70T1. The manufacturer shall be required to have an American Welding Society certified welding inspector in plant during testing operations within working hours to monitor weld quality.

Employees classified as welders are tested and certified to meet American Welding Society and American Society of Mechanical Engineers welding codes.

DELIVERY

To ensure proper break-in of all components while still under warranty, the apparatus shall be delivered under its own power, rail or truck freight shall not be acceptable. A qualified delivery engineer representing the contractor shall deliver the apparatus and instruct the Fire Department personnel in the proper operation, care and maintenance of the equipment delivered. The delivery of said apparatus is requested within 30 days of the award of the bid. This project is funded by a grant from FEMA as part of the Assistance to Firefighters Grant and therefore comes with a one-year period of performance. As such the buyer must take delivery before the period of performance ends, if the apparatus is not delivered by April 17, 2020 the vendor shall pay a penalty of $100.00 per day.

PERFORMANCE TESTS AND REQUIREMENTS

A road test shall be conducted with the apparatus fully loaded to its estimated in-service weight and shall be capable of the following performance while on dry paved roads that are in good condition and for a continuous run of ten (10) miles or more, during which time the apparatus shall show no loss of power or overheating. The transmission drive shaft or shafts and rear axles shall run quietly and be free from abnormal vibration or noise throughout the operating range of the apparatus. The successful bidder shall provide a Weight Certificate showing weights on front axle, rear axles and total weight for the completed apparatus at time of delivery.

A. The apparatus shall be capable of accelerating to 35 MPH (55 km/hr) from a standing start within 25 seconds on a level concrete highway without exceeding the maximum governed RPM of the engine.

B. The apparatus, fully loaded, shall be capable of obtaining a minimum top speed of 50 MPH (80 km/hr) on a level dry concrete highway with the engine not exceeding its governed RPM (fully loaded).

C. The service brakes shall be capable of stopping a fully loaded vehicle in 35ft (10.7 m) at 20 mph (32.2 km/hr) on a level concrete highway. The air brake system shall conform to Federal Motor Vehicle Safety Standards (FMVSS) 121.

D. The apparatus, when fully loaded, shall have not less than 25 percent nor more than 50 percent of the weight on the front axle, and not less than 50 percent nor more than 75 percent on the rear axle.

If optioned, the apparatus shall be tested and approved by the Underwriter's Laboratories Incorporated in accordance with their standard practices for pumping engines. The contractor shall provide copies of the Pump Manufacturer's Certification of hydrostatic test, the Engine Manufacturer current certified brake horsepower curve, and the Manufacturer's record of pumper construction details when delivered. If optioned, the vendor, at their expense, shall have the Underwriter's Laboratories Incorporated conduct the tests required by the Underwriter Laboratories Incorporated (Guide for the Certification of Fire Department Pumper subject 822 dated 1995 or latest). A copy of all tests shall accompany the Apparatus. (For apparatus sold within Canadian ULC S515 / latest revision.)

INFORMATION REQUIRED

The manufacturer shall supply at time of delivery, a complete operation and maintenance manual covering the completed apparatus as delivered. A permanent plate shall be mounted in the driver's compartment to specify the quantity and type of the following fluids used in the vehicle: Engine oil, engine coolant, and chassis transmission fluid, pump transmission lubrication fluid, pump primer fluid (if used) and drive axle lubrication fluid.

The manufacture shall supply the final certification of GVWR and GAWR on a nameplate affixed to the vehicle.

A permanent plate in the driver's compartment shall be installed, specifying the seating capacity of the enclosed cab.

Signs that state "OCCUPANTS MUST BE SEATED AND BELTED WHEN APPARATUS IS IN
MOTION" shall be provided and will be visible from each seated position. An accident prevention sign shall be located at the rear step area of the apparatus. It shall warn all personnel that standing on the step while apparatus is in motion shall be prohibited.

Bidder Complies	
Yes	No

A nameplate indicating the chassis transmission shift selector position to be used when pumping shall be provided in the driving compartment and located so that it can be easily read from the driver's position.

LIABILITY

The bidder, if their bid is accepted, shall defend any and all suits and assume all liability for the use of any patented device or article forming part of the apparatus or any appliance provided under the contract.

BID SPECIFICATION REQUIREMENTS

Item compliance shall be indicated in the "Yes/No" column of each item by all Bidders. Bidders shall submit a detailed proposal. Each bidder shall submit their proposals in the same arrangement as these specifications for ease of evaluation, comparison, and examination of compliance. Bid communications by letter only and/or written on a company letterhead, shall not be acceptable. {No Exceptions}

EXCEPTIONS TO SPECIFICATIONS

The following specifications shall be strictly adhered to. Exceptions shall be allowed if they are equal to or superior to that as specified and providing they are listed and entirely explained on a separate page entitled "Exceptions to Specifications". The exceptions list shall refer to specification page number and paragraph.
Proposals taking total exception to specifications or total exception to certain parts of the specifications will not be acceptable. The Apparatus shall be inspected upon completion for compliance with specifications. Deviations will not be tolerated and will be cause for rejection of Apparatus unless they were originally listed in bidder's proposal and accepted in writing by the department.
If the bidder takes an exception, on the exception page, the bidder must state an option price to bring their specifications into full compliance with the Department specifications. Failure to provide this information shall be cause to reject the proposal as being non-responsive. An exception to these requirements shall not be tolerated.

PURCHASER'S RIGHTS

The Purchaser reserves the right to accept or reject any or all bids as it deemed in their best interests.

GENERAL CONSTRUCTION

The apparatus shall be designed with due consideration to distribution of load between the front and rear axles, so that all specified equipment, including filled water tank, a full complement of personnel and fire hose will be carried without injury to the apparatus. Weight balance and

Bidder Complies	
Yes	No

distribution shall be in accordance with the recommendations of the National Fire Protection Agency.

The apparatus shall be designed so that the operator could perform all recommended daily maintenance checks easily without the need for hand tools. Apparatus components that interfere with repair or removal of other major components must be attached with fasteners (cap, screws, nuts, etc.) so that the components can be removed and installed with normal hand tools. These components must not be welded or otherwise permanently secured into place.

The GAWR and GVWR of the chassis shall be adequate to carry the fully equipped apparatus including all tanks filled, the specified hose load, unequipped personnel weight, ground ladders and a miscellaneous equipment allowance per NFPA criteria. It shall be the responsibility of the purchaser to provide the contractor with the weight of equipment to be carried if it is in excess of the allowance as set forth by NFPA.

The unequipped personnel weight shall be calculated at 250 lbs. per person times the maximum number of persons to ride on the apparatus. The height of the fully loaded vehicle's center of gravity shall not exceed the chassis manufacturer's maximum limit.

The front to rear weight distribution of the fully loaded vehicle shall be within the limits set by the chassis manufacturer. The front axle loads shall not be less than the minimum axle loads specified by the chassis manufacturer, under full loads and all other loading conditions.

The difference in weight on the end of each axle, from side to side, when the vehicle is fully loaded and equipped shall not exceed 7 percent.

The apparatus shall be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

Where special tools manufactured or designed by the contractor and are required to provide routine service on any component of the apparatus built or supplied by the contractor, such tools shall be provided with the apparatus.

For purposes of evaluation, the bidder shall provide a drawing illustrating, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus. Other specified equipment shall be required to be included with the bidder's proposal package.

The drawings shall be large "D" size (minimum 24" x 36"). Smaller size drawings, "similar to" drawings or general sales drawings, shall not be acceptable. Failure to provide a bid evaluation drawing in accordance with these specifications shall be cause for rejection of the bid proposal.

After the award of the bid, the contractor shall provide detailed colored engineering drawings including, but not limited to, the overall dimensions, wheelbase, and overall length of the proposed apparatus for use of pre-construction conference. The drawings shall include, but shall

Bidder Complies	
Yes	No

not be limited to, the right, left, top, front and rear views of the apparatus. The Customer will sign the final approval drawing.

SINGLE SOURCE MANUFACTURER

Bids shall only be accepted from a single source apparatus manufacturer. The definition of single source manufacturer is company that designs and manufactures their products utilizing an approach that includes complete product integration, including the apparatus chassis, cab and body modules being constructed, assembled, and tested on company premises only. Warranties qualified to the chassis and body design construction (excluding vender component warranties such as engine, axles, transmission, and pumps, etc.) will be from a single source manufacturer and not separated between manufacturers (i.e. body and chassis). The bidder shall provide evidence of maintaining compliance to this requirement. (NO EXCEPTIONS)

DIMENSIONAL REQUIREMENTS

To protect the interests of the taxpayers and the **EAST HAVEN** Fire Department, the successful bidder shall be responsible to ensure that the apparatus will fit in the existing **EAST HAVEN** Fire Department Station bay. Fit will be assured prior to acceptance of and payment for the apparatus. **(ABSOLUTELY NO EXCEPTIONS)**

SERVICE CENTER

The dealership supplying the apparatus must maintain a full service, repair and warranty center. The service center must be owned and operated by the dealership, which must be an established business entity. Third party service or repair services shall not be allowed. Furthermore, the dealership's service center and office must be located in a commercial business district, neither the office or service center may be located in a residential district, No Exception**. This is complicated apparatus and the only one the Town of EAST HAVEN owns of this type, these requirements have been set to insure minimal out of service time. These requirements are set forth to assure competent 24-hr. service can be provided without interruption. (THERE SHALL BE NO EXCEPTIONS TO THE SERVICE REQUIREMENTS)**

THE LOCAL DEALERSHIP SHALL HAVE THE FOLLOWING WITHOUT EXCEPTION:

1) Full Fire Apparatus CAD system for fire apparatus.
2) Minimum of Twenty (20) years of continuous ownership and management.
3) Certified in-house pump mechanics for the following pump:
   - Hale
   - Waterous
4) International air terminal within five (5) miles for receipt of air shipments of service parts.
5) Certified in-house mechanics the following areas:
   - EVT – Master Mechanic
   - EVT – Fire pumps and accessories
   - EVT – Aerial fire apparatus
   - REYCO – Spring maintenance and repair/replacement
   - CLASS 1 – Multiplexed electrical systems
   - GENERATOR - Harrison

- AIR COMPRESSOR SERVICE
  - American Bristol
  - Mako
- DETROIT DIESEL
  - Engine tune up
  - DDEC III & IV

6) Certified warranty center for the chassis being supplied. (Must supply documentation from chassis builder)
7) Four (4), Mobile service unit –fully stocked with tools & parts. (Must supply photographic proof)
8) 15,000sqft of heated indoor storage/repair area. (Must supply aerial photographic proof, no exception)
9) MIG & TIG welder and cutting torches.
10) PPG certified service center.
11) Digital camera for repair photographs.
12) Capability of servicing several large fire apparatuses (aerials, tankers and pumpers) simultaneously indoors with cabs fully tilted and aerial devices removed from their beds.
13) Plasma cutter.
14) Factory certified in-house aerial mechanics with **CERTIFICATION FROM OEM OF AERIAL DEVICE.**
15) 24-hour emergency onsite service at our fire house.
16) On site service, preventative maintenance and warranty repairs. The apparatus shall not be driven back and forth to the apparatus dealership for warranty & service work.
17) A Laptop computer & Pro-Link 9000 diesel engine reader and analytical device. An onsite print-out device with the following cartridges:

- DDEC motors
- ATEC application
- MERITOR ABS braking system
- CUMMINS motors

18) Harrison generator warranty/ service center.
19) Vogel lubrication refill pumps – in service center and on mobile service units.
20) Hydraulic hose coupling system with fittings and hose in house.
21) V-Mux Multiplexed USB downloader.
22) Metal Shear capable of cutting a 12’ long piece of metal. (Must supply photographic proof)

23) Service center must have the ability to lift a minimum of 120,000# and support three (3) axels. (Must supply photographic proof)
24) Synthetic grease system.
25) Robinair 34788-NP A/C recovery and recharge; fully automatic system.
26) Fifty-eight foot Cross/Down State Of The Art future cure paint booth.
27) Must employ at least 1 person with the EVT F2 – NFPA Apparatus design certification and must be able to furnish proof of certification.

THERE SHALL BE NO EXCEPTIONS TO THE SERVICE CENTER REQUIREMENTS.

ALL BIDDERS SHALL PROVIDE PHOTOGRAPHIC DOCUMENTATION OF THE FOLLOWING:

1. Service center
2. Mobile service trucks

(NO EXCEPTIONS)

Bidder Complies	
Yes	**No**

NEW DEALER LICENSE

All bidders shall supply copy with the bid their DMV license to sell new vehicles for their state of incorporation. Used dealer, general repairer or limited repairer licenses ARE NOT ACCEPTABLE. The **EAST HAVEN** Fire Department is buying a new vehicle and requires that any dealer selling the apparatus be a licensed and bonded New Vehicle Dealer. The department requires this license so that Lemon Law for new vehicles can be enforced. Furthermore, the department wishes to avoid split responsibility with warranty and service repairs on the vehicle and requires that any firm supplying the new apparatus have a proper license per EAST HAVEN State Statues to repair motor vehicles. The department requires that the firm selling the apparatus be responsible for all service and warranty repairs for the vehicle. Third party service centers are not acceptable.

Please input your dealer number here so the **EAST HAVEN** Fire Department can do a quick check in the DMV database _____.

Signature of person attesting to the above statement _____.

Typed name of person signing this document_____.

MOBILE SERVICE

It is the intent of the **EAST HAVEN** Fire Department to inspect each bidder's service center, personnel and mobile service units. Service of this vehicle is of the utmost importance to the purchaser. It is completely **unacceptable** for any bidder not to have mobile service units, in house personnel or a service center. Third party service is **NOT ACCEPTABLE, NO EXCEPTION**.

To insure that each bidder has in-house mobile service units and onsite service personnel, the **EAST HAVEN** Fire Department will conduct the following inspection:

- *Each bidder shall bring their mobile service units to our firehouse for inspection.*
- *The apparatus must be brought to our firehouse by a fulltime mechanic employed by the local dealership supplying the apparatus.*
- *The mobile service unit shall bring its registration or title showing the name of apparatus dealership as the owner.*
- *In addition, the personnel attending shall bring a copy of the local dealerships workmen's compensation and garage liability policies in **THEIR** name for our inspection.*

REFERENCE LIST

All bidders shall supply a list of surrounding cities in which their pumpers are located. No bids shall be accepted from any contractor who cannot show they have done at least 100 similar type units. (**WITHIN New England NO EXCEPTIONS)**

TAG ON ORDERS

Bidder Complies	
Yes	No

The purchaser reserves the right to require tag on purchases to this order for up to one (1) year from signing contract. The contract may be used for neighboring communities as well, as long as it is legally permissible for the neighboring community to avail themselves of this opportunity.

EQUIPMENT MOUNTING

All equipment shall be mounted on this apparatus by the dealership prior to delivery. The cost of this equipment mounting shall be included in the bid price. This includes **EAST HAVEN** Fire Department supplied equipment. Cost of additional brackets, and electrical wiring labor and materials is not covered under this requirement**.**

ELECTRICAL SYSTEM

The electrical system must be produced with commonly used components. Proprietary systems will not be accepted.

DELIVERY

The apparatus shall be driven from the final stage manufacturer to the **EAST HAVEN** Fire Department in order to provide a "test run" of the completed apparatus. To ensure that the intended "test run" is accomplished, this distance shall not be less than 1,500 miles. **(NO EXCEPTIONS)**

SUPPLIED INFORMATION & EXTRAS

The apparatus manufacturer shall supply two (2) copies of apparatus manuals with all manufactured apparatus. The manuals shall include, but not be limited to: all component warranties, users' manuals and information for supplied products, apparatus engineering information including drawings and build prints, and whatever other pertinent information the manufacturer can supply to its customer regarding the said apparatus.

Included in the delivery of the unit, the manufacturer shall also include spare hardware and extra fasteners, paint for touch-up, information regarding washing and care procedures, as well as other recommendations for care and maintenance of the general apparatus.

The manufacturer shall also supply a manufacturer's record of apparatus construction details, including the following information:
Owner name and address;
Apparatus manufacturer, model, and serial number; Chassis make, model, and serial number; GAWR of front and rear axles;
Front tire size and total rated capacity in pounds; Rear tire size and total rated capacity in pounds;
Chassis weight distribution in pounds with water (if applicable) and manufacturer mounted equipment (front and rear);
Engine make, model, serial number, rated horsepower, related speed and no load governed speed; Type of fuel and fuel tank capacity;

Bidder Complies	
Yes	No

Electrical system voltage and alternator output in amps; Battery make and model, capacity in CCA
Paint numbers;
Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall vehicle (with the water tank full (if applicable) but without personnel, equipment, and hose); Written load analysis and results of the electrical system performance tests;

Transmission make, model, and type;
Pump to drive through the transmission (yes or no);
Engine to pump gear ratio and transmission gear ratio used;
Pump make model, rated capacity in gallons per minute, serial number, and number of stages;
Pump manufacturer's certification of suction capability;
Pump manufacturer's certification of hydrostatic test;
Pump manufacturer's certification of inspection and test for the fire pump;
Copy of the apparatus manufacturer's approval for stationary pumping applications; Pump transmission make, model and serial number;
Priming device type;
Type of pump pressure control system;
The engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum no load governed speed;
Certification of the water tank capacity.

LIABILITY INSURANCE COVERAGE

In order to protect the department and its personnel, the bidder shall show proof that it has no less than
$30 million dollars in liability insurance in force. A certificate of coverage shall be included in the bid package. Failure to carry liability insurance of at least this amount or failure to include proof of coverage shall be cause to reject the bidder's proposal.

GENERAL WARRANTY

A warranty shall be offered for each new fire apparatus manufactured for a period of Two (2) years from the date of delivery, except for the commercial chassis and certain other components as noted in the next paragraph.

In the case of a commercial chassis being used, the warranty on the chassis, engine, transmission, tires, storage batteries, generators, electrical lamps and other devices subject to deterioration is limited to the warranty of the manufacturer thereof and adjustments for the same are to be made directly with the manufacturer by the customer.

This warranty is in lieu of all other warranties, expressed or implied, and all other obligations or liabilities. Please see the official warranty document in the appendix (attached) for specific details.

STRUCTURAL WARRANTY ALUMINUM BODY WARRANTY

A structural warranty shall be provided by the apparatus manufacturer for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a period of ten (10) years. Please see the official warranty document in the appendix (attached) for specific details.

PAINT WARRANTY

A ten (10) year limited paint warranty shall be provided by the apparatus manufacturer. Please see the official warranty document in the appendix (attached) for specific details.

PLUMBING WARRANTY

A Stainless Steel Plumbing/Piping warranty shall be offered for each new fire apparatus manufactured for a period of ten (10) years from the date of delivery. Please see the official warranty document in the appendix (attached) for specific details.

TANK WARRANTY

A lifetime tank warranty shall be provided by the tank manufacturer. Please see the official warranty document in the appendix (attached) for specific details.

MULTI-PLEXED ELECTRICAL WARRANTY

A four (4) year limited (V-MUX) multiplex system warranty, of Weldon Technologies, Inc, shall be provided by the apparatus manufacturer, for parts and labor, while under normal use and service, against mechanical, electrical and physical defects from the date of installation.

The warranty shall exclude: sensors, shunt interface modules, serial or USB kits, transceivers, cameras, GPS, and electrical display screens, which shall be limited to a period of one (1) time a year repair for

parts and labor from the date of installation. Please see the official warranty document in the appendix (attached) for specific details.

PUMP CERTIFICATION AND TESTING

The apparatus upon completion will be tested and certified by Underwriters Laboratories, Inc. The certification tests will follow the guide lines outlined in NFPA 1901 "Standard for Fire Apparatus".

There shall be multiple tests performed by the contractor and Underwriter's Laboratories when the apparatus has been completed. The manufacturer shall provide the completed Test Certificate(s) to the purchaser at time of delivery. The inspection services of Underwriters Laboratories are available to all bidders on an equal basis; therefore, no third party certification of testing results shall be acceptable.

The fire pump shall be mounted on the apparatus and shall have a minimum rated capacity of 250 gpm (1000 L/min) at 150 psi (1000 kPa) net pump pressure.

Where the apparatus is designed for pump in-motion operations, the vehicle drive engine and drive train shall be arranged so that the pump can deliver at least 20 gpm (76 L/min) at a gage pressure of 80 psi (550 kPa), while the fire apparatus is moving.

If the pumping system provided is rated at 3000gpm (12,000 L/min) or less, the pump shall be capable of delivering the following:

(1) One hundred percent of rated capacity at 150 psi (1000 kPa) net pump pressure.

(2) Seventy percent of rated capacity at 200 psi (1400 kPa) net pump pressure.

(3) Fifty percent of rated capacity at 250 psi (1700 kPa) net pump pressure.

If the pumping system provided is rated at greater than 3000 gpm (12,000 L/min), the pump shall be capable of delivering the following:

(1) One hundred percent of rated capacity at 100 psi (700 kPa) net pump pressure.

(2) Seventy percent of rated capacity at 150 psi (1000 kPa) net pump pressure.

(3) Fifty percent of rated capacity at 200 psi (1400 kPa) net pump pressure.

If the fire pump has a rated capacity of 1250 gpm or greater, the pump shall be tested after the pump and all its associated piping and equipment have been installed on the apparatus.

The tests shall include at least the pumping test, the pumping engine overload test, the pressure control system test, the priming device tests, and the vacuum test.

A test plate shall be provided at the pump operator’s panel that gives the rated discharges and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump as used, and the governed speed of the engine as

stated by the engine manufacturer on a certified brake horsepower curve. The plate shall be completely stamped with all information at the factory and attached to the vehicle prior to shipping.

Pumping Test:

The test site shall be adjacent to a supply of clear water at least 4 ft. (1.2 m) deep, with the water level not more than 10 ft. (3 m) below the center of the pump intake, and close enough to allow the suction strainer to be submerged at least 2 ft. (0.6 m) below the surface of the water when connected to the pump by 20 ft. (6 m) of suction hose.

Tests shall be performed when conditions are as follows:

(1) Air temperature: 0°F to 110°F (−18°C to 43°C)

(2) Water temperature: 35°F to 90°F (2°C to 32°C)

(3) Barometric pressure: 29 in. Hg (98.2 kPa), minimum (corrected to sea level)

Engine-driven accessories shall not be functionally disconnected or otherwise rendered inoperative during the tests.

The following devices shall be permitted to be turned off or not operating during the pump test:

(1) Hydraulically driven equipment (other than hydraulically driven line voltage generator)
(2) Windshield wipers
(3) Four-way hazard flashers

All structural enclosures, such as floorboards, gratings, grilles, and heat shields, not provided with a means for opening them in service shall be kept in place during the tests.

All test gauges shall meet the requirements for Grade A gauges as defined in ASME B40.100, Pressure Gauges and Gauge Attachments, and shall be at least size 3½ perASMEB40.100. The pump intake gauge shall have a range of 30 in. Hg (100 kPa) vacuum to zero for a vacuum gauge, or 30 in. Hg (100 kPa) vacuum to a gauge pressure of 150 psi (1000 kPa) for a compound gauge. The discharge pressure gauge shall have a gauge pressure range of 0 psi to 400 psi (0 kPa to 2800 kPa). All pilot gauges shall have a gauge pressure range of at least 0 psi to 160 psi (0 kPa to 1100 kPa). All gauges shall be calibrated in the month preceding the tests using a dead-weight gauge tester or a master gauge meeting the requirements for Grade 3Aor 4Agauges, as defined in ASME B40.100, Pressure Gauges and Gauge Attachments, that has been calibrated within the preceding year.

The engine speed–measuring equipment shall consist of a nonadjustable tachometer supplied from the engine or transmission electronics, a revolution counter on a checking shaft outlet and a stop watch, or other engine speed–measuring means that is accurate to within ± 50 rpm of actual speed.

If the apparatus is equipped with a fire pump rated at 750 gpm (3000 L/min) or greater but not greater than 3000 gpm (12,000 L/min), the pump shall be subjected to a 3 hour pumping test from draft consisting of 2 hours of continuous pumping at rated capacity at a minimum of 150 psi (1000 kPa) net pump pressure, followed by 1⁄2 hour of continuous pumping at 70 percent of rated capacity at a minimum of 200 psi (1400 kPa) net pump pressure and 1⁄2 hour of continuous pumping at 50 percent of rated capacity at a minimum of 250 psi (1700 kPa) net pump pressure and shall not be stopped until after the 2 hour test at rated capacity, unless it becomes necessary to clean the suction strainer.

If the apparatus is equipped with a fire pump rated at greater than 3000 gpm (12,000 L/min), the pump shall be subjected to a 3 hour pumping test from draft consisting of 2 hours of continuous pumping at rated capacity at 100 psi (700 kPa) net pump pressure, followed by 1⁄2 hour of continuous pumping at 70 percent of rated capacity at 150 psi (1000 kPa) net pump pressure and 1⁄2 hour of continuous pumping at 50 percent of rated capacity at 200 psi (1400 kPa) net pump pressure and shall not be stopped until after the 2 hour test at rated capacity, unless it becomes necessary to clean the suction strainer.

If the apparatus is equipped with a fire pump rated at less than 750 gpm (3000 L/min), the pump shall be subjected to a 50-minute pumping test from draft consisting of 30 minutes of continuous pumping at rated capacity at a minimum of 150 psi (1000 kPa) net pump pressure, followed by 10 minutes of continuous pumping at 70 percent of rated capacity at a minimum of 200 psi (1400 kPa) net pump pressure and 10 minutes of continuous pumping at 50 percent of rated capacity at a minimum of 250 psi (1700 kPa) net pump pressure and shall not be stopped until after the 30-minute test at rated capacity, unless it becomes necessary to clean the suction strainer.

Pumping Engine Overload Test:
If the pump has a rated capacity of 750 gpm (3000 L/min) or greater but not greater than 3000 gpm (12,000 L/min), the apparatus shall be subjected to an overload test consisting of pumping rated capacity at 165 psi (1100 kPa) net pump pressure for at least 10 minutes.

This test shall be performed immediately following the pumping test of rated capacity at 150 psi (1000 kPa).

The capacity, discharge pressure, intake pressure, and engine speed shall be recorded at least three times during the overload test.

Pressure Control System Test:
If the pump is rated at 3000 gpm (12,000 L/min) or less, the pressure control system on the pump shall be tested as follows:

(1) The pump shall be operated at draft, delivering rated capacity at a discharge gauge pressure of 150 psi (1000 kPa).

(2) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 150 psi (1000 kPa) ±5 percent.

(3) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.

(4) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

(5) The original conditions of pumping rated capacity at a discharge gauge pressure of 150 psi (1000 kPa) shall be reestablished.

(6) The discharge pressure gauge shall be reduced to 90 psi (620 kPa) by throttling the engine fuel supply, with no change to the discharge valve settings, hose, or nozzles.

(7) The pressure control system shall be set according to the manufacturer's instructions to maintain the discharge gauge pressure at 90 psi (620 kPa) ±5 percent.

(8) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.

(9) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

(10) The pump shall be operated at draft, pumping 50 percent of rated capacity at a discharge gauge pressure of 250 psi (1700 kPa).

(11) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 250 psi (1700 kPa) ±5 percent.

(12) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.

(13) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

If the pump is rated at greater than 3000 gpm (12,000 L/min), the pressure control system on the pump shall be tested as follows:

(1) The pump shall be operated at draft, delivering rated capacity at a discharge gauge pressure of 100 psi (700 kPa).

(2) The pressure control system shall be set in accordance with the manufacturer's instructions to maintain the discharge gauge pressure at 100 psi (700 kPa) ±5 percent.

Bidder Complies	
Yes	No

(3) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.

(4) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

(5) The original conditions of pumping rated capacity at a discharge gauge pressure of 150 psi (1000 kPa) shall be reestablished.

(6) The pump shall be operated at draft, pumping 50 percent of rated capacity at a discharge gauge pressure of 200 psi (1400 kPa).

(7) The pressure control system shall be set according to the manufacturer's instructions to maintain the discharge gauge pressure at 200 psi (1400 kPa) ±5 percent.

(8) All discharge valves shall be closed not more rapidly than in 3 seconds and not more slowly than in 10 seconds.

(9) The rise in discharge pressure shall not exceed 30 psi (200 kPa) and shall be recorded.

Priming System Tests:

With the apparatus set up for the pumping test, the primer shall be operated in accordance with the manufacturer's instructions until the pump has been primed and is discharging water. This test shall be permitted to be performed in connection with priming the pump for the pumping test.

The interval from the time the primer is started until the time the pump is discharging water shall be noted. The time required to prime the pump shall not exceed 30 seconds if the rated capacity is 1250 gpm (5000 L/min) or less. The time required to prime the pump shall not exceed 45 seconds if the rated capacity is 1500 gpm (6000 L/min) or more.

An additional 15 seconds shall be permitted in order to meet the requirements of 16.13.5.3 and 16.13.5.4 when the pump system includes an auxiliary 4 in. (100 mm) or larger intake pipe having a volume of 1 ft3 (0.03 m3) or more.

Vacuum Test:

The vacuum test shall consist of subjecting the interior of the pump, with all intake valves open,
all intakes capped or plugged, and all discharge caps removed, to a vacuum of 22 in. Hg (75 kPa) by means of the pump priming system.

Bidder Complies	
Yes	No

At altitudes above 2000 ft. (600 m), the vacuum attained shall be permitted to be less than 22 in. Hg (75 kPa) by 1 in. Hg (3.4 kPa) for each 1000 ft. (305 m) of altitude above 2000 ft. (610 m).

The vacuum shall not drop more than 10 in. Hg (34 kPa) in 5 minutes.

The primer shall not be used after the 5 minute test period has begun and the engine shall not be operated at any speed greater than the governed speed during this test.

Water Tank–to–Pump Flow Test:

A water tank–to–pump flow test shall be conducted as follows:

(1) The water tank shall be filled until it overflows.

(2) All intakes to the pump shall be closed.

(3) The tank fill line and bypass cooling line shall be closed.

(4) Hose lines and nozzles for discharging water at the rated tank-to-pump flow rate shall be connected to one or more discharge outlets.

(5) The tank-to-pump valve(s) and the discharge valves leading to the hose lines and nozzles shall be fully opened.

(6) The engine throttle shall be adjusted until the required flow rate −0/+5 percent is established.

(7) The discharge pressure shall be recorded.

(8) The discharge valves shall be closed and the water tank refilled.

(9) The bypass line shall be permitted to be opened temporarily, if needed, to keep the water temperature in the pump within acceptable limits.

(10) The discharge valves shall be reopened fully and the time noted.

(11) If necessary, the engine throttle shall be adjusted to maintain the discharge pressure recorded as noted in 16.13.7.1(7).

(12) When the discharge pressure drops by 10 psi (70 kPa) or more, the time shall be noted and the elapsed time from the opening of the discharge valves shall be calculated and recorded.

Volume Discharge Calculation:

Bidder Complies	
Yes	No

The volume discharged shall be calculated by multiplying the rate of discharge in gallons per minute (liters per minute) by the time in minutes elapsed from the opening of the discharge valves until the discharge pressure drops by at least 10 psi (70 kPa).

Other means shall be permitted to be used to determine the volume of water pumped from the tank such as a totalizing flowmeter, weighing the truck before and after, or refilling the tank using a totalizing flowmeter.

The rated tank-to-pump flow rate shall be maintained until 80 percent of the rated capacity of the tank has been discharge.

Engine Speed Advancement Interlock Test

The engine speed advancement interlock system shall be tested to verify that engine speed cannot be increased at the pump operator's panel unless there is throttle-ready indication.

If the apparatus is equipped with a stationary pump driven through split-shaft PTO, the test shall verify that the engine speed control at pump operator's panel cannot be advanced when either of the following conditions exists:

(1) The chassis transmission is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position.

(2) The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.

If the apparatus is equipped with a stationary pump driven through a transmission mounted PTO, front- of-engine crankshaft PTO, or engine flywheel PTO, the test shall verify that the engine speed control on the pump operator's panel cannot be advanced when either of the following conditions exists:

(1) The chassis transmission is in neutral, the parking brake is off, and the pump shift status in the driving compartment is disengaged.
(2) The chassis transmission is in any other gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the "Pump Engaged" position.

If the apparatus is equipped with a pump driven by the chassis engine designed for both stationary pumping and pump-in-motion, the test shall verify that the engine speed control at pump operator's panel cannot be advanced when either of the following conditions exists:

(1) The chassis transmission is in neutral, the parking brake is on, and the pump shift status in the driving compartment is disengaged.

(2) The chassis transmission is in any other gear other than neutral, the parking brake is on, and the pump shift in the driving compartment is in the "Pump Engaged" or the "OK to Pump In-Motion" position.

If the apparatus is equipped with a stationary pump driven through transfer case PTO, the test shall verify that the engine speed control on the pump operator's panel cannot be advanced when either of the following conditions exists:

(1) The chassis transmission is in neutral, the transfer case is in neutral, the parking brake is off, and the pump shift in the driving compartment is in the road position.
(2) The chassis transmission is in neutral, the transfer case is engaged, the parking brake is off, and the pump shift in the driving compartment is in the road position.
(3) The chassis transmission has been placed in the position for pumping as indicated on the label provided in the driving compartment, the parking brake is on, and the pump shift in the driving compartment is in the road position.

MODEL

The chassis shall be a Metro Star model. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit and maneuverability. The chassis shall be manufactured for heavy duty service with the strength and capacity to support a fully laden apparatus, one hundred (100) percent of the time.

MODEL YEAR

The chassis shall have a vehicle identification number that reflects a 2020 model year.

COUNTRY OF SERVICE

The chassis shall be put in service in the country of United States of America (USA).

The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis. Spartan Chassis is not responsible for compliance to state, regional, or local regulations. Dealers should identify those regulations and order any necessary optional equipment from Spartan Chassis or their OEM needed to be in compliance with those regulations.

CAB AND CHASSIS LABELING LANGUAGE

The cab and chassis shall include the applicable caution, warning, and safety notice labels with text to be written in English.

APPARATUS TYPE

The apparatus shall be a pumper vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a minimum rated capacity of 750 gallons per minute (3000 L/min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

VEHICLE TYPE

The chassis shall be manufactured for use as a straight truck type vehicle and designed for the installation of a permanently mounted apparatus behind the cab. The apparatus of the vehicle shall be supplied and installed by the apparatus manufacturer.

AXLE CONFIGURATION

The chassis shall feature a 4 x 2 axle configuration consisting of a single rear drive axle with a single front steer axle.

GROSS AXLE WEIGHT RATINGS FRONT

The front gross axle weight rating (GAWR) of the chassis shall be 18,000 pounds.

This front gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

GROSS AXLE WEIGHT RATINGS REAR

The rear gross axle weight rating (GAWR) of the chassis shall be 27,000 pounds.

This rear gross axle weight rating shall be adequate to carry the weight of the completed apparatus including all equipment and personnel.

ON-SPOT CHAINS
The apparatus shall be outfitted with air activated on-spot tire chains at the rear wheels that shall be activated from the cab.

PUMP PROVISION

The chassis shall include provisions to mount a drive line pump in the middle of the chassis, behind the cab, more commonly known as the midship location.

CAB STYLE

The cab shall be a custom, fully enclosed, LFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to ten (10) seating positions.

The cab shall incorporate a fully enclosed design with side wall roof supports, allowing for a spacious cab area with no partition between the front and rear sections of the cab. To provide a superior finish by reducing welds that fatigue cab metal; the roof, the rear wall and side wall panels shall be assembled using a combination of welds and proven industrial adhesives designed specifically for aluminum fabrication for construction.

The cab shall be constructed using multiple aluminum extrusions in conjunction with aluminum plate, which shall provide proven strength and the truest, flattest body surfaces ensuring less expensive paint repairs if needed. All aluminum welding shall be completed to the American Welding Society and ANSI D1.2-96 requirements for structural welding of aluminum.

All interior and exterior seams shall be sealed for optimum noise reduction and to provide the most favorable efficiency for heating and cooling retention.

The cab shall be constructed of 5052-H32 corrosion resistant aluminum plate. The cab shall incorporate tongue and groove fitted 6061-T6 0.13 & 0.19 inch thick aluminum extrusions for extreme duty situations. A single formed, one (1) piece extrusion shall be used for the "A" pillar, adding strength and rigidity to the cab as well as additional roll-over protection. The cab side walls and lower roof skin shall be 0.13 inch thick; the rear wall and raised roof skins shall be 0.09 inch thick; the front cab structure shall be 0.19 inch thick.

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 144.60 inches with 67.50 inches from the centerline of the front of the axle to the back of the cab.

The cab interior shall be designed to afford the maximum usable interior space and attention to ergonomics with hip and legroom while seated which exceeds industry standards. The crew cab floor shall be flat across the entire walking area for ease of movement inside the cab.

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 65.38 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches

wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 61.00 inches high, from the cab floor to the top of the door opening.

The cab shall incorporate a progressive two (2) step configuration from the ground to the cab floor at each door opening. The progressive steps are vertically staggered and extend the full width of each step well allowing personnel in full firefighting gear to enter and exit the cab easily and safely.

The first step for the driver and officer area shall measure approximately 11.50 inches deep X 31.13 inches wide. The intermediate step shall measure approximately 8.50 inches deep X 32.50 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed 11.00 inches.

The first step for the crew area shall measure approximately 11.50 inches deep X 20.44 inches wide. The intermediate step shall measure approximately 10.25 inches deep X 22.75 inches wide. The height from the first step to the intermediate step and the intermediate step to the cab floor shall not exceed
12.80 inches.

OCCUPANT PROTECTION

The vehicle shall include the Advanced Protection System™ (APS) which shall secure belted occupants and increase the survivable space within the cab. The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The system components shall include:

- Driver steering wheel airbag

- Driver dual knee air bags (patent pending) with energy management mounting (patent pending) and officer knee airbag.

- Large driver, officer, and crew area side curtain airbags

- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around the occupants, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries

Bidder Complies	
Yes	No

- Heavy truck Restraints Control Module (RCM) - receives inputs from the outboard sensors, selectively deploys APS systems, and records sensory inputs immediately before and during a detected qualifying event

- Integrated outboard crash sensors mounted at the perimeter of the vehicle - detects a qualifying front or side impact event and monitors and communicates vehicle status and real time diagnostics of all critical subsystems to the RCM

- Fault-indicating Supplemental Restraint System (SRS) light on the driver's instrument panel

Frontal impact protection shall be provided by the outboard sensors and the RCM. In a qualifying front impact event the outboard sensors provide inputs to the RCM. The RCM activates the steering wheel airbag, driver side dual knee airbags (patent pending), officer side knee airbag, and advanced seat belts for each occupant in the cab.

The APS frontal impact system shall be independently tested to ensure occupant injury criteria does not exceed injury criteria defined in Federal Motor Vehicle Safety Standard (FMVSS) 208. Frontal impact into a rigid barrier at 25 mph shall be conducted by an independent third party test facility using belted 95th percentile Hybrid II test dummies.

Rollover, side impact, and ejection mitigation shall be provided by the outboard sensors and the RCM. In qualifying rollover or side impact events the outboard sensors provide inputs to the RCM. The RCM activates the side curtain airbags and advanced seat belts for each occupant in the cab. The RCM

measures roll angle, lateral acceleration, and roll rate to determine if a rollover event or side impact event is imminent or occurring.

In the event of a qualifying offset or other non-frontal impact, the RCM shall determine and intelligently deploy the front impact protection system, the side impact protection system, or both front and side impact protection systems based on the inputs received from the outboard crash sensors.

The APS side impact system shall be independently tested to ensure occupant injury criteria does not exceed injury criteria defined in Federal Motor Vehicle Safety Standard (FMVSS) 214. Side impact from a moving barrier at 17 mph shall be conducted by an independent third party test facility using belted 50th percentile ES-2re test dummies.

CAB FRONT FASCIA

The front cab fascia shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate which shall be an integral part of the cab.

Bidder Complies	
Yes	No

The cab fascia will encompass the entire front of the aluminum cab structure from the bottom of the windshield to the bottom of the cab and shall be the "Classic" design.

The front cab fascia shall include two (2) molded plastic modules on each side accommodating a total of up to four (4) Hi/Low beam headlights and two (2) turn signal lights or up to four (4) warning lights. A chrome plated molded plastic bezel shall be provided on each side around each set of four lamps.

FRONT GRILLE

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches. The upper portion of the grille shall be hinged to provide service access behind the grille. The front grill shall have a graphic of the American flag, similar to apparatus in the Town of East Haven.

CAB UNDERCOAT

There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.

CAB SIDE DRIP RAIL

There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the cab side.

CAB PAINT EXTERIOR

The cab shall be painted prior to the installation of glass accessories and all other cab trim to ensure complete paint coverage and the maximum in corrosion protection of all metal surfaces.

All metal surfaces on the entire cab shall be ground by disc to remove any surface oxidation or surface debris which may hinder the paint adhesion. Once the surface is machine ground a high quality acid etching of base primer shall be applied. Upon the application of body fillers and their preparation, the cab shall be primed with a coating designed for corrosion resistance and surface paint adhesion. The maximum thickness of the primer coat shall be 2.00 mils.

The entire cab shall then be coated with an intermediate solid or epoxy surfacing agent that is designed to fill any minor surface defects, provide an adhesive bond between the primer and the paint and improve the color and gloss retention of the color. The finish to this procedure shall be a sanding of the cab with 360 grit paper followed by sealing the seams with SEM brand seam sealer.

Bidder Complies	
Yes	No

The cab shall then be painted the specific color designated by the customer with an acrylic urethane type system designed to retain color and resist acid rain and most atmospheric chemicals found on the fire ground or emergency scene. The paint shall have a minimum thickness of 2.00 mils, followed by a clear top coat not to exceed 2.00 mils. The entire cab shall then be baked at 180 degrees for one (1) hour to speed the curing process of the coatings.

CAB PAINT MANUFACTURER

The cab shall be painted with PPG Industries paint.

CAB PAINT PRIMARY/LOWER COLOR

The lower paint color shall be PPG FBCH 71528 Red.

The upper paint on the cab shall be Black (Chicago Style) Colors shall be identical to that of the current Chicago style paint scheme in the East Haven Fire Department.

CAB PAINT WARRANTY

The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.

CAB PAINT INTERIOR

The visible interior cab structure surfaces shall be painted with black Spar-Liner spray on bed liner product which shall mold to each surface of the cab interior. The Spar-Liner shall be environmentally friendly and chemically resistant.

CAB ENTRY DOORS

The cab shall include four (4) entry doors, two (2) front doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. The doors shall be constructed of extruded aluminum with a nominal thickness of 0.13 inch. The exterior skins shall be constructed of 0.13 inch aluminum plate.

The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit.

All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a 0.38 inch pin and shall be constructed of stainless steel.

CAB ENTRY DOOR TYPE

Bidder Complies	
Yes	No

All cab entry doors shall be full length in design to fully enclose the lower cab steps.

CAB INSULATION

The cab ceiling and walls shall include 1.00 inch thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.

CAB COMPARTMENTS

The cab shall have an EMS compartment located in the cab between the rear facing seats with two shelves, painted and include lighting. Similar to the current East Haven Fire Department Squad 1,

There shall be an overhead shelf with netting over the two front-facing seats. Similar to the current East Haven Fire Department Squad 1.

There shall be a netted storage area below the two forward facing seats. Similar to the current East Haven Fire Department Squad 1,

LH EXTERIOR REAR COMPARTMENT

The cab shall offer an exterior compartment on the left side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 84.19 inches high. The compartment size shall be
11.34 inches wide X 84.19 inches high X 21.19 inches deep below floor and 12.5 inches deep above floor. The compartment shall have a 10.63 inch wide, 84.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. The door shall open towards the rear of the cab. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

LEFT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the left side of the cab. The strip light shall be 43.00 inches long and shall include twelve (12) bright white Gen3 LEDs.

LH EXTERIOR COMPARTMENT INTERIOR FINISH

The interior of the left hand exterior compartment shall have a black Spar-Liner finish.

RH EXTERIOR REAR COMPARTMENT

Bidder Complies	
Yes	No

The cab shall offer an exterior compartment on the right side of the cab behind the rear door. The compartment opening shall be 10.00 inches wide X 84.19 inches high. The compartment size shall be
11.34 inches wide X 84.19 inches high X 21.19 inches deep below floor and 12.5 inches deep above floor. The compartment shall have a 10.63 inch wide, 84.00 inch high and 1.50 inch thick hinged box pan style flush mount door with a bright aluminum tread plate inner panel and a bent D-ring slam latch. The door shall open towards the rear of the cab. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar.

RIGHT HAND EXTERIOR REAR COMPARTMENT LIGHTING

There shall be one (1) SoundOff Signal brand LED strip light installed to illuminate the exterior rear compartment on the right side of the cab. The strip light shall be 43.00 inches long and shall include twelve (12) bright white Gen3 LEDs.

RH EXTERIOR COMPARTMENT INTERIOR FINISH

The interior of the right hand exterior compartment shall have a black Spar-Liner finish.

CAB STRUCTURAL WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles which ever may occur first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

CAB TEST INFORMATION

The cab shall have successfully completed the preload side impact, static roof load application and frontal impact without encroachment to the occupant survival space when tested in accordance with Section 4 of SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks, Section 5 of SAE J2422 Cab Roof Strength Evaluation Quasi –Static Loading Heavy Trucks and ECE R29 Uniform Provisions Concerning the Approval of Vehicles with regard to the Protection of the Occupants of the Cab of a Commercial Vehicles Annex 3 Paragraph 5.

Bidder Complies	
Yes	No

The above tests have been witnessed by and attested to by an independent third party. The test results were recorded using cameras, high speed imagers, accelerometers and strain gauges. Documentation of the testing shall be provided upon request.

ELECTRICAL SYSTEM

The chassis shall include a single starting electrical system which shall include a 12 volt direct current system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 degree Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275 degree Fahrenheit minimum high temperature flame retardant loom.

LOAD MANAGEMENT SYSTEM

The apparatus shall be equipped with a Class 1 Total System Manager (TSM) for performing electrical load management. The TSM shall have sixteen (16) programmable outputs to supply warning and load switching requirements. Outputs one (1) through twelve (12) shall be independently programmable to activate during the scene mode, the response mode, or both. These outputs can also be programmed to activate with the ignition or master warning switch, or to sequence and shed along with the priority.

Output thirteen (13) shall be designated to activate a fast idle system. Output fourteen (14) shall provide a low voltage warning for an isolated battery. Output fifteen (15) is a user configurable output and shall be programmable for activating between 10.50 and 15.00 volts. Output sixteen (16) shall provide a low voltage alarm that activates at the NFPA required 11.80 volts. The TSM shall have a digital display to indicate system voltage in normal operation mode and also indicate the output configuration during programming mode. The TSM shall be protected against reverse polarity and shorted outputs and be enclosed in a metal enclosure to enhance EMI/RFI protection.

DATA RECORDING SYSTEM

The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed. The system shall be designed to meet NFPA 1901. The following information shall be recorded:

- Vehicle Speed
- Acceleration
- Deceleration
- Engine Speed
- Engine Throttle Position
- ABS Event
- Seat Occupied Status
- Seat Belt Status
- Master Optical Warning Device Switch Position
- Service Brake

- Engine Hours
- Time
- Date

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system. The laptop connection shall be a panel mounted female type B USB connection point, remotely mounted in the left side foot well of the cab.

ACCESSORY POWER

The electrical distribution panel shall include two (2) power studs. The studs shall be size #10 and each of the power studs shall be circuit protected with a fuse of the specified amperage. One (1) power stud shall be capable of carrying up to a 40 amp battery direct load. One (1) power stud shall be capable of carrying up to a 15 amp ignition switched load. The two (2) power studs shall share one (1) #10 ground stud. A 225 amp battery direct power and ground stud shall be provided and installed on the chassis near the left hand battery box for OEM body connections.

AUXILIARY ACCESSORY POWER

An auxiliary set of power and ground studs shall be provided and installed behind the electrical center cover with a 40 amp breaker. The studs shall be 0.38 inch diameter and capable of carrying up to a 40 amp load switched with the master power switch.

ADDITIONAL ACCESSORY POWER

An additional ten (10) position blade type fuse panel shall be installed behind the officer's seat. The fuse panel shall be protected by a 40 amp fuse located at the batteries. The panel shall be capable of carrying up to a maximum 40 amp battery direct load.

EXTERIOR ELECTRICAL TERMINAL COATING

All terminals exposed to the elements will be sprayed with a high visibility protective rubberized coating to prevent corrosion.

ENGINE

The chassis engine shall be a Cummins ISL9 engine. The ISL9 engine shall be an in-line six (6) cylinder, four cycle diesel powered engine. The engine shall offer a rating of 450 horse power at 2100 RPM and shall be governed at 2200 RPM. The torque rating shall feature 1250 foot pounds of torque at 1400 RPM with 543 cubic inches (8.9 liters) of displacement.

The ISL9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA

certified to meet the 2013 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

The engine shall include an engine mounted combination full flow/by-pass oil filter with replaceable spin on cartridge for use with the engine lubrication system. The engine shall include Citgo brand Citgard 500, or equivalent SAE 15W40 CJ4 low ash engine oil which shall be utilized for proper engine lubrication.

A wiring harness shall be supplied ending at the back of the cab. The harness shall include a connector which shall allow an optional harness for the pump panel. The included circuits shall be provided for a tachometer, oil pressure, engine temperature, hand throttle, high idle and a PSG system. A circuit for J1939 data link shall also be provided at the back of the cab.

CAB ENGINE TUNNEL

The cab interior shall include an integrated engine tunnel constructed of 5052-H32 Marine Grade, 0.19 of an inch thick aluminum. The tunnel shall be a maximum of 41.50 inches wide X 25.50 inches high.

DIESEL PARTICULATE FILTER CONTROLS

There shall be two (2) controls for the diesel particulate filter. One (1) control shall be for regeneration and one (1) control shall be for regeneration inhibit.

ENGINE PROGRAMMING HIGH IDLE SPEED

The engine high idle control shall maintain the engine idle at approximately 1250 RPM when engaged.

ENGINE HIGH IDLE CONTROL

The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated and the transmission is in neutral with the parking brake set. When automatically engaged the high idle shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear, and shall be available to manually or automatically re- engage when the brake is released, or when the transmission is placed in neutral.

ENGINE PROGRAMMING ROAD SPEED GOVERNOR

The engine shall include programming which will govern the top speed of the vehicle.

FOAM CELL and PLUMBING

Bidder Complies	
Yes	No

There shall be a 30-gallon foam cell located in the dunnage area of the apparatus that shall be plumbed with a quick connect and fill gauge located on the pump panel.

AUXILIARY ENGINE BRAKE

A compression brake, for the six (6) cylinder engine shall be provided. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs. The engine compression brake shall activate upon 0% accelerator when in operation mode and actuate the vehicle's brake lights.

The engine shall utilize a variable geometry turbo (VGT) as an integrated auxiliary engine brake to offer a variable rate of exhaust flow, which when activated in conjunction with the compression brake shall enhance the engine's compression braking capabilities.

AUXILIARY ENGINE BRAKE CONTROL

An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all of the following conditions are simultaneously detected:

- A valid gear ratio is detected.
- The driver has requested or enabled engine compression brake operation.
- The throttle is at a minimum engine speed position.
- The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift.

The compression brake shall be controlled through an on/off switch and a low/medium/high selector switch.

ELECTRONIC ENGINE OIL LEVEL INDICATOR

The engine oil shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal. The warning shall activate in a low oil situation upon turning on the master battery and ignition switches without the engine running.

FLUID FILLS

The front of the chassis shall accommodate fluid fill for the engine oil through the grille. This area shall also accommodate a check for the engine oil. The transmission, power steering, and coolant fluid fills and checks shall be under the cab. The windshield washer fill shall be accessible through the front left side mid step.

ENGINE DRAIN PLUG

The engine shall include an original equipment manufacturer installed oil drain plug.

Bidder Complies	
Yes	No

ENGINE WARRANTY

The Cummins engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.

REMOTE THROTTLE HARNESS

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a Fire Research In Control 300/400 pressure governor and a multiplexed gauge. Separate circuits shall be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indication light. The harness shall contain interlocks that will prevent shifting to road or pump mode unless the transmission output speed translates to less than 1 mph and the transmission is in neutral. The shift to pump mode shall also require the park brake be set. The harness shall be designed for a side mount pump panel.

An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump functions. This harness shall control the inputs for the transmission lock up circuits, governor/hand throttle controls and dash display which shall incorporate "Pump Engaged" and "OK to Pump" indicator lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.

ENGINE PROGRAMMING REMOTE THROTTLE

The engine ECM (Electronic Control Module) discreet wire remote throttle circuit shall be turned off for use with a J1939 based pump controller or when the discreet wire remote throttle controls are not required.

ENGINE PROGRAMMING IDLE SPEED

The engine low idle speed will be programmed at 700 rpm.

ENGINE FAN DRIVE

The engine cooling system fan shall incorporate a thermostatically controlled, Horton clutched type fan drive.

When the clutched fan is disengaged it shall facilitate improved vehicle performance, cab heating in cold climates, and fuel economy. The fan clutch design shall be fail safe so that if the clutch drive fails the fan shall engage to prevent engine overheating due to the fan clutch failure.

Bidder Complies	
Yes	No

ENGINE COOLING SYSTEM

There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and contraction at various rates without inducing stress into the adjoining cores.

The cooling system shall utilize a charge air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. The main components shall include a surge tank, an air to air charge air cooler bolted to the front of the radiator, recirculation shields, a shroud, a fan, and required tubing.

The radiator shall be a down-flow design constructed with aluminum cores, plastic end tanks, and a steel frame. The radiator shall be equipped with a drain cock to drain the coolant for serviceability.

The cooling system shall include a one piece injection molded polymer eleven (11) blade fan with a fiberglass fan shroud.

The cooling system shall be equipped with a surge tank that is capable of removing entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements, and allows for expansion and recovery of coolant into a separate integral expansion chamber.

All radiator tubes shall be formed from aluminized steel tubing. Recirculation shields shall be installed where required to prevent heated air from reentering the cooling package and affecting performance.

The charge air cooler shall be a cross-flow design constructed completely of aluminum with cast tanks. All charge air cooler tubes shall be formed from aluminized steel tubing and installed with silicone hump hoses and stainless steel “constant torque” style clamps meeting the engine manufacturer’s requirements.

ENGINE COOLING SYSTEM PROTECTION

The engine cooling system shall include a recirculation shield designed to act as a light duty skid plate below the radiator to provide additional protection for the engine cooling system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame color.

Bidder Complies	
Yes	No

ENGINE COOLANT

The cooling package shall include Extended Life Coolant (ELC). The use of ELC provides longer intervals between coolant changes over standard coolants providing improved performance. The coolant shall contain a 50/50 mix of ethylene glycol and de-ionized water to keep the coolant from freezing to a temperature of -34 degrees Fahrenheit.

Proposals offering supplemental coolant additives (SCA) shall not be considered, as this is part of the extended life coolant makeup.

ENGINE COOLANT FILTER

An engine coolant filter with a shut-off valve for the inlet and outlet shall be installed on the chassis. The location of the filter shall allow for easy maintenance.

Proposals offering engines equipped with coolant filters shall be supplied with standard non-chemical type particulate filters.

ELECTRONIC COOLANT LEVEL INDICATOR

The instrument panel shall feature a low engine coolant indicator light which shall be located in the center of the instrument panel. An audible tone alarm shall also be provided to warn of a low coolant incident.

ENGINE PUMP HEAT EXCHANGER

A single bundle type coolant to water heat exchanger shall be installed between the engine and the radiator. The heat exchanger shall be designed to prohibit water from the pump from coming in contact with the engine coolant. This shall allow the use of water from the discharge side of the pump to assist in cooling the engine.

COOLANT HOSES

The cooling system hoses shall be silicone heater hose with rubber hoses in the cab interior. The radiator hoses shall be formed silicone coolant hoses with formed aluminized steel tubing. All heater hose, silicone coolant hose, and tubing shall be secured with stainless steel constant torque band clamps.

ENGINE AIR INTAKE

The engine air intake system shall include an ember separator behind the right side headlamp. This ember separator shall be designed to protect the downstream air filter from embers using a combination of unique flat and crimped metal screens packaged in a heavy duty galvanized

steel frame. This multilayered screen shall trap embers and allow them to burn out before passing through the pack.

The engine air intake system shall also include an air cleaner mounted to the frame beneath the cab on the right side of the vehicle. This air cleaner shall utilize a replaceable dry type filter element designed to prevent dust and debris from being ingested into the engine. A service cover shall be provided on the bottom of the housing, reducing the chance of contaminating the air intake system during air filter service.

The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

AIR INTAKE PROTECTION

A light duty skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall provide protection for the air intake system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame color.

ENGINE EXHAUST SYSTEM

The exhaust system shall be mounted below the frame in the outboard position with the SCR canister in line rearward of the DPF. The exhaust system shall utilize a 90-degree bend in the exhaust tubing from the turbo into a side inlet DPF canister that allows the entire system to be pulled forward. The discharge shall terminate horizontally on the right side of the vehicle ahead of the rear tires.

The exhaust system shall include a diesel particulate filter (DPF), a diesel oxidation catalyst, and a selective catalytic reduction (SCR) catalyst to meet current EPA standards. The selective catalytic reduction catalyst utilizes a diesel exhaust fluid solution consisting of urea and purified water to convert NOx into nitrogen, water, and trace amounts of carbon dioxide. The solution shall be injected into the system through the decomposition tube between the DPF and SCR.

The system shall utilize 0.07 inch thick stainless steel exhaust tubing between the engine turbo and the DPF. Zero leak clamps seal all system joints between the turbo and DPF.

The DPF, the decomposition tube, and the SCR canister through the end of the tailpipe shall be connected with zero leak clamps.

DIESEL EXHAUST FLUID TANK

The exhaust system shall include a molded cross linked polyethylene tank for Diesel Exhaust Fluid (DEF). The tank shall have a capacity of six (6) usable gallons and shall be mounted on the left hand side of the chassis frame behind the batteries below the frame.

Bidder Complies	
Yes	No

The DEF tank shall be designed with capacity for expansion in case of fluid freezing. Engine coolant, which shall be thermostatically controlled, shall be run through lines in the tank to help prevent the DEF from freezing and to provide a means of thawing the fluid if it should become frozen.

The tank fill tube shall be routed under the rear of the cab with the fill neck and splash guard accessible in the top rear step.

ENGINE EXHAUST ACCESSORIES

An exhaust temperature mitigation device shall be shipped loose for installation by the body manufacturer on the vehicle. The temperature mitigation device shall lower the temperature of the exhaust by combining ambient air with the exhaust gasses at the exhaust outlet.

ENGINE EXHAUST WRAP

The exhaust tubing between the engine turbo and the diesel particulate filter (DPF) shall be wrapped with a thermal cover in order to retain the necessary heat for DPF regeneration. The exhaust wrap shall also help protect surrounding components from radiant heat which can be transferred from the exhaust.

TRANSMISSION

The drive train shall include an Allison model EVS 3000 torque converting, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.

The transmission shall include two (2) internal oil filters and Castrol TranSynd™ synthetic TES 295 transmission fluid which shall be utilized in the lubrication of the EVS transmission. An electronic oil level sensor shall be included with the readout located in the shift selector.

The transmission gear ratios shall be: 1st 3.49:1
2nd 1.86:1
3rd 1.41:1
4th 1.00:1
5th 0.75:1
6th 0.65:1 (if applicable) Rev 5.03:1

TRANSMISSION MODE PROGRAMMING

The transmission, upon start-up, will automatically select a four (4) speed operation. The fifth speed over drive shall be available with the activation of the mode button on the shifting pad.

TRANSMISSION FEATURE PROGRAMMING

The Allison Gen V-E transmission EVS group package number 127 shall contain the 198 vocational package in consideration of the duty of this apparatus as a pumper. This package shall incorporate an automatic neutral with selector override. This feature commands the transmission to neutral when the park brake is applied, regardless of drive range requested on the shift selector. This requires re-selecting drive range to shift out of neutral for the override.

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

A transmission interface connector shall be provided in the cab. This package shall contain the following input/output circuits to the transmission control module. The Gen V-E transmission shall include prognostic diagnostic capabilities. These capabilities shall include the monitoring of the fluid life, filter change indication, and transmission clutch maintenance.

Function ID assignment	Inputs	Description	Wire
C		PTO Request	142
J		Fire Truck Pump Mode (4th Lockup)	122 / 123
Outputs			
C		Range Indicator	145 (4th)
G		PTO Enable Output	130
		Signal Return	103

ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR

The transmission fluid shall be monitored electronically and shall send a signal to activate a warning in the instrument panel when levels fall below normal.

TRANSMISSION SHIFT SELECTOR

An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector shall have a graphical Vacuum Florescent Display (VFD) capable of displaying two lines of text. The shift selector shall provide mode indication and a prognostic indicator (wrench symbol) on the digital display. The prognostics monitor various operating parameters and shall alert you when a specific maintenance function is required.

TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE

When the auxiliary brake is engaged, the transmission shall automatically shift to second gear to decrease the rate of speed assisting the secondary braking system and slowing the vehicle.

Bidder Complies	
Yes	No

TRANSMISSION COOLING SYSTEM

The transmission shall include a water to oil cooler system located in the cooling loop between the radiator and the engine. The transmission cooling system shall meet all transmission manufacturer requirements. The transmission cooling system shall feature continuous flow of engine bypass water to maintain uninterrupted transmission cooling.

TRANSMISSION DRAIN PLUG

The transmission shall include an original equipment manufacturer installed magnetic transmission fluid drain plug.

TRANSMISSION WARRANTY

The Allison EVS series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.
LH PTO

A Spartan supplied ten (10) bolt standard duty clutched drive PTO shall be installed on the transmission. Installation shall include mounting of the PTO and wiring the unit with a control switch.

LH PTO MODEL

A ten (10) bolt Chelsea model 277-XDFJP-B5RA heavy duty transmission driven PTO shall be installed. The clutched shifted PTO is designed specifically for the Allison world transmission and provides torque ranges from 250 to 335 lb. ft.

PTO LOCATION

The transmission shall have two (2) power take off (PTO) mounting locations, one (1) in the 8:00 o'clock position and one (1) in the 4:00 o'clock position.

PTO CONTROL

The left hand power take off shall be controlled by the transmission. The power take off shall be activated by a locking on/off rocker switch with generator legend which contains an integral light which shall illuminate upon a positive engagement of the power take off. This switch shall be located on dash. The high idle shall automatically engage when the power take off is activated.

Required operating conditions for enabling this function are:
- Throttle position is low
- Engine speed is within customer specified constant limits
- Transmission output speed is within customer specified constant limits Park brake set

Bidder Complies	
Yes	No

PTO PROGRAMMING

The power take off shall be programmed for operator control such that it shall only engage at or below 900 engine RPM and a transmission output speed of 250 RPM. The PTO shall operate in a range up to 2100 engine RPM or a transmission output speed of 5000 RPM. The PTO programming shall provide for automatic disengagement set at a specified engine speed of 4000 RPM, or transmission output speed of 5000 RPM. The range shall be programmed to protect equipment driven from the power take off.

DRIVELINE

All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®.

MIDSHIP PUMP / GEARBOX

A temporary jackshaft driveline shall be installed by the chassis manufacturer to accommodate the mid- ship split shaft pump as specified by the apparatus manufacturer.

MIDSHIP PUMP / GEARBOX MODEL

The midship pump/gearbox provisions shall be for a Hale DSD forward pump.

MIDSHIP PUMP GEARBOX DROP

The Hale pump gearbox shall have an “L” (long) drop length.

MIDSHIP PUMP RATIO

The ratio for the midship pump shall be 2.28:1 (23).

MIDSHIP PUMP LOCATION C/L SUCTION TO C/L REAR AXLE

The midship pump shall be located so the dimension from the centerline of the suction to the centerline of the rear axle is 89.00 inches.

PUMP SHIFT CONTROLS

One (1) air pump shift control panel shall be located on the left hand side of the engine tunnel, integrated with the shifter pod. The following shall be provided on the panel: a three (3) position control lever; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow

Bidder Complies	
Yes	No

border outline and shall include pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided and located so it can be read from the driver's position per NFPA 16.10.1.3. The road mode shall be selected when the control lever is in the forward position and pump mode shall be selected when the control lever is in the rearward position.

The control lever center position shall exhaust air from both pump and road sides of the pump gear box shift cylinder.

FUEL FILTER/WATER SEPARATOR

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator as a primary filter. The fuel filter shall have a drain valve.

A water in fuel sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator.

A secondary fuel filter shall be included as approved by the engine manufacturer.

FUEL LINES

The fuel system supply and return lines installed from the fuel tank to the engine shall be reinforced nylon tubing rated for diesel fuel. The fuel lines shall be brown in color and connected with brass fittings.

FUEL SHUTOFF VALVE

A fuel shutoff valve shall be installed in the fuel draw line at the primary fuel filter to allow the fuel filter to be changed without loss of fuel to the fuel pump.

A second fuel shutoff valve shall be installed in the fuel draw line, near the fuel tank to allow maintenance to be performed with minimal loss of fuel.

ELECTRIC FUEL PRIMER

Integral to the engine assembly is an electric lift pump that serves the purpose of pre-filter fuel priming.

FUEL COOLER

An aluminum cross flow air to fuel cooler shall be provided to lower fuel temperature allowing the vehicle to operate at higher ambient temperatures. The fuel cooler shall be located above the rear axle.

Bidder Complies	
Yes	No

FUEL TANK

The fuel tank shall have a capacity of sixty-eight (68) gallons and shall measure 35.00 inches in width X 17.00 inches in height X 29.00 inches in length. The baffled tank shall be made of 14 gauge aluminized steel. The exterior of the tank shall be painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

The tank shall have a vent port to facilitate venting to the top of the fill neck for rapid filling without "blow-back" and a roll over ball check vent for temperature related fuel expansion and draw.

The tank is designed with dual draw tubes and sender flanges. The tank shall have 2.00 inch NPT fill ports for right or left hand fill. A 0.50 inch NPT drain plug shall be centered in the bottom of the tank.

The fuel tank shall be mounted below the frame, behind the rear axle. Two (2) three-piece strap hanger assemblies with “U” straps bolted midway on the fuel tank front and rear shall be utilized to allow the tank to be easily lowered and removed for service purposes. Rubber isolating pads shall be provided between the tank and the upper tank mounting brackets. Strap mounting studs through the rail, hidden behind the body shall not be acceptable.

FUEL TANK MATERIAL AND FINISH

The fuel tank shall be constructed of 14 gauge aluminized steel. The exterior of the fuel tank shall be coated with Spar-Liner spray on protective coating.

FUEL TANK STRAP MATERIAL

The fuel tank straps shall be constructed of ASTM A-36 steel.

FUEL TANK FILL PORT

The fuel tank fill ports shall be provided with two (2) left fill ports located one (1) in the forward position and one (1) in the middle position and the right fill port located in the middle position of the fuel tank.

A 1.50 inch diameter hole shall be provided in the left and right frame rails for vent hose routing provisions. The holes shall be located adjacent to the fuel tank and 5.13 inches up from the bottom of each rail.

FUEL TANK SERVICEABILTY PROVISIONS

The chassis fuel lines shall have additional length provided so the tank can be easily lowered and removed for service purposes. The additional 8.00 feet of length shall be located above

the fuel tank and shall be coiled and secured. The fuel line fittings shall be pointed towards the right side (curbside) of the chassis.

FUEL TANK DRAIN PLUG

A 0.5 inch NPT drain plug shall be centered in the bottom of the fuel tank.

FRONT AXLE

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-18. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to 18,000 pounds.

FRONT AXLE WARRANTY

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

FRONT WHEEL BEARING LUBRICATION

The front axle wheel bearings shall be lubricated with oil. The oil level can be visually checked via clear inspection windows in the front axle hubs.

FRONT SHOCK ABSORBERS

Two (2) Bilstein inert, nitrogen gas filled shock absorbers shall be provided and installed as part of the front suspension system. The shocks shall be a monotubular design and fabricated using a special extrusion method, utilizing a single blank of steel without a welded seam, achieving an extremely tight peak-to-valley tolerance and maintains consistent wall thickness. The monotubular design shall provide superior strength while maximizing heat dissipation and shock life.

The ride afforded through the use of a gas shock is more consistent and shall not deteriorate with heat, the same way a conventional oil filled hydraulic shock would.

The Bilstein front shocks shall include a digressive working piston assembly allowing independent tuning of the compression and rebound damping forces to provide optimum ride and comfort without compromise. The working piston design shall feature fewer parts than most conventional twin tube and “road sensing” shock designs and shall contribute to the durability and long life of the Bilstein shock absorbers.

Proposals offering the use of conventional twin tube or “road sensing” designed shocks shall not be considered.

FRONT SUSPENSION

The front suspension shall include a four (4) leaf spring pack consisting of 54.00 inch long and 4.00 inch wide taper leaf springs and shall feature a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 18,000 pounds.

STEERING COLUMN/ WHEEL

The cab shall include a Douglas Autotech steering column which shall include a seven (7) position tilt, a
2.25 inch telescopic adjustment, and an 18.00 inch, four (4) spoke steering wheel located at the driver's position. The steering wheel shall be covered with black polyurethane foam padding.

The steering column shall contain a horn button, self-canceling turn signal switch, four-way hazard switch and headlamp dimmer switch.

ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR

The power steering fluid shall be monitored electronically and shall send a signal to activate an audible alarm and visual warning in the instrument panel when fluid level falls below normal.

POWER STEERING PUMP

The hydraulic power steering pump shall be a TRW PS and shall be gear driven from the engine. The pump shall be a balanced, positive displacement, sliding vane type.

FRONT AXLE CRAMP ANGLE

The chassis shall have a front axle cramp angle of 50-degrees to the left and right.

POWER STEERING GEAR

The power steering gear shall be a TRW model TAS 85.

CHASSIS ALIGNMENT

The chassis frame rails shall be measured to insure the length is correct and cross checked to make sure they run parallel and are square to each other. The front and rear axles shall be laser aligned. The front tires and wheels shall be aligned and toe-in set on the front tires by the chassis manufacturer.

Bidder Complies	
Yes	No

REAR AXLE

The rear axle shall be a Meritor model RS-25-160 single drive axle. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 27,000 pounds.

The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.63 of an inch for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance.

The axle shall have heavy-duty Hypoid gearing for longer life, greater strength and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.

REAR AXLE DIFFERENTIAL LUBRICATION

The rear axle differential shall be lubricated with oil.

REAR AXLE WARRANTY

The rear axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.

REAR WHEEL BEARING LUBRICATION

The rear axle wheel bearings shall be lubricated with oil.

VEHICLE TOP SPEED

The top speed of the vehicle shall be approximately 68 MPH +/-2 MPH at governed engine RPM.

REAR SUSPENSION

The single rear axle shall feature a Reyco 79KB vari-rate, self-leveling captive slipper type conventional multi-leaf spring suspension, with 57.50 inch X 3.00 inch springs. One (1) adjustable and one (1) fixed torque rod shall be provided.

The rear suspension capacity shall be rated from 21,000 to 31,500 pounds.

FRONT TIRE

Bidder Complies	
Yes	No

The front tires shall be Goodyear 425/65R-22.5 20PR "L" tubeless radial G296 MSA mixed service tread.

The front tire stamped load capacity shall be 22,800 pounds per axle with a nominal speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating maximum load capacity shall be 24,400 pounds per axle with a speed rating of 68 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating maximum speed capacity shall be 22,800 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

REAR TIRE

The rear tires shall be Goodyear 12R-22.5 16PR "H" tubeless radial G622 RSD mixed service tread.

The rear tire stamped load capacity shall be 27,120 pounds per axle with a nominal speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating maximum load capacity shall be 29,020 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch.

The Goodyear Intermittent Service Rating maximum speed capacity shall match the nominal speed rating.

The Goodyear Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

REAR AXLE RATIO

The rear axle ratio shall be 5.13:1.

TIRE PRESSURE INDICATOR

Bidder Complies	
Yes	No

There shall be a voucher provided with the chassis for a pop up style tire pressure indicator at each tire valve stem. The indicator shall provide visual indication of pressure in the specific tire.

The tire pressure indicators shall be redeemed upon the vehicle manufacturer's receipt of the voucher for installation by the customer.

FRONT WHEEL

The front wheels shall be Alcoa hub piloted, 22.50 inch X 12.25 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and a polished finish that lasts.

REAR WHEEL

The outer rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch LvL One™ aluminum wheels with a polished outer surface. The inner rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch aluminum wheels with LvL One™ bright machine finish. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

BALANCE WHEELS AND TIRES

All of the wheels and tires, including any spare wheels and tire assemblies, shall be dynamically balanced.

WHEEL GUARDS

The rear dual wheels shall include a plastic isolator approximately 0.04" thick installed between the inner and outer wheel to help prevent corrosion caused by metal to metal contact.

TIRE CHAINS

Onspot brand six (6) strand automatic ice chains shall be installed on the rear axle of the chassis to provide instant traction while traveling on ice and snow at speeds below 35 mph.

TIRE CHAINS ACTIVATION

The tire chain system shall be activated by a locking switch on the dash to deter accidental activation. The light on the switch shall illuminate when the tire chains are engaged. The tire chains shall be interlocked with the transmission and shall engage only if the vehicle is traveling 30 MPH or less. After traveling over 30 MPH, the vehicle must be reduced to a speed below 5 MPH for the tire chains to be engaged or dis-engaged.

Bidder Complies	
Yes	No

BRAKE SYSTEM

A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system with a total of 4152 cubic inch of air capacity. A floor mounted treadle valve shall be mounted inside the cab for graduated control of applying and releasing the brakes. An inversion valve shall be installed to provide controlled service brake application during the unlikely event of primary air supply loss. All air reservoirs provided on the chassis shall be labeled for identification.

The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall designate when the system air pressure is below 60 PSI.

A four (4) sensor, four (4) modulator Anti-lock Braking System (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. This in turn shall allow the driver to maintain steering control under heavy braking and in most instances, shorten the braking distance. The electronic monitoring system shall incorporate diagonal circuitry which shall monitor wheel speed during braking through a sensor and tone ring on each wheel. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. The ABS system shall automatically disengage the auxiliary braking system device when required. The speedometer screen shall be capable of reporting all active defaults using PID/SID and FMI standards.

Additional safety shall be accommodated through Automatic Traction Control (ATC) which shall be installed on the single rear axle. The ATC system shall apply the ABS when the drive wheels loose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

A momentary rocker style switch shall be provided and properly labeled “mud/snow”. When the switch is pressed once, the system shall allow a momentary wheel slip to obtain traction under extreme mud and snow conditions. During this condition the ATC light and the light on the rocker switch shall blink continuously notifying the driver of activation. Pressing the switch again shall deactivate the mud/snow feature.

FRONT BRAKES

The front brakes shall be Meritor EX225 Disc Plus disc brakes with 17.00 inch vented rotors.

REAR BRAKES

The rear brakes shall be Meritor 16.50 inch X 7.00 inch S-cam drum type. The brakes shall feature a cast iron shoe.

Bidder Complies	
Yes	No

PARK BRAKE

Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements.

PARK BRAKE CONTROL

A Meritor-Wabco manual hand control push-pull style valve shall operate the parking brake.

The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the transmission shift pod console within easy access of the driver. The control shall include a protective guard which shall prevent accidental activation of the parking brake and still allow proper actuation of the control.

REAR BRAKE SLACK ADJUSTERS

The rear brakes shall include Meritor automatic slack adjusters installed on the axle which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.

REAR BRAKE DUST SHIELDS

The rear brakes shall be equipped with brake dust shields.

AIR DRYER

The brake system shall include a Wabco System Saver 1200 air dryer with an integral heater with a Metri-Pack sealed connector. The air dryer incorporates an internal turbo cutoff valve that closes the path between the air compressor and air dryer purge valve during the compressor "unload" cycle. The turbo cutoff valve allows purging of moisture and contaminants without the loss of turbo boost pressure. The air dryer shall be mounted behind the battery box on the left hand side.

FRONT BRAKE CHAMBERS

The front brakes shall be provided with MGM type 24 long stroke brake chambers.

REAR BRAKE CHAMBERS

The rear axle shall include TSE 30/36 brake chambers which shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE Type 36 brake chamber has a 36.00 square inch effective area.

Bidder Complies	
Yes	No

AIR COMPRESSOR

The air compressor provided for the engine shall be a Wabco® SS318 single cylinder pass-through drive type compressor which shall be capable of producing 18.7 CFM at 1200 engine RPMs. The air compressor shall feature a higher delivery efficiency translating to more air delivery per horsepower absorbed. The compressor shall include an aluminum cylinder head which shall improve cooling, reduce weight and decrease carbon formation. Superior piston and bore finishing technology shall reduce oil consumption and significantly increasing the system component life.

AIR GOVERNOR

An air governor shall be provided to control the cut-in and cut-out pressures of the engine mounted air compressor. The governor shall be calibrated to meet FMVSS requirements. The air governor shall be located on the air dryer bracket on the left frame rail behind the battery box.

AUXILIARY AIR RESERVOIR

One (1) auxiliary air reservoir with a 2084 cubic inch capacity shall be installed on the chassis to act as an additional reserve supply to the air system for air horn, air tool, or other non-service brake use. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

MOISTURE EJECTORS

A heated, automatic moisture ejector with a manual drain provision shall be installed on the wet tank of the air supply system. Manual pet-cock type drain valves shall be installed on all remaining reservoirs of the air supply system.

AIR SUPPLY LINES

The air system on the chassis shall be plumbed with color coded reinforced nylon tubing air lines. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue.

Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.

AUXILIARY AIR CONNECTION

An auxiliary airline shall be plumbed off the auxiliary air tank and routed inside the cab terminating under the driver dash area. A temporary mounted brass single port tee shall be

supplied for the OEM usage, such as pump shift operator valves. If used for a pump shift control it shall be provided and installed by the OEM.

AIR TANK SPACERS

There shall be spacers included with the air tank mounting. The spacers shall move the air tanks 3.00 inches inward towards the center of the chassis. This shall provide clearance between the air tanks and the frame for body U-bolt clearance.

REAR AIR TANK MOUNTING

If a combination of wheel base, air tank quantity, or other requirements necessitate the location of one or more air tanks to be mounted rear of the fuel tank, these tank(s) will be mounted perpendicular to frame.

WHEELBASE

The chassis wheelbase shall be 177.50 inches.

REAR OVERHANG

The chassis rear overhang shall be 47.00 inches.

FRAME

The frame shall consist of single rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, 10.25 inch web X 3.50 inches deep upper and lower flanges X 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each single rail shall be rated by a Resistance Bending Moment (RBM) minimum of 1,830,400 inch pounds and have a minimum section modulus of 16.64 cubic inches calculated by the radius method. The outside dimension frame shall measure 34.25 inches in width.

Proposals calculating the frame strength using the “box method” shall not be considered.

Proposals including heat treated rails shall not be considered. Heat treating frame rails produces rails that are not uniform in their mechanical properties throughout the length of the rail. Rails made of high strength, low alloy steel are already at the required yield strength prior to forming the rail.

A minimum of seven (7) fully gusseted 0.25 inch thick cross members shall be installed. The inclusion of the body mounting, or bumper mounting shall not be considered as a cross member. The cross members shall be attached using zinc coated grade 8 fasteners. The bolt heads shall be flanged type, held in place by distorted thread flanged lock nuts. Each cross member shall be mounted to the frame rails utilizing a minimum of 0.25 inch thick gusset reinforcement plates at all corners balancing the area of force throughout the entire frame.

Bidder Complies	
Yes	No

Any proposals not including additional reinforcement for each cross member shall not be considered.

All relief areas shall be cut in with a minimum 2.00 inch radius at intersection points with the edges ground to a smooth finish to prevent a stress concentration point.

The frame and cross members shall carry a lifetime warranty to the original purchaser. A copy of the frame warranty shall be made available upon request.

Proposals offering warranties for frames not including cross members shall not be considered.

FRAME WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The frame and cross members shall carry a limited lifetime warranty to the original purchaser. The warranty period shall commence on the date the vehicle is delivered to the first end user.

REAR TOW DEVICE

The frame rails shall contain (6) holes per frame in a pattern specified by the OEM for mounting Spartan ER tow eyes at the rear of the frame at a location defined by the OEM.

FRAME PAINT

The frame shall be powder coated black prior to any attachment of components.

All powder coatings, primers and paint shall be compatible with all metals, pretreatments and primers used. The cross hatch adhesion test per ASTM D3359 shall not have a fail of more than ten (10) squares. The pencil hardness test per ASTM D3363 shall have a final post-curved pencil hardness of H- 2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

Any proposals offering painted frame with variations from the above process shall not be accepted. The film thickness of vendor supplied parts shall also be sufficient to meet the performance standards as stated above.

Bidder Complies	
Yes	No

The chassis under carriage consisting of frame, axles, driveline running gear, air tanks and other chassis mounted components shall be painted with gloss black paint. Paint shall be applied prior to airline and electrical wiring installation.
FRONT BUMPER

The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall be 0.38 thick ASTM A36 steel which shall measure 12.00 inches high with a 3.05 inch flange and shall be 99.00 inches wide with angled front corners.

The bumper shall be primed and painted as specified.

FRONT BUMPER EXTENSION LENGTH

The front bumper shall be extended approximately 21.00 inches ahead of the cab.

FRONT BUMPER PAINT

The front bumper shall be painted the same as the lower cab color. The front bumper trim shall be painted Spar-Liner black.

FRONT BUMPER TRIM

A stainless steel trim angle, painted to the customer's specifications, shall be installed on the top corner of the bumper across the front and on the top corner of the bumper tails. The trim angle shall measure 1.10 inches wide on the horizontal flange and 1.60 inches tall on the vertical flange. The trim shall be affixed to the bumper without holes and fasteners.

FRONT BUMPER SUCTION PROVISION

The bumper apron shall include a 5.00 inch stainless steel pipe intended for use as a suction intake for the pump. The suction pipe shall be routed from the right hand front bumper area to the area rear of the front axle near the back of the cab.

The front of the suction pipe shall be designed to extend vertically 1.50 inches above the top surface of the bumper in the right hand outboard position.

The forward end of the suction pipe shall be finished with a 5.00 inch National Pipe Thread (NPT). The rear of the suction shall include a Victaulic groove for connecting to the pump plumbing. The suction pipe shall also include a 0.50 inch NPT port intended as a primer assist connection.

The apparatus manufacturer shall plumb the suction pipe to the pump and shall provide all valves as required.

Bidder Complies	
Yes	No

FRONT BUMPER APRON

The 21.00 inch extended front bumper shall include an apron constructed of 0.19 inch thick embossed aluminum tread plate.

The apron shall be installed between the bumper and the front face of the cab affixed using stainless steel bolts attaching the apron to the top bumper flange.

FRONT BUMPER COMPARTMENT CENTER

The front bumper shall include a compartment in the bumper apron located in the center between the frame rails which may be used as a hose well. The compartment shall be constructed of 0.13 inch 5052- H32 grade aluminum and shall include drain holes in the bottom corners to allow excess moisture to escape. The compartment shall include a notched cover constructed of 0.19 inch thick bright embossed aluminum tread plate. The notch shall be located in the right front portion of the cover and shall be 4.00 inches in length with a 2.00 inches wide radius.

FRONT BUMPER COMPARTMENT COVER HARDWARE

The front bumper compartment cover(s) shall include gas cylinder stays which shall hold the cover open. Each cover shall be held in the closed position via a D-ring style latch.

MECHANICAL SIREN

The front bumper shall include an electro mechanical Federal Q2B™ siren, which shall be streamlined, chrome-plated and shall produce 123 decibels of sound at 10.00 feet. The Q2B™ siren produces a distinctive warning sound that is recognizable at long distances. A unique clutch design provides a longer coast down sound while reducing the amp draw to 100 amps. The siren shall measure 10.50 inches wide X 10.00 inches high X 14.00 inches deep. The siren shall include a pedestal mount to surface mount on a horizontal surface.

MECHANICAL SIREN LOCATION

The siren shall be pedestal mounted on the bumper apron on the furthest outboard section of the bumper on the driver side.

AIR HORN

The chassis shall include two (2) Grover brand Stutter Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish.

AIR HORN LOCATION

The air horns shall be recess mounted in the front bumper fascia between the frame rails in the right and left outboard positions.

AIR HORN RESERVOIR

One (1) air reservoir, with a 2084 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

ELECTRONIC SIREN SPEAKER

There shall be one (1) Federal Signal model BP200-EF, 200 watt speaker provided. The speaker shall measure 5.50 inches tall X 7.70 inches wide X 7.80 inches deep. The speaker shall include a Federal Signal "Electric F" style grille which shall measure 6.61 inches tall X 6.78 inches wide.

ELECTRONIC SIREN SPEAKER LOCATION

The electronic siren speaker shall be located on the front bumper face on the left side outboard of the frame rail in the far outboard position.

FRONT BUMPER TOW HOOKS

Two (2) heavy duty tow hooks, painted to match the chassis frame, shall be installed below the front bumper in the forward position, bolted directly to the underside of each chassis frame rail with grade 8 bolts.

CAB TILT SYSTEM

The entire cab shall be capable of tilting approximately 45-degrees to allow for easy maintenance of the engine and transmission. The cab tilt pump assembly shall be located on the right side of the chassis above the battery box.

The electric-over-hydraulic lift system shall include an ignition interlock and red cab lock down indicator lamp on the tilt control which shall illuminate when holding the "Down" button to indicate safe road operation.

It shall be necessary to activate the master battery switch and set the parking brake in order to tilt the cab. As a third precaution the ignition switch must be turned off to complete the cab tilt interlock safety circuit.

Two (2) spring-loaded hydraulic hold down hooks located outboard of the frame shall be installed to hold the cab securely to the frame. Once the hold-down hooks are set in place, it shall take the application of pressure from the hydraulic cab tilt lift pump to release the hooks.

Bidder Complies	
Yes	No

Two (2) cab tilt cylinders shall be provided with velocity fuses in each cylinder port. The cab tilt pivots shall be 1.90 inch ball and be anchored to frame brackets with 1.25 inch diameter studs.

A steel safety channel assembly, painted safety yellow shall be installed on the right side cab lift cylinder to prevent accidental cab lowering. The safety channel assembly shall fall over the lift cylinder when the cab is in the fully tilted position. A cable release system shall also be provided to retract the safety channel assembly from the lift cylinder to allow the lowering of the cab.

CAB TILT AUXILIARY PUMP

A manual cab tilt pump module shall be attached to the cab tilt pump housing.

CAB TILT LIMIT SWITCH

A cab tilt limit switch shall be installed. The switch will effectively limit the travel of the cab when being tilted. The limit adjustment of the switch shall be preset by the chassis manufacturer to prevent damage to the cab or any bumper mounted option mounted in the cab tilt arc. Further adjustment to the limit by the apparatus manufacturer shall be available to accommodate additional equipment.

CAB TILT CONTROL RECEPTACLE

The cab tilt control cable shall include a receptacle which shall be temporarily located on the right hand chassis rail rear of the cab to provide a place to plug in the cab tilt remote control pendant. The tilt pump shall include 8.00 feet of cable with a six (6) pin Deutsch receptacle with a cap.

The remote control pendant shall include 20.00 feet of cable with a mating Deutsch connector. The remote control pendant shall be shipped loose with the chassis.

CAB WINDSHIELD

The cab windshield shall have a surface area of 2825.00 square inches and be of a two (2) piece wraparound design for maximum visibility.

The glass utilized for the windshield shall include standard automotive tint. The left and right windshield shall be fully interchangeable thereby minimizing stocking and replacement costs.

Each windshield shall be installed using black self-locking window rubber.

GLASS FRONT DOOR

Bidder Complies	
Yes	No

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be accomplished manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

There shall be an irregular shaped fixed window which shall measure 2.50 inches wide at the top, 8.00 inches wide at the bottom X 26.00 inches in height, more commonly known as "cozy glass" ahead of the front door roll down windows.

The windows shall be mounted within the frame of the front doors trimmed with a black anodized ring on the exterior.

Each front door window shall include patent pending heated glass technology to reduce fogging with a switch on the dash.

GLASS TINT FRONT DOOR

The windows located in the left and right front doors shall have a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS REAR DOOR RH

The rear right hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

GLASS TINT REAR DOOR RIGHT HAND

The window located in the right hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS REAR DOOR LH

The rear left hand side door shall include a window which is 27.00 inches in width X 26.00 inches in height. This window shall roll up and down manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

GLASS TINT REAR DOOR LEFT HAND

The window located in the left hand side rear door shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS SIDE MID RH

Bidder Complies	
Yes	No

The cab shall include a window on the right side behind the front and ahead of the crew door which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self-locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

GLASS TINT SIDE MID RIGHT HAND

The window located on the right hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

GLASS SIDE MID LH

The cab shall include a window on the left side behind the front door and ahead of the crew door and above the wheel well which shall measure 16.00 inches wide X 26.00 inches high. This window shall be fixed within this space and shall be rectangular in shape. The window shall be mounted using self- locking window rubber. The glass utilized for this window shall include a green automotive tint unless otherwise noted.

GLASS TINT SIDE MID LEFT HAND

The window located on the left hand side of the cab between the front and rear doors shall include a standard green automotive tint which shall allow seventy-five percent (75%) light transmittance.

CLIMATE CONTROL

A ceiling mounted combination defroster and cabin heating and air conditioning system shall be located above the engine tunnel area. The system covers and plenums shall be of sever duty design made of aluminum which shall be coated with a customer specified interior paint. The design of the system's covers shall provide quick access to washable air intake filters as well as easy access to other serviceable items.
The air delivery plenums provide targeted airflow directly to the vehicle occupants. Six (6) adjustable louvers will provide comfort for the front seat occupants and ten (10) adjustable louvers will provide comfort for the rear crew occupants.
The system shall be capable of producing up to 12 FPM of air velocity at all occupant seating positions. Separate front and rear blower motors shall be of brushless design and shall be controlled independently. It shall be capable of reducing the interior cabin air temperature from 122˚ F (+/- 3˚ F) to 80˚ F in thirty minutes with 50% relative humidity and full solar load as described in SAE J2646.

Bidder Complies	
Yes	No

The system shall also provide heater pull up performance which meets or exceeds the performance requirements of SAE J1612 as well as defrost performance that meets or exceeds the performance requirements of SAE J381.
A gravity drain system shall be provided that is capable of evacuating condensate from the vehicle while on a slope of up to a 13% grade in any direction.
The air conditioning system plumbing shall be a mixture of custom bent zinc coated steel fittings and Aero-quip GH134 flexible hose with Aeroquip EZ-Clip fittings.
The overhead heater/defroster plumbing shall include an electronic flow control valve that re-directs hot coolant away from the evaporator, via a bypass loop, as the temperature control is moved toward the cold position.
Any component which needs to be accessed to perform system troubleshooting shall be accessible by one person using basic hand tools. Regularly serviced items shall be replaceable by one person using basic hand tools.
**Performance data is based on testing performed by an independent third party test facility using a medium four-door 10" Raised roof Gladiator chassis equipped with an ISL engine.

CLIMATE CONTROL DRAIN

The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance.

CLIMATE CONTROL ACTIVATION

The heating, defrosting and air conditioning controls shall be on the dash next to driver panel, in a position which is easily accessible to the driver. The climate control shall be activated by a rotary switch.

HVAC OVERHEAD COVER PAINT

The overhead HVAC cover shall be painted with a multi-tone black-black texture finish.

A/C CONDENSER LOCATION

A roof mounted A/C condenser shall be installed centered on the cab forward of the raised roof against the slope rise.

A/C COMPRESSOR

The air-conditioning compressor shall be a belt driven, engine mounted compressor. The compressor shall be compatible with R134-a refrigerant.

CAB CIRCULATION FANS FRONT

Bidder Complies	
Yes	No

The cab shall include two (2) all metal 6.00 inch air circulation fans installed in the outer front cab corners. Each fan shall be controlled by an individual toggle switch on each fan. The fans can be used to help defog the windshield or to increase air circulation for passenger comfort.

UNDER CAB INSULATION

The underside of the cab tunnel surrounding the engine shall be lined with multi-layer insulation, engineered for application inside diesel engine compartments.

The insulation shall act as a noise barrier, absorbing noise thus keeping the decibel level in the cab well within NFPA recommendations. As an additional benefit, the insulation shall assist in sustaining the desired temperature within the cab interior.

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft² PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads.

INTERIOR TRIM FLOOR

The floor of the cab shall be covered with a multi-layer mat consisting of 0.25 inch thick sound absorbing closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The covering shall be held in place by a pressure sensitive adhesive and aluminum trim molding. All exposed seams shall be sealed with silicone caulk matching the color of the floor mat to reduce the chance of moisture and debris retention.

INTERIOR TRIM

The cab interior shall include trim on the front ceiling, rear crew ceiling, and the cab walls. It shall be easily removable to assist in maintenance. The trim shall be constructed of insulated vinyl over a hard board backing.

REAR WALL INTERIOR TRIM

The rear wall of the cab shall be trimmed with vinyl.

HEADER TRIM

The cab interior shall feature header trim over the driver and officer dash constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum.

TRIM CENTER DASH

The main center dash area shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate. There shall be four (4) holes located on the top of the dash near each outer edge of the electrical access cover for ventilation.

TRIM LH DASH

The left hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 inch thick aluminum plate for a perfect fit around the instrument panel. For increased occupant protection the extreme duty left hand dash utilizes patent pending break away technology to reduce rigidity in the event of a frontal crash. The left hand dash shall offer lower vertical surface area to the left and right of the steering column to accommodate control panels.

TRIM RH DASH

The right hand dash shall be constructed of 5052-H32 Marine Grade, 0.13 of an inch thick aluminum plate and shall include a glove compartment with a hinged door and a Mobile Data Terminal (MDT) provision. The glove compartment size will measure 14.00 inches wide X 6.38 inches high X 5.88 inches deep. The MDT provision shall be provided above the glove compartment.

ENGINE TUNNEL TRIM

The cab engine tunnel shall be covered with a multi-layer mat consisting of 0.25 inch closed cell foam with a 0.06 inch thick non-slip vinyl surface with a pebble grain finish. The mat shall be held in place by pressure sensitive adhesive. The engine tunnel mat shall be trimmed with anodized aluminum stair nosing trim for an aesthetically pleasing appearance.

ENGINE TUNNEL ACCESSORIES

The engine tunnel shall feature a fabricated aluminum console which shall include a large storage bin with dividers and a map compartment. There shall be two (2) cup holders included in the console.

POWER POINT DASH MOUNT

The cab shall include one (1) 12 volt cigarette lighter type receptacle in the cab dash electrical panel to provide a power source for 12 volt electrical equipment. The receptacle shall be wired to be live with the battery master switch.

The cab dash electrical panel shall also include one (1) Dual universal serial bus (USB) charging receptacle in the cab dash rocker switch cutout to provide a power source for USB

chargeable electrical equipment. One (1) USB port shall be capable of a 5 Volt-1 amp output and One (1) USB port shall be capable of a 5 Volt-2.1 amp output. The receptacles shall be live with the battery master switch and include a backlit legend.

STEP TRIM

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of polished 5032 H32 aluminum Grip Strut® grating with angled outer corners. The step shall feature a splash guard to reduce water and debris from splashing in to the step. The splash guard shall have an opening on the outer edge to allow debris and water to flow through rather than becoming trapped within the stepping surface. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed with a Flex-Tred® adhesive grit surface material.

STEP TRIM KICKPLATE

The cab steps shall include a kick plate in the rise of each step. The risers shall be trimmed in 3003-H22 bright aluminum tread-plate which is 0.07 inch thick.

UNDER CAB ACCESS DOOR

The cab shall include an access door in the left crew step riser constructed of aluminum tread plate with a push and turn latch. The under cab access door shall provide access to the diesel exhaust fluid fill.

INTERIOR DOOR TRIM

The interior trim on the doors of the cab shall consist of an aluminum panel constructed of Marine Grade 5052-H32 0.13 of an inch thick aluminum plate. The door panels shall include a painted finish.

DOOR TRIM CUSTOMER NAMEPLATE

The interior door trim on the front doors shall include a customer nameplate which states the vehicle was custom built for their Department.

CAB DOOR TRIM REFLECTIVE

The interior of each door shall include high visibility reflective tape. A white reflective tape shall be provided vertically along the rear outer edge of the door. The lowest portion of each door skin shall include a reflective tape chevron with red and white stripes and a Spartan logo. The chevron tape shall measure 6.00 inches in height.

INTERIOR GRAB HANDLE "A" PILLAR

There shall be two (2) rubber covered 11.00 inch grab handles installed inside the cab, one on each "A" post at the left and right door openings. The left handle shall be located 7.88 inches above the bottom of the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

INTERIOR GRAB HANDLE FRONT DOOR

Each front door shall include one (1) ergonomically contoured 9.00 inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.

INTERIOR GRAB HANDLE REAR DOOR

A yellow powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00 inch long handle shall extend horizontally the width of the window just above the window sill. The handle shall assist personnel in exiting and entering the cab.

INTERIOR SOFT TRIM COLOR

The cab interior soft trim surfaces shall be gray in color.

INTERIOR TRIM SUN VISOR

The header shall include two (2) sun visors, one (1) on each side forward of the driver and officer seating positions above the windshield. The sun visors shall be constructed of Masonite covered with padded vinyl trim.

In addition to the padded sun visors, two (2) impact resistant, transparent acrylic polycarbonate sun visors with a smoke gray tint shall be provided and installed on the header above the driver and officer.

The see thru visors are designed for maximum flexibility of positioning utilizing an arm with virtually unlimited adjustability with lateral travel of the tinted visor at the end of the arm which can be locked in place by a thumbscrew.

The tinted sun visors are easily adjusted and can be placed into a chosen position with one hand. The tinted sun visors will help protect vehicle occupants from solar glare without obscuring their vision.

INTERIOR FLOOR MAT COLOR

The cab interior floor mat shall be black in color.

Bidder Complies	
Yes	No

CAB PAINT INTERIOR

The inner door panel surfaces shall be coated with Spar-Liner black pebble-grain texture finish.

HEADER TRIM INTERIOR PAINT

The metal surfaces in the header area shall be coated with black Spar-Liner.

TRIM CENTER DASH INTERIOR PAINT

The entire center dash shall be coated with black Spar-Liner. Any accessory pods attached to the dash shall also be coated with this material.

TRIM LEFT HAND DASH INTERIOR PAINT

The left hand dash shall be coated with black Spar-Liner.

TRIM RIGHT HAND DASH INTERIOR PAINT

The right hand dash shall be coated with black Spar-Liner.

ENGINE TUNNEL ACCESSORIES PAINT

The engine tunnel accessories shall be coated with black Spar-Liner.

DASH PANEL GROUP

The main center dash area shall include three (3) removable panels located one (1) to the right of the driver position, one (1) in the center of the dash and one (1) to the left of the officer position. The center panel shall be within comfortable reach of both the driver and officer.

SWITCHES CENTER PANEL

The center dash panel shall include twelve (12) rocker switch positions in a six (6) over six (6) switch configuration in the left portion of the panel.
A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES LEFT PANEL

Bidder Complies	
Yes	No

The left dash panel shall include thirteen (13) switches. There shall be six (6) switches across the top of the panel and seven (7) across the bottom of the panel. Five (5) of the top row of switches shall be rocker type and the left one (1) shall be the headlight switch. Five (5) of the lower row of switches shall be rocker type and the left two (2) shall be the windshield wiper/washer control switch and instrument lamp dimmer switch.

A rocker switch with a blank legend installed directly above shall be provided for any position not designated by a specific option. The non-designated switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

SWITCHES RIGHT PANEL

The right dash panel shall include no rocker switches or legends.

SEAT BELT WARNING

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall activate an indicator light in the instrument panel, a digital seat position indicator with a seat position legend in the switch panel, and an audible alarm.

The warning system shall activate when any seat is occupied with a minimum of 60 pounds and the corresponding seat belt remains unfastened. The warning system shall also activate when any seat is occupied and the corresponding seat belt was fastened in an incorrect sequence. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have the seat belts fastened.

SEAT MATERIAL

The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. Common trade names for this material are Imperial 1200 and Durawear.

SEAT COLOR

All seats supplied with the chassis shall be gray in color. All seats shall include red seat belts.

SEAT BACK LOGO

The seat back shall include the “Spartan” logo. The logo shall be centered on the standard headrest of the seat back and on the left side of a split headrest.

SEAT DRIVER

Bidder Complies	
Yes	No

The driver's seat shall be an H.O. Bostrom Firefighter Sierra model seat. The seat shall feature eight- way electric positioning. The eight positions shall include up and down, fore and aft with 8.00 inches of travel, back angle adjustment and seat rake adjustment. The seat shall feature integral springs to isolate shock.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches measured with the seat height adjusted to the lowest position of travel.

This model of seat shall have successfully completed the static load tests set forth by FMVSS 207, 209, and 210 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity.

The materials used in construction of the seat shall also have successfully completed testing with regard to the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK DRIVER

The driver’s seat shall include a standard seat back incorporating the all belts to seat feature (ABTS). The seat back shall feature a contoured head rest.

SEAT MOUNTING DRIVER

The driver’s seat shall be installed in an ergonomic position in relation to the cab dash.

OCCUPANT PROTECTION DRIVER

The driver’s position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The driver’s seating area APS shall include:

• Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the driver, securing the occupant in the seat and the load limiter plays out some of the seat belt

webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

• Large side curtain airbag - protects the driver's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the driver in a qualifying event by covering the window and the upper portion of the door.

• Dual knee airbags (patent pending) with energy management mounting (patent pending) - protects the driver's lower body from dangerous surface contact injuries, acceleration injuries, and from intrusion as well as locks the lower body in place so the upper body shall be shall be slowed by the load limiting seat belt.

Steering wheel airbag - protects the driver's head, neck, and upper torso from contact injuries, acceleration injuries, and contact points with intrusive surfaces as a result of a collision.

SEAT OFFICER

The officer's seat shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat shall be a non-adjustable type seat.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK OFFICER

The officer's seat shall feature a SecureAll™ SCBA locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit

Bidder Complies	
Yes	No

or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

SEAT MOUNTING OFFICER

The officer’s seat shall be installed in an ergonomic position in relation to the cab dash.

OCCUPANT PROTECTION OFFICER

The officer’s position shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

The officer’s seating area APS shall include:

- Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the officer, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

- Large side curtain airbag - protects the officer’s head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the officer in a qualifying event by covering the window and the upper portion of the door.

Knee airbags - protects the officer's lower body from dangerous surface contact injuries, acceleration injuries, and from contact points with intrusive surfaces as a result of a collision

Bidder Complies	
Yes	No

as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.

POWER SEAT WIRING

The power seat or seats installed in the cab shall be wired directly to battery power.

SEAT BELT ORIENTATION CREW

The crew position seat belts shall follow the standard orientation which extends from the outboard shoulder extending to the inboard hip.

SEAT REAR FACING OUTER LOCATION

The crew area shall include two (2) rear facing crew seats, which include one (1) located directly behind the left side front seat and one (1) located directly behind the right side front seat.

SEAT CREW REAR FACING OUTER

The crew area shall include a seat in the rear facing outboard position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK REAR FACING OUTER

Bidder Complies	
Yes	No

The rear facing outboard seat shall feature a Bostrom SecureAll™ self-contained breathing apparatus (SCBA) locking system which shall store most U.S. and International SCBA brands and bottle sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the center of the bottom seat cushion for easy access and to eliminate hooking the release handle with clothing or other equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

SEAT MOUNTING REAR FACING OUTER

The rear facing outer seats shall offer special mounting positions which shall be 2.00 inches towards the rear wall offering additional space between the front seats and the outer rear facing seats.

OCCUPANT PROTECTION RFO

The rear facing outer seat position(s) shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

Each rear facing outer seating position APS shall include:

- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around each occupant, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

Side curtain airbag - protects each occupant's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to each occupant in a qualifying event by covering the

Bidder Complies	
Yes	No

windows and walls adjacent to each seating position with an airbag custom designed for each cab configuration.

SEAT FORWARD FACING CENTER LOCATION

The crew area shall include two (2) forward facing center crew seats with both located at the center of the rear wall.

SEAT CREW FORWARD FACING CENTER

The crew area shall include a seat in the forward facing center position which shall be a H.O. Bostrom Firefighter series. The seat shall feature a tapered and padded seat, and cushion. The seat and cushion shall be hinged and compact in design for additional room and shall remain in the stored position until occupied.

The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant.

The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches.

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

SEAT BACK FORWARD FACING CENTER

The forward facing center seat shall feature a SecureAll™ self-contained breathing apparatus (SCBA) locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool.

The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically.

The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto- locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions.

The SecureAll™ shall include a release handle which shall be integrated into the seat cushion for quick and easy release. This shall eliminate the need for straps or pull cords to interfere with other SCBA equipment.

The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.

OCCUPANT PROTECTION FFC

The forward facing center seat position(s) shall be equipped with the Advanced Protection System™ (APS). The APS shall selectively deploy integrated systems to protect against injuries in qualifying frontal impact, side impact, and rollover events. The increase in survivable space and security of the APS shall also provide ejection mitigation protection.

Each forward facing center seating position APS shall include:

• APS advanced seatbelt system - retractor pre-tensioners tighten the seat belts around each occupant, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.

Side curtain airbag - provides ejection mitigation protection to each occupant in a qualifying event by covering the windows and walls adjacent to crew seating with an airbag custom designed for each cab configuration.

SEAT FRAME FORWARD FACING

The forward facing center seating positions shall include a full width seat frame located and installed at the rear wall. The seat frame shall span the available space on the rear wall. The seat frame shall be 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

SEAT FRAME FORWARD FACING STORAGE ACCESS

There shall be two (2) access points to the storage area centered on the front of the seat frame. Each access point shall be covered by a hinged door to allow access for storage in the seat box.

Bidder Complies	
Yes	No

SEAT MOUNTING FORWARD FACING CENTER

The forward facing center seats shall be installed facing the front of the cab.

CAB FRONT UNDERSEAT STORAGE ACCESS

The left and right under seat storage areas shall have a solid aluminum hinged door with non-locking latch.

SEAT COMPARTMENT DOOR FINISH

All underseat storage compartment access doors shall have a protective coating of black Spar-Liner.

WINDSHIELD WIPER SYSTEM

The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which both the left hand and right hand windshield wipers are attached, initiating a back and forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.

ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR

The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.

CAB DOOR HARDWARE

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of aluminum with a chrome plated finish.

The interior exit door handles shall be flush paddle type with a black finish, which are incorporated into the upper door panel.

All cab entry doors shall include locks which are keyed alike. The door locks shall be designed to prevent accidental lockout.

Bidder Complies	
Yes	No

The exterior pull handles shall include a scuff plate behind the handle constructed of polished stainless steel to help protect the cab finish.

DOOR LOCKS

Each cab entry door shall include a manually operated door lock. Each door lock may be actuated from the inside of the cab by means of a red knob located on the paddle handle of the respective door or by using a TriMark key from the exterior. The door locks are designed to prevent accidental lock out.

DOOR LOCK LH REAR CAB COMPARTMENT

The left hand side rear compartment shall feature a manual door lock.

DOOR LOCK RH REAR CAB COMPARTMENT

The right hand side rear compartment shall feature a manual door lock.

GRAB HANDLES

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The grab handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable non-slip assistance with a gloved hand.

REARVIEW MIRRORS

Retrac Aerodynamic West Coast style dual vision mirror heads model 613305 shall be provided and installed on each of the front cab doors.

The mirrors shall be mounted via 1.00 inch diameter tubular stainless steel arms to provide a rigid mounting to reduce mirror vibration.

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an integral convex mirrors installed in the mirror head below the flat glass to provide a wider field of vision. The flat and convex mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The flat and convex mirrors shall be heated for defrosting in severe cold weather conditions.

The mirrors shall be constructed of a vacuum formed chrome plated ABS plastic housing that is corrosion resistant and shall include the finest quality non-glare glass.

REARVIEW MIRROR HEAT SWITCH

The heat for the rearview mirrors shall be controlled through a rocker switch on the dash in the switch panel.

Bidder Complies	
Yes	No

CAB FENDER

Full width wheel well liners shall be installed on the extruded cab to limit road splash and enable easier cleaning. Each two-piece liner shall consist of an inner liner 16.00 inches wide made of vacuum formed ABS composite and an outer fenderette 3.50 inches wide made of 14 gauge 304 polished stainless steel.

CAB EXTERIOR FRONT & SIDE EMBLEMS

The cab shall include three (3) Spartan emblems. There shall be one (1) installed on the front air intake grille and one (1) emblem on the exterior of the cab on the lower forward portion of the front driver and officer side doors. The cab shall also include one (1) Advanced Protection System shield emblem just rear of the Spartan emblem on each front door.

IGNITION

A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a one-quarter turn Cole Hersee switch, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches.

Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the “ON” position.

The starter button shall only operate when both the master battery and ignition switches are in the “ON” position.

BATTERY

The single start electrical system shall include six (6) Harris BCI 31 925 CCA batteries with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.

BATTERY TRAY

The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame.

The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non- conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be held in place by non-conducting phenolic resin hold down boards.

BATTERY BOX COVER

Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.

BATTERY CABLE

The starting system shall include cables which shall be protected by 275 degree F. minimum high temperature flame retardant loom, sealed at the ends with heat shrink and sealant.

BATTERY JUMPER STUD

The starting system shall include battery jumper studs. These studs shall be located in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.

ALTERNATOR

The charging system shall include a 320 amp Leece-Neville 12 volt alternator. The alternator shall include a self-exciting integral regulator.

BATTERY CONDITIONER

A Kussmaul 1200 battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab in the LH rear facing outer seating position.

BATTERY CONDITIONER DISPLAY

A Kussmaul Auto Charge Deluxe Status Center battery conditioner display shall be mounted in the cab viewable through the cab mid side window behind the left front door.

AUXILIARY AIR COMPRESSOR

A Kussmaul Auto Pump 120V air compressor shall be supplied. The air compressor shall be installed behind the officer's seat. The air compressor shall be plumbed to the air brake system to maintain air pressure.

ELECTRICAL INLET

A Kussmaul 20 amp super auto-eject electrical receptacle shall be supplied. It shall automatically eject the plug when the starter button is depressed.

A single item or an addition of multiple items must not exceed the rating of the electric inlet that it’s connected to.

Bidder Complies	
Yes	No

Amp Draw Reference List:
Kussmaul 1000 Charger - 3.5 Amps
Kussmaul 1200 Charger - 10 Amps Kussmaul 35/10 Charger - 10 Amps 1000W Engine Heater - 8.33 Amps 1500W Engine Heater - 12.5 Amps 120V Air Compressor - 4.2 Amps

ELECTRICAL INLET LOCATION

An electrical inlet shall be installed on the left hand side of cab over the wheel well.

ELECTRICAL INLET CONNECTION

The electrical inlet shall be connected to the battery conditioner and the air pump.

ELECTRICAL INLET COLOR

The electrical inlet connection shall include a yellow cover.

HEADLIGHTS

The cab front shall include four (4) rectangular LED headlamps with separate high and low beams mounted in bright chrome bezels.

FRONT TURN SIGNALS

The front fascia shall include two (2) Whelen model 600 4.00 inch X 6.00 inch programmable LED amber turn signals which shall be installed in a chrome bezel outboard of the front warning and above the headlamps.

HEADLIGHT LOCATION

The headlights shall be located on the front fascia of the cab directly above the front warning lights.

SIDE TURN/MARKER LIGHTS

The sides of the cab shall include two (2) LED round side marker lights which shall be provided just behind the front cab radius corners.

MARKER AND ICC LIGHTS

In accordance with FMVSS, there shall be five (5) LED cab marker lamps designating identification, center and clearance provided. These lights shall be installed on the face of the cab within full view of other vehicles from ground level.

HEADLIGHT AND MARKER LIGHT ACTIVATION

Bidder Complies	
Yes	No

The headlights and marker lights shall be controlled through a rocker switch within easy reach of the driver. There shall be a dimmer switch within easy reach of the driver to adjust the brightness of the dash lights. The headlamps shall be equipped with the "Daytime Running" light feature, which shall illuminate the headlights to 80% brilliance when the battery master switch is in the "On" position and the parking brake is released.

GROUND LIGHTS

Each door shall include an LED NFPA compliant ground light mounted to the under side of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the respective door as well as being activated when the parking brake is set.

LOWER CAB STEP LIGHTS

The middle step located at each door shall include a recess mounted 4.00 inch round LED light which shall activate with the opening of the respective door.

INTERMEDIATE STEP LIGHTS

The intermediate step well area at each door shall include an LED light within a chrome housing. The Egress step lights shall provide visibility to the step well area for the first step exiting the vehicle. The Egress step lights shall activate with Entry step lighting.

UNDER BUMPER LIGHTS

There shall be two (2) 4.00 inch round LED NFPA compliant ground lights mounted under the bumper. The lights shall include a polycarbonate lens, a housing which is vibration welded, and LEDs which shall be shock mounted for extended life. The under bumper ground lighting shall be interlocked with the park brake and the marker light activation.

ENGINE COMPARTMENT LIGHT

There shall be an LED NFPA compliant light mounted under the engine tunnel for area work lighting on the engine. The light shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The light shall activate automatically when the cab is tilted.

LIGHTBAR PROVISION

There shall be one (1) light bar installed on the cab roof. The light bar shall be provided and installed by Spartan Chassis. The light bar installation shall include a lowered mounting that

shall place the light bar just above the junction box and wiring to a control switch on the cab dash.

CAB FRONT LIGHTBAR

The lightbar provisions shall be for one (1) Whelen brand Freedom IV LED lightbar mounted centered on the front of the cab roof. The lightbar shall be 72.00 inches in length. The lightbar shall feature six
(6) red LED light modules and two (2) clear LED light modules. The entire lightbar shall feature a clear lens. The clear lights shall be disabled with park brake engaged. The cable shall exit the lightbar on the right side of the cab. Lightbar shall include Opticom preemption device.

LIGHTBAR SWITCH

The light bar shall be controlled by a rocker switch located on the switch panel. This switch shall be clearly labeled for identification.

FRONT SCENE LIGHTS
The front of the cab shall include a Whelen Pioneer model PFS2 contour roof mount scene light installed on the brow of the cab.

Each lamp head shall have two (2) 12 volt high intensity LED panels. Each lamp head shall include a flood light and an 8-degree spotlight. Each lamp head shall draw 12.0 amps and generate 14,000 lumens total. Each lamp head shall measure 4.25 inches in height X 14.00 inches in width. The lamp heads and brackets shall be powder coated white.

SIDE SCENE LIGHTS
The sides of the cab shall include 2 Whelen Pioneer model PFS2 contour side mount scene light installed on both sides of the cab above the driver and passenger doors.

Each lamp head shall have two (2) 12 volt high intensity LED panels. Each lamp head shall include a flood light and an 8-degree spotlight. Each lamp head shall draw 12.0 amps and generate 14,000 lumens total. Each lamp head shall measure 4.25 inches in height X 14.00 inches in width. The lamp heads and brackets shall be powder coated white.

FRONT SCENE LIGHTS ACTIVATION

The front scene lighting shall be activated by a rocker switch.

FRONT SCENE LIGHT LOCATION

There shall be one (1) scene light mounted center on the front brow of the cab.

SIDE SCENE LIGHTS

The side of the cab shall include two (2) Whelen 900 series 9SC0ENZR model scene lights, one (1) each side which shall be surface mounted with a chrome bezel. The Whelen lights shall offer LED lighting at a gradient 32-degree angle.

SIDE SCENE LIGHT LOCATION

The scene lighting located on the left and right sides of the cab shall be mounted rearward of the cab "B" pillar in the 10.00 inch raised roof portion of the cab between the front and rear crew doors.

SIDE SCENE ACTIVATION

The scene lights shall be activated by two (2) rocker switches located in the switch panel, one (1) for each light, and by opening the respective side cab doors.

REAR SCENE LIGHTS

The rear of the cab shall include one (1) Whelen 900 series 9SC0ENZR model scene light which shall be surface mounted with a chrome bezel. The Whelen light shall offer LED lighting at a gradient 32- degree angle.

REAR SCENE LIGHT LOCATION

The rear scene light shall be located at the top of the rear wall in the center.
REAR SCENE LIGHT ACTIVATION

The rear scene lighting shall be activated via a single rocker switch located inside the cab on the switch panel.

TRAFFIC ADVISOR
There shall be a rear traffic advisor located on the rear of the pump body wired to the cab for control. This shall be a WHELEN Traffic advisor LED.

INTERIOR OVERHEAD LIGHTS

The cab shall include a red/clear Whelen LED dome lamp located over each door. The dome lamps shall be rectangular in shape and shall measure approximately 7.00 inches in length X 3.00 inches in width with a black colored bezel. The clear function of each lamp shall be activated by opening the respective door. While the door is closed the individual red or clear function of each lamp can be activated dependently by switches on each lamp.

Bidder Complies	
Yes	No

An additional separately functioning red or clear Whelen LED dome lamp shall be provided over the engine tunnel. Each individual function can be activated dependently by switches on the lamp.

AUXILIARY DOME LIGHT FRONT CREW

The cab shall include two (2) Whelen LED red/clear type auxiliary dome lights in the headliner inboard of the rear facing crew seat. They shall be rectangular shaped and measure approximately 7.00 inches in length X 3.00 inches in width, with a black colored bezel. The clear portion of each light shall be activated by the rear doors as well as a push button on each light. The red portion of each light shall be activated by a push button on each light only.

DO NOT MOVE APPARATUS LIGHT

The front headliner of the cab shall include a flashing red light clearly labeled "Do Not Move Apparatus". In addition to the flashing red light, an audible alarm shall be included which shall sound while the light is activated.

The flashing red light shall be 6.00 inches long X 2.50 inches wide X 1.75 inches high and shall be located centered left to right for greatest visibility.

The light and alarm shall be interlocked for activation when either a cab door is not firmly closed or an apparatus compartment door is not closed, and the parking brake is released.

MASTER WARNING SWITCH

A master switch shall be included in the main rocker switch panel. The switch shall be a rocker type, red in color and labeled “Master” for identification. The switch shall feature control over all devices wired through it. Any warning device switch left in the “ON” position shall automatically power up when the master switch is activated.

HEADLIGHT FLASHER

An alternating high beam headlight flashing system shall be installed into the high beam headlight circuit which shall allow the high beams to flash alternately from left to right.

Deliberate operator selection of high beams will override the flashing function until low beams are again selected. Per NFPA, these clear flashing lights will also be disabled “On Scene” when the park brake is applied.

HEADLIGHT FLASHER SWITCH

The flashing headlights shall be activated through a rocker switch on the switch panel. The rocker switch shall be clearly labeled for identification.

Bidder Complies	
Yes	No

INBOARD FRONT WARNING LIGHTS

The cab front fascia shall include two (2) Whelen 600 series Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

INBOARD FRONT WARNING LIGHTS COLOR

The warning lights mounted on the cab front fascia in the inboard positions shall be red with a clear lens.

FRONT WARNING SWITCH

The front warning lights shall be controlled via rocker switch on the panel. This switch shall be clearly labeled for identification.

INTERSECTION WARNING LIGHTS

The chassis shall include two (2) Whelen 600 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors.

INTERSECTION WARNING LIGHTS COLOR

The intersection lights shall be red with a clear lens.

INTERSECTION WARNING LIGHTS LOCATION

The intersection lights shall be recess mounted in the forward position on the side of the bumper ahead of the cornering light.

SIDE AND INTERSECTOR WARNING SWITCH

The side and intersector warning lights shall be controlled by a rocker switch on the switch panel. This switch shall be clearly labeled for identification.

TANK LEVEL LIGHTS

There shall be two (2) Whelen PSTANK water level light strips surface mounted vertically, one (1) on each side of the cab behind the rear cab doors.

The light strips shall feature four (4) colors of LED lights to indicate the fluid level of a tank. The colors from top to bottom shall be green, blue, amber, and red.

Bidder Complies	
Yes	No

INTERIOR DOOR OPEN WARNING LIGHTS

The interior of each door shall include one (1) 15.87 inch long X 0.73 inch tall amber Weldon LED warning light. The light shall be located on the upper portion of the door frame to be visible when a person is standing in front of the door while entering or exiting the cab. Each light shall activate with a scrolling directional flash pattern which moves from inside to outside when the door is in the open position. This shall serve as a warning to oncoming traffic.

SIREN CONTROL HEAD

A Whelen 295SLSA1 electronic siren control head with hard wired microphone shall be mounted in the cab dash center panel in a location specified by the customer. The siren shall offer a selectable 100 or 200-watt output, radio broadcast, public address, and seventeen (17) Scan-Lock siren tones and hands free operation which shall allow the operator to turn the siren on and off from the steering wheel horn ring if a horn/siren selector switch option is also selected. The siren circuitry shall be placed behind the rocker switch panels under the electrical cover with a 30.00 inch loop for the OEM to route as desired.

HORN BUTTON SELECTOR SWITCH

A rocker switch shall be installed in the switch panel between the driver and officer to allow control of either the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position to meet FMCSA requirements.

AIR HORN ACTIVATION

The air horn activation shall be accomplished by the steering wheel horn button for the driver and a black momentary push button on the switch panel. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

MECHANICAL SIREN ACTIVATION

The mechanical siren shall be actuated by a Linemaster model SP491-S81 foot switch mounted in the front section of the cab for use by the driver and a black push button in the switch panel on the dash. A red momentary siren brake rocker switch shall be provided in the switch panel on the dash.

The siren shall only be active when master warning switch is on to prevent accidental engagement.

BACK-UP ALARM

An ECCO model 575 backup alarm shall be installed at the rear of the chassis with an output level of 107 dB. The alarm shall automatically activate when the transmission is placed in reverse.

INSTRUMENTATION

An ergonomically designed instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring.

A twenty eight (28) icon lightbar message center with integral LCD odometer/trip odometer shall be included. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD message center screen shall be capable of custom configuration by the users for displaying certain vehicle status and diagnostic functions.

The instrument panel shall contain the following gauges:

One (1) three-movement gauge displaying Diesel Exhaust Fluid (DEF) level, fuel level, and electronic speedometer shall be included. The scale on the DEF and fuel level gauges shall read from empty to full as a fraction of full tank capacity. An amber indicator light shall indicate low fuel at 25% tank level. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen and an audible alarm. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H.

One (1) three-movement gauge displaying primary system, and secondary system air volumes and electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI) with a red line scale indicating critical levels of air pressure. The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, voltmeter, and transmission temperature. The scale on the engine oil pressure gauge shall read from 0 to 100 pounds per square inch (PSI) with a red line zone indicating critical levels of oil pressure. The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F) with a red line zone indicating critical temperature reading. The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the voltmeter shall read from 9 to 18 volts with a red line zone indicating critical levels of battery voltage. A red

indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the transmission temperature gauge shall read from 100 to 300 degrees Fahrenheit (F) with a red line zone indicating critical temperature reading. The transmission temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data. A red indicator light in the gauge shall indicate a high transmission temperature reading, as well as a message on the LCD screen.

The light bar portion of the message center shall include twenty eight (28) LED backlit icon/decals with clear LED and colored lenses. The lightbar shall be split with fourteen (14) back lit indicators on each side of the LCD message screen. The lightbar shall contain the following backlit indicators and produce the following audible alarms when supplied in conjunction with applicable configurations:

RED LENS
Stop Engine-indicates critical engine fault
Air Filter Restricted-indicates excessive engine air intake restriction Park Brake ISO icon-indicates parking brake is set
Seat Belt ISO icon-indicates when a seat is occupied and corresponding seat belt remains unfastened Low Coolant-indicates engine coolant is required

AMBER LENS
Malfunction Indicator Lamp (MIL) ISO icon-indicates an engine emission control system fault Check Engine ISO icon-indicates engine fault
Check Trans ISO icon-indicates transmission fault
High Transmission Temperature ISO icon-indicates excessive transmission oil temperature
ABS ISO icon-indicates anti-lock brake system fault
High exhaust system temperature ISO symbol icon
Water in Fuel ISO icon-indicates presence of water in fuel filter
*DPF restriction ISO icon indicates a restriction of the diesel particulate filter
*Regen Inhibit-indicates regeneration has been postponed due to user interaction
Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.
*SRS-indicates a problem in the supplemental restraint system
Check Message icon indicates a vehicle status or diagnostic on the LCD display requiring attention. Check Message-Turn Signal On
Check Message-Door Ajar Check Message-Cab Ajar
*Check Message-ESC Active
*Check Message-DPF Regen Active Check Message-No Engine Data Check Message-No Transmission Data Check Message-No ABS Data
Check Message-No Data All Communication With The Vehicle Systems Has Been Lost
Check Message-Check Engine Oil Level
Check Message-Check Washer Fluid Level
Check Message-Check Power Steering Fluid Level Check Message-Low Transmission Fluid Level Check Message-Check Coolant Level

GREEN LENS
Left and Right turn signal ISO icons
*ATC ISO icon-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system

High Idle-indicates engine high idle is active. Cruise Control-indicates cruise control is active OK to Pump-indicates the pump engage conditions have been met Pump Engaged-indicates the pump is currently in use
Auxiliary Brake-indicates secondary braking device is active

BLUE LENS
High Beam ISO icon

CLEAR LENS
Wait to Start-indicates active engine air preheat cycle

AUDIBLE ALARMS FROM GAUGE PACKAGE
High Trans Temp High or Low Voltage Check Engine
Check Transmission Stop Engine
Low Air Pressure Fuel Low
Water in Fuel
*ESC
High Coolant Temperature Low Engine Oil Pressure Low Coolant Level
Low DEF Level Air Filter Restricted
Extended Left and Right Turn Remaining On Cab Ajar
Door Ajar
ABS System Fault Seatbelt Indicator

EXTERNAL AUDIBLE ALARM
Air Filter Cab Ajar Door Ajar
Check Engine Stop Engine
Low Air Pressure
Low Engine Oil Pressure Water in Fuel
*Low DEF
ABS System Fault Seatbelt Indicator

*Items marked with an asterisk are provided only in applicable configurations.

LCD MESSAGES
Transmission Temperature Battery Voltage
Engine Hours Vehicle Speed Engine RPMs Fuel Level DEF Level
Engine Oil Pressure Ammeter (If equipped)
Auxiliary Ammeter (If equipped) Engine Coolant Temp

Bidder Complies	
Yes	No

Primary System Air Pressure Secondary System Air Pressure Turbo Boost Pressure
Exhaust Temperature Engine Load
Engine Torque Instant Fuel Economy
Average Fuel Economy

BACKLIGHTING COLOR

The instrumentation gauges and the switch panel legends shall be backlit using blue LED backlighting.

RADIO

A Panasonic radio with weather band, AM/FM stereo receiver, compact disc player, and four (4) speakers shall be installed in the cab. The radio shall be installed above the driver position. The speakers shall be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers on the upper rear wall of the cab.

AM/FM ANTENNA

A small antenna shall be located on the left hand side of the cab roof for AM/FM and weather band reception.

SPARTAN MOBILE GATEWAY

A vehicle mobile gateway router shall be provided. The device, once supplied with a customer provided USB aircard(s) and data plan SIM card(s), shall produce a mobile Wi-Fi hotspot in and around the vehicle using a cellular data connection. The vehicle router also enhances the vehicle's effective cellular data coverage and range. This option comes with free access to remote configuration software for a year.

The mobile data hotspot shall be mounted in the cab, in the overhead above the officer's seating position within a removable bracket for ease of access.

MOBILE GATEWAY ANTENNA

A mobile gateway Wi-Fi hotspot antenna shall be provided. The antenna shall be mounted on the right hand mid area of the cab roof above the "B" pillar so not to interfere with light bars or other roof mounted equipment installed by Spartan Chassis.

CAMERA

An Audiovox Voyager heavy duty rearview camera system, complete with an LCD display monitor, shall be supplied. One (1) camera with a teardrop shaped chrome plated housing

Bidder Complies	
Yes	No

shall be shipped loose for OEM installation in the body to afford the driver a clear view to the rear of the vehicle.

The camera shall be wired to a 7.00 inch flip down monitor which shall include a color display and day and night brightness modes installed above the driver position. The camera shall activate when the transmission is placed in reverse.

COMMUNICATION ANTENNA

An antenna base, for use with an NMO type antenna, shall be mounted on the right hand front corner of the cab roof so not to interfere with light bars or other roof mounted equipment installed by Spartan Chassis. The antenna base shall be an Antenex model MABVT8 made for either a 0.38 inch or 0.75 inch receiving hole in the antenna and shall include 17.00 foot of RG58 A/U cable with no connector at the radio end of the cable. The antenna base design provides the most corrosion resistance and best power transfer available from a high temper all brass construction and gold plated contact design. The antenna base shall be provided by Spartan.

COMMUNICATION ANTENNA CABLE ROUTING

The antenna cable shall be routed from the antenna base mounted on the roof to the area inside the center rocker switch console.

AUXILIARY COMMUNICATION ANTENNA

An auxiliary antenna base, for use with an NMO type antenna, shall be installed on the cab. The antenna base shall be an Antenex model MABVT8 and shall include 17.00 foot of RG58 A/U cable with no connector at the radio end of the cable. The antenna shall be mounted on the left hand front corner of the cab roof so not to interfere with light bars or other roof mounted equipment installed by Spartan Chassis. The antenna base shall be provided by Spartan.

AUXILIARY COMMUNICATION ANTENNA CABLE ROUTING

The auxiliary antenna cable shall be routed from the antenna base mounted on the roof to the area inside the center rocker switch console.

CAB EXTERIOR PROTECTION

The cab face shall have a removable plastic film installed over the painted surfaces to protect the paint finish during transport to the body manufacturer.

FIRE EXTINGUISHER

A 2.50 pound D.O.T approved fire extinguisher with BC rating shall be shipped loose with the cab.

DOOR KEYS

The cab and chassis shall include a total of four (4) door keys for the manual door locks.

DIAGNOSTIC SOFTWARE OCCUPANT PROTECTION

Diagnostic software for the Spartan Advanced Protection System shall be available for free download from the Spartan Chassis website to Spartan authorized OEMs, dealers and service centers, as well as the vehicle owner.

The software has been validated to be compatible with the following RP1210 interface adapters:

- Dearborn Group DPA4 Plus
- Noregon Systems JPRO® DLA+
- Cummins INLINE5
- Cummins INLINE6
- NexIQ™ USB-Link™

The software and adapter utilize the SAE J1939-13 heavy duty nine (9) pin connector which is located below the driver's side dash to the left of the steering column.

WARRANTY

Summary of Warranty Terms:

THE FOLLOWING IS SUMMARY OF WARRANTY TERMS FOR INFORMATION ONLY. THE ACTUAL LIMITED WARRANTY DOCUMENT, WHICH IS ATTACHED TO THIS OPTION, CONTAINS THE COMPLETE STATEMENT OF THE SPARTAN MOTORS USA LIMITED WARRANTY. SPARTAN'S RESPONSIBILITY IS TO BE ACCORDING TO THE TERMS OF THE COMPLETE LIMITED WARRANTY DOCUMENT.

The chassis manufacturer shall provide a limited parts and labor warranty to the original purchaser of the custom built cab and chassis for a period of twenty-four (24) months, or the first 36,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

CHASSIS OPERATION MANUAL

There shall be two (2) digital copies of the chassis operation manual provided with the chassis. The digital data shall include a parts list specific to the chassis model.

ENGINE AND TRANSMISSION OPERATION MANUALS

Bidder Complies	
Yes	No

The following manuals specific to the engine and transmission models ordered will be included with the chassis in the ship loose items:
(1) Hard copy of the Engine Operation and Maintenance manual with CD

(1) Digital copy of the Transmission Operator's manual

(1) Digital copy of the Engine Owner's manual

CAB/CHASSIS AS BUILT WIRING DIAGRAMS

The cab and chassis shall include two (2) digital copies of wiring schematics and option wiring diagrams.

SALES TERMS

The sale of the Spartan Chassis shall be governed by the terms contained on the Sales Terms – Acceptance of Purchase Order document, a copy of which is attached to this option.

DRIVELINE LAYOUT CONFIRMATION

During the design phase of the chassis the Spartan Chassis driveline engineer shall submit the driveline layout to an OEM engineer to review the chassis design for any potential problems integrating the OEM body to the chassis. The OEM engineer shall provide approval to the driveline engineer prior to driveline bills of materials being released.

LOW-VOLTAGE ELECTRICAL SYSTEM PERFORMANCE TESTING

The apparatus low-voltage electrical system will be tested and certified. Tests shall be performed when the air temperature is between 0°F and 110°F (–18°C and 43°C). The three tests defined in NFPA shall be performed in the order in which they appear. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for 10 minutes. Failure of any of these tests shall require a repeat of the sequence.

Reserve Capacity Test:

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged.

The engine shall be shut off and the minimum continuous electrical load shall be activated for 10 minutes.

Bidder Complies	
Yes	No

All electrical loads shall be turned off prior to attempting to restart the engine. The battery system shall then be capable of restarting the engine. Failure to restart the engine shall be considered a test failure of the battery system.

Alternator Performance Test at Idle:

The minimum continuous electrical load shall be activated with the engine running at idle speed. The engine temperature shall be stabilized at normal operating temperature.
The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

Alternator Performance Test at Full Load:

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed.

The test duration shall be a minimum of 2 hours.

Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the system required in NFPA 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system or 23.6 V dc for a 24 V nominal system, for more than 120 seconds, shall be considered a test failure.

Low Voltage Alarm Test:

Following the above test, a Low Voltage Alarm Test will be performed in the manner prescribed.

With the engine shut off, the total continuous electrical load shall be activated and shall continue to be applied until the excessive battery discharge alarm activates.

The battery voltage shall be measured at the battery terminals.

The test shall be considered a failure if the alarm has not yet sounded 140 seconds after the voltage drops to 11.70V for a 12 V nominal system or 23.4 V for a 24 V nominal system.

The battery system shall then be able to restart the engine. Failure to restart the engine shall be considered a test failure.

Certification Documentation:

At the time of delivery, the manufacturer shall provide the following documentation:

Bidder Complies	
Yes	No

(1) Documentation of the electrical system performance tests.
(2) A written electrical load analysis, including the following:
(a) The nameplate rating of the alternator.
(b) The alternator rating under the conditions specified above.
(c) Each of the component loads specified that make up the minimum continuous electrical load.
(d) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load.
(e) Each individual intermittent electrical load.

FINITE ELEMENT ANALYSIS AND TESTING

Finite Element Analysis has been utilized in evaluating and engineering the critical areas of the apparatus body. Prototype bodies have been subjected to rigorous testing over varied terrains simulating different environmental conditions. The purpose of such complex engineering methods of analysis shall be to ensure the longevity of the design by analyzing stress levels throughout the body and incorporating the structural supports wherever necessary.

In addition to the FEA analysis, the core product design shall be strain gauged instrumental to ensure validation of FEA results and "Real World" drive/apparatus driving conditions.

Analysis shall also have been conducted on the mounting system for the apparatus body and pump house. EXCEPTIONS TO THIS STATEMENT MAY BE CAUSE FOR IMMEDIATE REJECTION AND/OR BE CONSIDERED NON-COMPLIANT.

NO PRE-CONSTRUCTION CONFERENCE

There shall be no Pre-construction conference, prior to manufacturing, with individuals from the Fire Department.

NO FINAL INSPECTION

There shall be no Final- Inspection unless otherwise specified.

ONLINE CUSTOMER INTERACTION

The manufacturer shall provide the capability for online access through the manufacturer's website. The customer shall be able to view digital photos of their apparatus in the specified phases of construction. The following phases will be captured and displayed on the manufacturer's website:

4. Chassis
5. Body – Prior to Paint

6. Body – Painted

7. Pump and Plumbing
8. Assembly – 80% Complete

Due to the complex nature of the fire apparatus and the importance of communication between the manufacturer and customer, this line item is considered a critical requirement.

PUMP AND APPARATUS TRAINING

The successful bidder shall provide a factory-trained technician to provide the following training:
A minimum hour structured training course for the fire apparatus mechanics of the department, covering the repair and maintenance of all components of the apparatus called for in the specifications.

The successful bidder shall provide a minimum hour structured training course to be repeated three times to cover each of the shifts of personnel assigned to operate the apparatus, covering nomenclature of components, proper operation of the apparatus, daily operational maintenance checks, and other information necessary for a firefighter/driver/engineer to properly operate and maintain the apparatus.

It is intended that this training be organized in such a manner that both the mechanics and fire personnel receive full benefit of the aforementioned structured training. The firefighter/operator training shall be conducted within one week after the vehicle is fully accepted and readied for service by the "Purchaser" or at a time mutually agreed upon by the "Purchaser" and "Supplier".

MAXIMUM OVERALL LENGTH REQUIREMENT

The Apparatus specified shall be constructed with no restrictions to the maximum Overall Length.

MAXIMUM OVERALL HEIGHT REQUIREMENT

The Apparatus specified shall be constructed with no restrictions to the maximum Overall Height.

MAXIMUM WHEEL BASE REQUIREMENT

The Apparatus specified shall be constructed with no restrictions to the maximum Wheel Base.

Bidder Complies	
Yes	No

APPARATUS STABILITY (CG) CALCULATED STABILITY

Vehicle stability or roll stability shall be presented by methods of calculations or measurements per NFPA 1901 – current edition. The calculated or measured center of gravity (CG) shall be no higher than 80 percent of the rear axle track width.
The OEM shall utilize supplied documents and information detailing specific equipment and locations for purposes of calculating CG. If no such information is supplied the OEM shall estimate approximate equipment loads based upon the vehicle configuration for such calculations in correspondence with

NFPA 1901 required loadings.
Upon acceptance of the vehicle, a signed OEM written certification shall be supplied with the fire apparatus before delivery.

HELMET RESTRAINTS

All NFPA required helmet restraints will be supplied and installed by the Customer prior to the truck being placed into service.

CAB TILT PENDANT CONTROL

There shall be a cab tilt pendant control provided and installed on the right side of the apparatus. The pendant shall be located directly behind the upper pump panel, accessible through a small hinged door secured with a push button style latch.

There shall also be a cab tilt instruction plate located as close as possible to the control pendant for ease of operation.

SINGLE AXLE HUB AND LUG NUT COVERS

There shall be chrome plated Baby Moon and lug nut covers installed on the apparatus front and rear wheels.

HEAT EXCHANGER

A supplementary heat exchanger cooling system shall be provided with the chassis and shall be complete to the discharge side of the fire pump through the engine compartment, without intermixing, for absorption of excess heat. The heat exchanger shall be adequate in size to maintain the temperature of the coolant in the pump drive engine not in excess of the engine manufacturer's temperature rating under all pumping conditions.

Appropriate drains shall be provided to allow draining the heat exchanger to prevent damage from freezing. A manual shut-off valve shall be supplied at the pump operator's position.

Bidder Complies	
Yes	No

SCBA COMPARTMENT/FUEL FILL

There shall be three (3) compartments located on the body, one (1) ahead and one (1) behind the wheel well, on the right side, and one (1) ahead of the wheel well on the left side. The compartments shall have cast aluminum doors and hold 6.75" diameter x 26.5" long SCBA bottles.

A fuel fill door shall be located behind the wheel well on the left side.

CHASSIS REQUIRED LABELING

Signs that state "Occupants must be seated and belted when apparatus is in motion" shall be provided. They shall be visible from each seating position.

There shall be a lubrication plate mounted inside cab listing the type and grade of lubrication used in the following areas on the apparatus and chassis:

- Engine oil
- Engine Coolant
- Transmission Fluid
- Pump Transmission Lubrication Fluid
- Drive Axle Lubrication Fluid
- Generator Lubrication Fluid (where applicable)
- Tire Pressures

APPARATUS INFORMATION LABEL

There shall be a high-visibility label installed in a location clearly detectable to the driver while in the seated position. The label shall indicate the following specified information.

Overall Height (feet and inches) Overall Length (feet and inches) Overall GVWR (tons or metric tons)

MUD FLAPS

Heavy-duty rubber mud flaps shall be installed behind the rear wheels. The mud flaps shall be black rubber type and be bolted in place.

PUMP MODULE

The side operator controlled pump module shall be a self-supported structure mounted independently from the body and chassis cab. The pump module shall be constructed entirely of extrusions and aluminum plate. The framework shall be formed from beveled aluminum alloy extrusions. The pump module design must allow normal frame deflection through

Bidder Complies	
Yes	No

isolation mounts without imposing stress on the pump module structure or side running boards. The pump module shall consist of a welded framework, properly braced to withstand chassis frame flexing. The pump module support shall be bolted to the frame rails of the chassis.

An upper stainless steel drop down access panel with three (3) positive lock latches shall be provided on the Driver's side of the pump compartment module. Two (2) straps attached to the panel and module structure shall be provided to prevent the panel from accidentally detaching from the module. Drain controls shall be provided on the lower stainless steel portion of the pump compartment.

A stainless steel panel with positive lock latches shall be provided on the officer's side of the pump compartment module for easy access to the pump compartment plumbing.

SIDE MOUNT OPERATOR'S CONTROL PANEL

The controls and instrument panel shall be located on the driver's side pump house panel. Locking push pull control rods shall be provided for valve actuation. The handles shall have a recessed area for 1" x 3" (2.54 x 12.70cm) identification tags. The controls shall be locked in any position.

Color coded labels shall be provided on the handles.

PANEL LIGHTS

Adequate illumination shall be provided for all gauges and controls by means of a shielded light assembly with a total of six (6) WELDON LED 2631-0000-30. A total of three (3) lights per side.

Two (2) driver side and all right side panel lights, step lights, under body lights, all to activate with park brake with the exception of one " ok to pump" lights under the pump panel operators side of light shield.

The center light on the pump panel shall illuminate when the pump is engaged and it is "OK TO PUMP".

PUMP MODULE MOUNTING SYSTEM

The entire pump module assembly shall be mounted so that it "floats" above the chassis frame rails with vibration isolators. The body substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Each assembly shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each body mount bracket shall be mounted to the side chassis frame flange.

Bidder Complies	
Yes	No

There shall be no welding to the chassis frame rail sides, web or flanges, or drilling of holes in the top or bottom frame flanges between axles. All body to chassis connections shall be bolted so that in the event of an accident, the body shall be easily removable from the truck chassis for repair or replacement.

Because of the constant vibration and twisting action that occurs in chassis frame rails and suspension, the torsion mounting system is required to minimize the possibility of premature body structural failures.

PUMP ASSEMBLY

The Hale DSD single stage pump shall be of a size and design to mount on the chassis rails of commercial and custom truck chassis, and have the capacity of 1500 gallons per minute (U.S. GPM), NFPA-1901 rated performance.

The entire pump shall be assembled and tested at the pump manufacturer's factory.

The pump shall be driven by a drive line from the truck transmission. The engine shall provide sufficient horsepower and RPM to enable pump to meet and exceed its rated performance.

The entire pump shall be hydrostatically tested to a pressure of 600 PSI. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest NFPA Pamphlet No. 1901. Pump shall be free from objectionable pulsation and vibration.

The pump body and related parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI (2069 bar). All metal moving parts in contact with water shall be of high quality bronze or stainless steel. Pump utilizing castings made of lower tensile strength cast iron not acceptable.

Pump body shall be vertically split, on a single plane for easy removal of entire impeller assembly including clearance rings.

Pump shaft to be rigidly supported by two bearings for minimum deflection. The bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated. Shaft seal comes standard with face-type, self-adjusting corrosion- and wear-resistant mechanical seals.

The pump impeller shall be hard, fine grain bronze of the mixed flow design; accurately machines, hand-ground and individually balanced. The vanes of the impeller intake eye shall be hand ground and polished to a sharp edge, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Bidder Complies	
Yes	No

Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body.

The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox.

GEAR BOX

Pump gearbox shall be of sufficient size to withstand up to 16,000 lbs. ft. of torque of the engine. The drive unit shall be designed of ample capacity for lubrication reserve and to maintain the proper operating temperature.

The gearbox drive shafts shall be of heat-treated chrome nickel steel and at least 2-3/4 inches in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine.

All gears, drive and pump, shall be of highest quality electric furnace chrome nickel steel. Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurately cut spur design shall be provided to eliminate all possible end thrust.

The pump ratio shall be selected by the apparatus manufacturer to give maximum performance with the engine and transmission selected.

If the gearbox is equipped with a power shift, the shifting mechanism shall be a heat treated, hard anodized aluminum power cylinder, with stainless steel shaft. An in-cab control for rapid shift shall be provided that locks in road or pump.

For automatic transmissions, three green warning lights shall be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two green lights to be located in the truck driving compartment and one green light on pump operator's panel adjacent to the throttle control. For manual transmissions, one green warning light will be provided for the driving compartment. All lights to have appropriate identification/instruction plates.

Certification
The pump will perform and meet the following tests: 100% of rated capacity @ 150 PSI net pump press 100% of rated capacity @ 165 PSI net pumps press 70% of rated capacity @ 200 PSI net pump press 50% of rated capacity @ 250 PSI net pump press

PUMP WARRANTY

A pump warranty shall be provided by the pump manufacturer for products of its manufacture to be free from defects in material and workmanship, under normal use and service, for a

period of two (2) years parts and labor and parts only for years three (3) through five (5). Please see the official warranty document in the appendix (attached) for specific details.

PRESSURE GOVERNOR AND MONITORING DISPLAY

Fire Research "InControl 400" Series pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:
Pump discharge; shown with four daylight bright LED digits more than 1/2" high Pump Intake; shown with four daylight bright LED digits more than 1/2" high Pressure / RPM setting; shown on a dot matrix message display
Pressure and RPM operating mode LEDs Throttle ready LED
Engine RPM; shown with four daylight bright LED digits more than 1/2" high Check engine and stop engine warning LEDs
Oil pressure; shown on a dual color (green/red) LED bar graph display
Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
Transmission Temperature: shown on a dual color (green/red) LED bar graph display

Battery voltage; shown on a dual color (green/red) LED bar graph display.
The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:
High Battery Voltage
Low Battery Voltage (Engine Off) Low Battery Voltage (Engine Running) High Transmission Temperature
Low Engine Oil Pressure
High Engine Coolant Temperature Out of Water (visual alarm only)
No Engine Response (visual alarm only).
The program features shall be accessed via push buttons and a control knob located on the front of the control panel. There shall be a USB port located at the rear of the control module to upload future firmware enhancements.

Bidder Complies	
Yes	No

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

TANK LEVEL GAUGE

A Fire Research TankVision model WLA300-A00 tank indicator kit shall be installed on the apparatus. The kit shall include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The indicator shall show the volume of water in the tank on nine (9) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be waterproof, manufactured of aluminum, and have a distinctive blue label.

The program features shall be accessed from the front of the indicator module. The program shall support self-diagnostics capabilities, self-calibration, and a datalink to connect remote indicators. Low water warnings shall include flashing LEDs at 1/4 tank, down chasing LEDs when the tank is almost empty, and an output for an audio alarm.

The indicator shall receive an input signal from an electronic pressure sensor. The sensor shall be mounted from the outside of the water tank near the bottom. No probe shall place on the interior of the tank. Wiring shall be weather resistant and have automotive type plug-in connectors. There shall be a driver gauge for chassis provided light/connections.

The gauge shall be located on the pump panel.

PRIMING PUMP

The priming pump shall be of a positive displacement, oil-less rotary vane type, electric motor driven pump. The pump shall conform to the requirements of NFPA 1901 and pump body shall be manufactured of heat treated anodized aluminum for increased wear and corrosion resistance.

The pump shall be capable of producing a minimum 24 Hg vacuum at 2000 feet above sea level and provided with the following specifications:

Bidder Complies	
Yes	No

The control valve shall be of all bronze construction.
The electric motor shall be a 12 VDC totally enclosed unit. The priming pump shall not require lubrication.
The priming pump shall be operated by a single push-pull control valve mounted on the pump operator panel.

6.0” STEAMER INLETS

Two (2) 6.0” (15.24cm) steamer inlets will be installed, one (1) on the left side and one (1) on the right side. Both inlets shall have long handle chrome vented caps and a screen.

RELIEF VALVE

There shall be one (1) suction relief valve with a 2.0" (50mm) discharge opening installed on the pump system.

U.L. TEST PORTS

One (1) set of U.L. testing ports with plugs shall be installed on the pump panel for testing of the vacuum and pump pressures.

BEZELS FOR DISCHARGE GAUGES

Deluxe metal bezels shall be supplied around the discharge pressure gauges.

APPARATUS LABELING

The apparatus shall be descriptively tagged with color coded labels. The labels shall be applied near apparatus features that require a user function description. Wherever necessary, the labels shall be color coded to differentiate controls and their respective functions to simplify and clarify complex configurations.

PIPING AND MANIFOLDS

All piping and pump body attached manifolding, shall be of stainless steel, flex hose or similar materials. The complete piping system shall be designed to direct mount all 1.5” or larger ball valves onto the pump body or stainless steel manifolds attached directly to the pump body.

All NPT pipe thread connections larger than .75" connections shall be avoided in the construction of the plumbing system.

BALL VALVES

The valves shall be cast brass with full flow capability.

Bidder Complies	
Yes	No

All 3.0” (7.62cm) discharge valves shall be supplied with a true slow close mechanism, which is required to be no less than 70 lb (31.8kg) of hand pressure over a three second throw. The valve shall also require a maximum actuation force of 75 lb (34 kg).

2.0” TANK FILL

One (1) 2.0" pump to tank fill line shall be installed with a 1.5", or larger, inline valve. The valve shall be manually controlled and properly labeled at the pump operator's panel.

3.0” TANK TO PUMP

The tank to pump valve shall be 3.0" (7.62cm) inline, installed between the water tank and the pump. The valve shall be a quarter turn ball type, fixed pivot design and be constructed of stainless steel or brass. The valve shall be controlled at the side or top pump panel with a chrome handle.

PUMP COOLING LINE

There shall be a 3/8" line run from the pump to the water tank to assist in keeping the pump water from overheating. There shall be a 1/4 turn or petcock style on/off valve installed on the pump operator's panel.

2.5" LEFT SIDE AUXILIARY INLET

One (1) 2.5"(6.4cm) auxiliary suction inlet shall be located on the LH side panel. The valve shall be manually controlled and properly labeled for direct valve operation through the side panel with a swing- out type control.

The valve shall be a quarter turn ball type constructed of an all brass body and either a chrome plated brass or stainless steel ball. The auxiliary intake shall be equipped with a quarter-turn, ¾" drain valve.

The 2.5" inlet shall be equipped with an integrated brass straight adapter terminating in 2.5" FNST swivel threads. One (1) chrome plug and chain shall also be supplied.

2.5” RIGHT SIDE AUXILIARY INLET

One (1) 2.5" suction inlet valve shall be provided and installed on the right side of the pump panel.

The valve shall be controlled at the side or top pump panel with a chrome handle. The valve shall come equipped with a chrome plug, chain, inlet strainer, one (1) 2.5" NST chrome inlet swivel and one (1) ¾" bleeder/drain valve.

Bidder Complies	
Yes	No

2.5" LEFT SIDE DISCHARGE

One (1) 2.5" (6.35cm) discharges with a stainless steel or brass valve shall be located on the LH side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2.5" (6.35cm) outlet shall be equipped with a stainless steel or brass chrome plated, 30-degree elbow terminating with 2.5" MNST threads.

One (1) chrome cap and chain shall also be supplied. Valve shall be controlled at the side or top pump panel with a chrome handle.

One (1) 2.5"(6.35cm) white-faced, liquid filled pressure gauge shall be provided and installed on the panel near the control handle to indicate pressures from 0 to 400 PSI The discharge shall also come equipped with a quarter-turn, ¾" drain valve.

2.5" RIGHT SIDE DISCHARGE

One (1) 2.5" (6.35cm) discharge with a stainless steel or brass valve shall be located on the RH side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2.5" (6.35cm) outlet shall be equipped with a stainless steel or brass chrome plated, 30-degree elbow terminating with 2.5" MNST threads.

One (1) chrome cap and chain shall also be supplied. Valve shall be controlled at the side or top pump panel with a chrome handle. One (1) 2.5"(6.35cm) white-faced, liquid filled pressure gauge shall be installed on the panel near the control handle to indicate pressures from 0 to 400 PSI. The discharge shall also come equipped with a quarter-turn, ¾" drain valve.

2.5" RIGHT REAR DISCHARGE

There shall be one (1) 2.5"discharge with a stainless steel or brass valve provided and installed on the right side rear of the apparatus.

The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures. The 2.5"outlet shall terminate with a chrome plated 30 degree elbow, cap, and chain. The valve shall be controlled at the side or top pump panel with a chrome handle.

One (1) 2.5" white-faced liquid filled pressure gauge shall be installed on the panel near the control handle and indicate pressure readings from 0 to 400 PSI.The discharge shall be equipped with a quarter- turn, ¾" drain valve.

3.0" RIGHT SIDE DISCHARGE

Bidder Complies	
Yes	No

One (1) 3.0" (7.62cm) discharge with a stainless steel or brass valve shall be located on the RH side panel. The valve shall be a quarter turn ball type and fixed pivot design to allow easy operation at all pump pressures.

The 3.0" (7.62cm) outlet shall be equipped with an integral, stainless steel, 30-degree elbow terminating with 3.0" MNST threads. One (1) chrome cap shall also be supplied. Valve shall be controlled at the side or top pump panel with a chrome handle.

One (1) 2.5"(6.35cm) white-faced, liquid filled pressure gauge shall be installed on the panel near the control handle to indicate pressures from 0 to 400 PSI The discharge shall also come equipped with a quarter-turn, ¾" drain valve.

3.0" DECK GUN DISCHARGE

There shall be a 3.0"(7.62cm) deck gun discharge installed at the top of the pump. The valve shall be a quarter turn ball type of fixed pivot design and constructed of stainless steel or brass. The valve shall be controlled at the side or top pump panel with a chrome handle.

The valve shall be of the slow-close design so as not to allow the valve to open or close in less than 3 seconds. One (1) 2.5"(6.35cm) white-faced liquid filled pressure gauge shall be installed in the operator's panel near the control handle to indicate pressures from 0 to 400 PSI. The discharge shall be equipped with a ¾" auto-drain valve.

The discharge shall be capped at the outlet of the pipe located on the top of the pumphouse.

DECK GUN MONITOR

One (1) Akron Apollo Hi-Riser #3431 Single-Inlet portable and deck monitor complete with liftoff, direct mount, ground base and pipe, and quad stacked tips shall be provided with the apparatus.

With #5160 nozzle

The monitor shall have 360 degree rotation when mounted in the deck mode, 180 degrees in the portable mode. The vertical travel shall be from 90 degrees above to 45 degrees below horizontal, with a built-in 35 degree safety stop.

INTAKE VALVE

The vendor shall supply a large diameter hose intake valve mounted to the pump intake on the pump panel equipped with an intake relief valve and 5" Locking Storz connection.

CROSSLAY

Bidder Complies	
Yes	No

Two (2) crosslays shall be installed on each side of the apparatus. Each crosslay shall have one 2" valve. The crosslay shall be controlled at the side or top pump panel with a chrome handle. There shall be a 2.5" individual line gauge and ¾" quarter–turn drain valve provided for each crosslay valve.

CROSSLAY 2.5"

An additional crosslay shall be installed. The crosslay shall have a 2.5" valve. The crosslay shall be controlled at the side pump panel with a chrome handle. There shall be a 2.5" individual line gauge and
¾" quarter–turn drain valve provided for each crosslay valve.

CROSSLAY COVER

The crosslay hose bed area shall have a D & S cover installed on the top of the crosslay area. The top cover shall be held in place by an extrusion across the front of crosslays and Velcro across the rear.

FRONT BUMPER DISCHARGE

The front bumper discharge shall be installed on top of the gravel shield of the front bumper extension. The discharge shall be located next to the Q Siren on the driver's side. The discharge shall terminate with a chicksan swivel to accommodate deployment of hose in different directions.

The discharge termination shall include the following components. One (1) 2" NPT x 1 1/2" NST, polished SST chicksan swivel.
The plumbing shall consist of 2" piping, and incorporate a manual drain control installed below the pump area for ease of access. Auto-drain (s) shall be installed in the discharge piping at lowest point of the plumbed system.

A 2.5" (63mm) gauge shall be supplied for the discharge pressure reading of 0-400 PSI (27.5bar) The gauge shall be a model FA-LFP-210-0-400 with a white face and black lettering.

The discharge shall be plumbed with an auto-drain located at the lowest point of the waterway system.

5" FRONT SUCTION INLET

The suction inlet shall be plumbed with an electrically actuated, Hale Master Intake Valve (MIV). The valve shall have an electrically operated control that shall be located on or near the pump operator's panel. The control shall include status lights that indicate whether the valve is open, closed or traversing from one position to another.

Bidder Complies	
Yes	No

The valve shall have a manual override control provided in an accessible location and shall be rated at 1500 PSI, capable of withstanding the same pressures as the pump. The valve shall be mounted between the main pump body casting and the steamer inlet casting. The MIV shall have a built-in, adjustable bronze relief valve and a quarter turn air bleeder valve plumbed to the water supply side of the intake valve (by a 3/4" NPT port) to help evacuate air from the system and avoid cavitation of the pump.

The front suction inlet shall be plumbed with 5" piping. The piping system shall include a suction relief valve with a range of pressure adjustment from 75 to 250 PSI. The valve shall be preset at 125 PSI suction inlet pressure.

INLET RELIEF VALVE

A suction inlet relief valve with a range of pressure adjustment from 75 to 250 PSI shall be furnished, and installed inside pump compartment piped to the suction side of the pump. The valve shall be preset at 125 PSI suction inlet pressure.

The valve shall be installed inside the pump compartment where it will be easily accessible for future adjustment. The excess water shall be plumbed to the atmosphere via the unloader pipe and shall dump on the opposite side of the pump operator. The valve shall come with 2 1/2" male NPT threads that can be capped if the relief valve fails in the open position. For normal pumping operations, the relief valve shall not be capped and there shall be a placard stating "DO NOT CAP" installed.

MANUALLY OPERATED DRAINS

The manually operated drains shall be installed as needed in the lowest point(s) of the piping.

The suction shall terminate with an Elkhart 5” NPT x 6" NST swiveling adapter and a heavily chrome plated, long handled cap.

The suction inlet shall be located on the front bumper on the right hand side.

MASTER PUMP DRAIN

The pump shall be equipped with a Master Pump drain to allow draining of the lower pump cavities, volute and selected water carrying lines and accessories.

MANUALLY OPERATED DRAINS

The manually operated drains shall be installed as needed and in the lowest point(s) of the piping.

RUNNING BOARDS

Bidder Complies	
Yes	No

The running boards shall be made of a structural tubular framework overlaid with embossed aluminum diamond plate. The tubular frame support all loads by transmitting the loads through the pump compartment structure directly to the chassis frame rails.

The running boards shall be independent of the apparatus body and shall be tied only to the pump compartment structure, thereby eliminating any pump compartment to body interference. This is essential in keeping a truly 'modular' configuration.

RUNNING BOARD HOSE WELLS

A hose well shall be installed in the running board directly below the pump house module, one each side.

There shall be two (2) velcro straps installed at the top of the hose well. The straps shall be used to hold the hose in place during transit.

AIR HORN BUTTON

There shall be an air horn activation button installed on the pump operator's gauge panel. The air horn button shall be of weather resistance type and labeled “AIR HORN”.

VIBRA-TORQUE™ BODY MOUNTING SYSTEM

The entire body module assembly shall be mounted to the chassis frame rails exclusively with Vibra- Torq™ torsion isolator assemblies to reduce the vibration and stress providing an extremely durable body mount.

The body substructure shall be mounted above the frame to allow independent flexing to occur between the body and the chassis. Two (2) assemblies shall be mounted to the chassis frame rails with steel, gusseted mounting brackets. Each bracket shall be painted for corrosion resistance. Each body mount bracket shall be mounted to the side chassis frame flange with two 5/8”-UNC Grade 5 HHCS.

The rear assemblies shall have a two-part rubber vibration isolator. Certain assemblies shall also incorporate a torsion spring. Helical coil springs shall be incorporated into specific mounts in tandem with the rubber isolators to minimize the stress absorbed by the body caused from chassis frame rail flexing.

There shall be no welding to the chassis frame rail sides, web or flanges, or drilling of holes in the top or bottom frame flanges between axles. All body to chassis connections shall be bolted so that in the event of an accident, the body shall be easily removable from the truck chassis for repair or replacement.

Because of the constant vibration and twisting action that occurs in chassis frame rails and suspension, the torsion mounting system is required to minimize the possibility of premature body structural failure. The Vibra-Torque™ body mounting system shall have a lifetime warranty.

COMPARTMENT VENTILATION

To allow for proper air circulation and flow, each compartment shall have a venting route. The venting locations shall be determined by "best-fit" locations for each body style configuration. The vents will be a chrome louvered and mounted appropriately on the compartment interior walls.

COMPARTMENTATION

The following compartments shall be supplied on the apparatus:

Compartment "L1": There shall be one (1) full height compartment ahead of the rear wheels on the left side of the apparatus. The approximate upper interior dimensions of this compartment shall be 37.75" wide x 72.00" high x 26.00” deep.

Compartment "L2": There shall be one compartment over the rear wheels on the left side of the apparatus. The approximate upper dimensions of this compartment shall be 68.00" wide x 47.00" high x 26.00”.

Compartment "L3": There shall be one (1) full height compartment behind the rear wheels on the left side of the apparatus. The approximate upper interior dimensions of this compartment shall be 49.75" wide x 72.00" high x 26.00”

Compartment "R1": There shall be one (1) full height compartment ahead of the rear wheels on the right side of the apparatus. The approximate upper interior dimensions of this compartment shall be 37.75" wide x 39.00" high x 12.50” deep and the lower portion 37.75” wide x 33.00” high x 26.00” deep.

Compartment "R2": There shall be one compartment over the rear wheels on the right side of the apparatus. The approximate upper dimensions of this compartment shall be 68.00" wide x 39.00" high x 12.50” deep and the lower portion 68.00” wide x 8.00” high x 26.00” deep.

Compartment "R3": There shall be one (1) full height compartment behind the rear wheels on the right side of the apparatus. The approximate upper interior dimensions of this compartment shall be 49.75" wide x 39.00" high x 12.50” deep and the lower portion 49.75” wide x 33.00” high x 26.00” deep.

FORMED BODY DESIGN – 0.125” ALUMINUM CONSTRUCTION

The apparatus body shall be a formed sheet metal design, which serves as the compartment enclosures and supporting substructure of the body. The substructure and enclosures shall

Bidder Complies	
Yes	No

work in unison to provide maximum storage that supports and protect the contents contained within.

Body Construction: The body substructure and compartments shall utilize a combination of huck bolting and welding methods.

The huck bolt systems utilized in either body or substructure shall be 5/16" or 3/8" diameter stainless steel fasteners for maximum shear and tension strength. Other system of fasteners that do not consist of stainless steel shall NOT be acceptable.

In combination with the Huck system, strictly monitored welding procedures shall be instituted. To ensure maximum joint strength, any welding zones shall be welded together utilizing A.W.S. Certified welding procedures.

Due to the engineered combination of specifically chosen materials, no dissimilar metals shall be used in the body and its supporting substructure without being separated by a sufficient corrosion and electrolysis inhibitor. This shall consist of isolation pads and structural adhesives.

Body Substructure: The supporting tank and compartment substructure shall be manufactured from corrosion resistant 3CR12 stainless steel material. The supporting material shall be engineered from 7 gauge stainless steel material to provide both high strength and corrosion resistance for longevity of the apparatus body. The use of black carbon steel materials that have been painted or coated to try to prevent corrosion shall not be expectable.

Body Compartments: The formed sheet metal compartments shall utilize a 0.125" thick 5052-H32 aluminum alloy to provide maximum strength and durability. Each compartment sheet and enclosure shall be fabricated in a manor to provide proper sheet alignment and weld location application. The body shall consist of multiple pre-engineered compartment assemblies that shall be combined to create a series of body combinations. In the event of body damage, these assemblies shall allow for easier disassembly and assembly through the use of common tools and materials.

Compartment Top and Exterior Hose Bed Wall: The top and wall of the compartments shall be an integral portion of the body. The exterior compartment top and outer hose bed wall shall consist of 1/8" aluminum diamondplate material to provide both strength and pleasing appearance. The hose bed wall shall be aluminum diamondplate to the outward face while incorporating an additional smooth aluminum interior wall sheet to form the hose bed area. The use of interior and exterior hose bed wall sheets shall provide an enclosed section for strength integrity, wire routing, etc. The hosebed wall shall contain integrated tarp hooks. Single hose bed wall sheet construction shall NOT be acceptable.

Compartment Floors: The body compartments shall be enclosed with aluminum sheet metal as specified above. The compartment floors shall have a 1" lip downward at the door opening

Bidder Complies	
Yes	No

side of the compartment. This lip shall integrate with a structural member on the bottom edge and form a “sweep- out” compartment. This design shall also allow for a structural flush fitting door frame and a complete door/weather seal.

Compartment Load Capacity: Each compartment shall have a minimum of one additional structural compartment floor support hat section centered on the underside of the compartment floor. This additional member shall be integral with compartment assemblies of each area. Each compartment must be designed, and analyzed to carry a working load of: Full depth side compartment: 500 lbs per compartment Half depth side compartment: 375 lbs per compartment Rear center compartment: 500 lbs per compartment

Finite Element Analysis: The proposed body design must have completed a review and analysis by an external engineering consultant. At a minimum, the consultant must have conducted a computer modeled finite element analysis of the proposed design. The analysis is to include real world working load scenarios. Analysis to cover both static and dynamic situations must be completed. The purpose of the finite element analysis is to ensure proper design of the apparatus body, and that it is capable of carrying the typical fire apparatus loads and those specified by NFPA for equipment. Strain Gauge testing must also have been completed.

REAR COMPARTMENT

Rear Compartment: There shall be one compartment installed at the rear of the apparatus with a roll up door. The interior dimensions of this compartment shall be approximately 41.50” wide x 39.50” high x 33.25” deep.

ROLL-UP DOOR CONSTRUCTION

All horizontal and vertical side compartment doors shall be roll-up style doors.

SATIN ALUMINUM FINISH

The rollup doors shall have a satin aluminum finish.

ROLL-UP DOOR ASSIST STRAPS

There shall be nylon straps installed on the both left and right side body side, 'high side' compartment doors, to assist in closing the door. The strap shall be attached to each door and shall be permanently mounted to the rearward wall with footman loops using nutzerts, half way between the top and bottom of the compartment.

DOOR OPEN INDICATOR

Each roll up door shall have an integral door open indicator magnet in the lift bar. If the bar is not properly closed, it shall activate the "Door Open" light in the cab.

Bidder Complies	
Yes	No

HOSE STORAGE

A hosebed shall be provided that meets the minimum NFPA storage requirements. The hosebed shall have a slotted 1/4" aluminum flooring installed to allow drainage through the tank cavity to the ground below. The aluminum flooring shall be manufactured in discrete sections to allow for easy removal and outstanding stability. The area shall be free of sharp edges to protect the hose when loaded or distributed.

HOSEBED FINISH SPARLINER

The apparatus hosebed interior side walls shall receive an application of gray Spariner, to provide a durable and pleasing appearance.

HOSEBED DIVIDER(S)

There shall be two (2) divider(s) installed in the hosebed. The divider(s) shall be fabricated of 1/4" thick aluminum plate with a double sided reinforcement where it is attached to the adjustable slide rails. The rear of the divider(s) shall have a radius to provide a smooth corner and a hand cut out on the upper portion. Hose payout shall be unobstructed by the divider(s).

HOSEBED RISER

A 10.00” hosebed riser made from the same material as the body shall be provided in order to increase the hosebed capacity.

CATWALKS

Catwalks shall be provided over the top of the compartments. The catwalks shall be approved stepping surfaces overlaid with 1/8” embossed diamond plate material approved by the latest NFPA standards for abrasiveness. The outboard edge shall be bent downward at a 90 degree angle and over the compartments on both sides.

D&S HYPALON HOSE BED COVER

There shall be a custom D&S hose bed cover provided and installed with the apparatus to cover the top of the hose bed area. The cover shall be manufactured from 22oz hypalon material with a grab tensile strength of 500lbs. Cover shall be red in color.

The cover shall be held in place by an elastic shock cord sewn into the tarp with brass grommets where the shock cord passes through the hose bed cover on the front and sides. Tabs integrated into the body caps shall be provided on the sides to provide a means of attaching the cover to the apparatus. The hooks shall be made of cast aluminum.

Bidder Complies	
Yes	No

DUNNAGE AREA

A vertical bulkhead shall be installed at the front of the hosebed area, just behind the water tank fill tower, forming a storage area that is separated from the hosebed. The rear face of the bulkhead shall serve as a mounting surface for the hosebed dividers, resulting in the ability to move any hosebed divider across the entire width of the hosebed.

POLYPRENE TANK

The booster tank shall be constructed of ½, ¾, and 1" thick polypropylene sheet stock which is a non-corrosive stress relieved thermoplastic. It shall be designed to be completely independent of the body and compartments. All joints and seams are extrusion welded and/or contain the "Bent Edge" and tested for maximum strength and integrity. The top of the booster tank is fitted with lifting eyes designed with a 3 to 1 safety factor to facilitate tank removal.

Cover:
The tank cover shall be constructed of 3/4" thick polyprene and shall be recessed. A minimum of two lifting dowels shall be drilled and tapped 1/2" x 2" to accommodate the lifting eyes.

Baffles:
The swash partitions are manufactured of 1/2" polyprene. All partitions are equipped with vent and air holes to permit movement of air and water between compartments to provide to provide maximum water flow. All swash partitions interlock and are welded to one another as well as to the walls of the tank.

Mounting:
The tank shall rest on the sub-frame cross members with an unsupported area not to exceed 530 square inches on tanks up to 40" in height. On tanks over 40" in height, an unsupported area of not more than 400 square inches must be maintained. All tanks shall be isolated from those cross members with a minimum of 2" x 1/4" hard rubber strips that are 60 durometer in hardness. The tank shall sit cradle mounted in the under body sub-frame and shall be completely removable without disturbing the body side panels.

TANK CAPACITY

The tank shall be 750 gallons in capacity.

FILL TOWER

Fill opening shall be approximately 13" x 12". The tower will have a 1/4" thick removable poly material screen and hinged type cover that will open if the tank is filled at an excess rate. There shall be a removable 1/4" thick poly material screen to prevent debris from falling into the tank.

The fill tower shall have a 4" overflow that will discharge underneath the tank, behind the rear wheels. The overflow shall terminate above the tank water level when filled to the rated capacity.

LADDER STORAGE

There shall be a ladder storage compartment installed on the right side of the apparatus booster tank. The compartment shall have provisions for ladder storage and up to three (3) pike poles.
The compartment and door shall be fabricated of .125" smooth aluminum. The door shall be provided with two push button style latches and a chrome handle centered between the push button latches.

The door shall be switched to the "Open Door Indicator Light" in the cab to alert the driver if the door is not closed.

SUCTION HOSE STORAGE

The suction hoses shall be stored in a tray, both on the left side, above the compartments.

BODY OVERLAYS – FRONT/REAR

The entire front face of the apparatus body shall have aluminum diamond plate overlays installed. The entire rear face of the apparatus body shall have raw aluminum overlays installed for the installation of chevron striping.

All overlay materials shall be coated with 3M adhesive sealant on the back portion to provide an insulating barrier between dissimilar metals.

ROLL OUT TRAY- REAR COMPARTMENT

There shall be a roll out tray installed in the rear compartment. The tray shall be approximately 32.00” x 32.00” deep. The roll-out system shall be bolted to the compartment floor for rigid and sturdy mounting. The tray shall be mounted to a ball bearing slide assembly. The roll-out tray shall be rated for 300 lbs. and extend 100% of the slide capacity.

Black Versiflex matting shall be provided for a pleasing appearance and durability.

ROLL-OUT DRAWER/AIR BOTTLE STORAGE TRAY

There shall be a roll-out drawer installed on the left side of the apparatus body, in the rearward lower portion of the compartment directly above the rear wheels. The drawer shall be approximately 25.00" deep by 28.00" wide and have a 300 lb. capacity.

Bidder Complies	
Yes	No

There shall also be a four (4) place air bottle storage tray, provided directly forward of the roll-out drawer in the lower portion of the same compartment.

Black Versiflex matting shall be provided for a pleasing appearance and durability.

SHELVING

A shelf 64.00" wide x 12.50" deep x 2.00" high shall be provided in the upper portion of the wheel well compartment. The shelf shall be 3/16" smooth aluminum with a formed 2" lip on the front and back. The side mounting brackets shall be integral with the shelving to form the sides.

SCBA COMPARMENT BIN

There shall be an eight (8) place air bottle compartment bin provided in the lower portion of the compartment located above the wheel well area on the right side. The interior surface of each SCBA storage tube shall be lined with a coating of gray sparliner. The application of speedliner shall aid to minimize any damage caused to the canisters while stored in the holders.

SHELVING

A shelf 64.00" wide x 12.50" deep x 2.00" high shall be provided in the upper portion of the wheel well compartment. The shelf shall be 3/16" smooth aluminum with a formed 2" lip on the front and back. The side mounting brackets shall be integral with the shelving to form the sides.

COMPARTMENT FLOOR MATTING

Shall be provided in the following compartments. One (1) located in the L-2 compartment. Red Versiflex matting shall be provided for a pleasing appearance and durability.

Tapered floor tile shall be installed on one (1) compartment floor edge(s). The beveled tile shall be custom fitted to the matting installed and the interior compartment construction. The tapered tile shall aid in the removal and installation of equipment and help in protecting the compartment floor edge from equipment damage.

One (1) located in the R-2 compartment.

Red Versiflex matting shall be provided for a pleasing appearance and durability.

Tapered floor tile shall be installed on one (1) compartment floor edge(s). The beveled tile shall be custom fitted to the matting installed and the interior compartment construction. The tapered tile shall aid in the removal and installation of equipment and help in protecting the compartment floor edge from equipment damage.

Bidder Complies	
Yes	No

SHELVING

The shelving shall be made out of .190 smooth aluminum sheet material with a formed 2" lip on the front and back. The side mounting brackets shall be integral with the shelving to form the sides. The shelving shall be vertically adjustable.

The following shelving shall be provided:

A full width x half depth x 2.00" high shelf shall be provided and installed in the upper compartment as specified. There shall be a total quantity of one (1).

One (1) located in the R-1 compartment.

Red Versiflex matting shall be provided for a pleasing appearance and durability.

A full width x half depth x 2.00" high shelf shall be provided and installed in the upper compartment specified. There shall be a total quantity of one (1).

One (1) located in the R-3 compartment. R-3 Compartment shall be heated and have shore-power connection for charging Lifepak.

Red Versiflex matting shall be provided for a pleasing appearance and durability.

A full width x full depth x 2.00" high shelf shall be provided and installed in the compartment as specified. There shall be a total quantity of three (3).

Two (2) located in the L-1 compartment. One (1) located in the R-1 compartment.
Red Versiflex matting shall be provided for a pleasing appearance and durability.

A full width x full depth x 2.00" high shelf shall be provided and installed in the compartment as specified. There shall be a total quantity of three (3).

Two (2) located in the L-3 compartment. One (1) located in the R-3 compartment.
Red Versiflex matting shall be provided for a pleasing appearance and durability.

ROLL OUT TRAYS

The tray shall be fabricated of .190 thick 3003 grade or higher aluminum sheet material with four 3" side flanges, corner welded for maximum strength. The tray shall be secured to a 24" long ball bearing slide assembly. The roll-out system shall be bolted to the compartment floor for rigid and sturdy mounting to the compartment floor. The tray shall have a 300# capacity and 100% extension.

All Roll Out Trays shall be front drawer release.

Bidder Complies	
Yes	No

The following shall be supplied:

A full width x full depth x 3.00" high roll-out tray shall be provided and installed in the compartment as specified. There shall be a total quantity of two (2).

One (1) located in the L-1 compartment.

One (1) floor mount roll-out tray shall be located in the R-1 compartment.

Red Versiflex matting shall be provided for a pleasing appearance and durability.

A full width x full depth x 3.00" high roll-out tray shall be provided and installed in the compartment as specified. There shall be a total quantity of two (2).

One (1) located in the L-3 compartment. One (1) located in the R-3 compartment.
Red Versiflex matting shall be provided for a pleasing appearance and durability.
One (1) Roll-Out Drop Down Tray in compartment R-2 and have a capacity of 300 pounds.

One (1) custom fabricated air bag compartment tray to be mounted above the roll out drop down tray. Tray will be fabricated to customer specifications and hold (1) 15"x15" air bag, (2) 15" x 21" airbags, (2) 20'x20" airbags, (2) 24"x24" airbags (1) 15"x42" airbags (2) 28"x28" airbags.

COMPARTMENT UNISTRUT

Vertically mounted Uninstrut shall be installed in ALL compartments (excluding B-1 rear compartment) of the apparatus body to accommodate mounting shelves, trays, and other miscellaneous equipment items.

PAC TRAC WALL MOUNTED TOOL BOARD

A total quantity of three (3) Pac Trac tool board(s) shall be installed on the apparatus as specified. The tool board(s) shall be mounted to the back wall of the compartment(s) utilizing the brackets provided by the manufacture.

One (1) located in the left front compartment.

One (1) located in the left over wheel compartment. One (1) located in the right overwheel compartment. WHEEL WELL PANELS
The body panel area around the wheel well on each side of the body shall be painted the same color as the rest of the body

SIDE RUB RAILS

Bidder Complies	
Yes	No

The bottom edge of the compartments shall be protected with rub rails to absorb minor damage while protecting the body.

The rub rails shall be fabricated of brightly anodized aluminum channel. The rub rails shall be bolted in place with stainless steel bolts and shall be spaced away from the body with 1/2" nylon spacers to help prevent the collection of water and debris. Each rub rail section shall be easily removable and replaced should it become damaged.

REAR RUB RAILS

The rearward edge of the rear step shall be trimmed with rub rails to absorb minor damage while protecting the body.

The rub rails shall be fabricated of brightly anodized aluminum channel. The rub rails shall be bolted in place with stainless steel bolts and shall be spaced away from the body with 1/2" nylon spacers to help prevent the collection of water and debris. Each rub rail section shall be easily removable and replaced should it become damaged.

DOOR SILL TRIM PLATES

Brushed stainless steel door sill plates shall be installed at the bottom of each body compartment door opening.

VERTICAL OVERLAY TRIM PLATES

Full height brushed stainless steel vertical overlay trim plates shall be installed on the back outer rear corners of the body compartment.

FENDERETTES

Two (2) polished aluminum fenderettes shall be provided and installed on body rear wheel well openings, one (1) each side. Rubber welting shall be provided between the body and the crown to seal the seam and restrict moisture from entering. A dielectric barrier shall be provided between the fender crown fasteners (screws) and the fender sheet metal to resist deterioration.

REAR TAILBOARD

The rear tailboard shall be fabricated of the same materials as used in the apparatus body. The tailboard shall be an independent assembly fastened to the rear body structural framing to provide body protection and a solid rear stepping platform.

The rear of the apparatus body shall be vertical in design - otherwise known as a 'flat-back'. On the rear body surface, a sign shall be attached that states: "DO NOT RIDE ON REAR STEP, DEATH OR SERIOUS INJURY MAY RESULT."

The rear tailboard and body shall be constructed such that the angle of departure shall be no less than 8 degrees at the rear of the apparatus when fully loaded (Per NFPA 1901).

REAR TAILBOARD STEP

The rear tailboard shall be approximately thirteen and one-half (13.5) inches deep and shall incorporate an 1/8" embossed aluminum diamond plate overlay. The stepping area shall span the width of the apparatus, overlapping the perimeter of the structural tailboard framework. The embossed tread plate material shall meet the minimum NFPA standard requirements for slip resistance.

INTERMEDIATE REAR STEP

An upper rear embossed aluminum diamond plate step approximately, 40.00” wide x 8.00” deep shall be provided above the rear compartment to be used as a stepping area when loading or deploying hose.

The step shall be mounted on the flat back of the apparatus with gusset-type mounting.

Two (2) light(s) shall be installed to illuminate the stepping areas as provided. Each light shall be a LED Whelen OS 45 degree lights. Each light shall be directed towards and positioned above the stepping surfaces.

The lights shall activate with park brake.

FOLDING STEP

Illuminated folding step(s) shall be installed on the body as directed by the department or required per NFPA. The top of the stepping surface shall have a knurled finish and an LED light that illuminates the stepping surface. An additional light shall be provided on the step mounting bracket to illuminate the area under the step.

The following steps shall be installed:

ILLUMINATED FOLDING STEPS

Three (3) illuminated folding steps shall be installed on the left rear vertical face of the body.

ILLUMINATED FOLDING STEPS

Three (3) illuminated folding steps shall be installed on the right front vertical face of the body. The step lights shall activate with the park brake.
10" HANDRAIL(S)

One (1) 10" long x 1 1/4" diameter handrail constructed of knurled #3 polished stainless steel tubing shall be installed in a best fit location above the forward step(s) to assist in climbing the steps according to NFPA 1901. There shall be a 2" minimum clearance between the bracket and the body.

Location: Top of catwalk

ILLUMINATED FOLDING STEPS

Three (3) illuminated folding steps shall be installed on the right rear vertical face of the body. The step lights shall activate with the park brake.

36" HANDRAILS

One (1) 36” long handrail shall be horizontally mounted just below the bottom of the hosebed.

REAR TOW EYES

There shall be two (2) rear tow eyes installed on the rear sub frame support structure, one each side. The location of the tow eyes shall be below the rear center compartment. The tow eyes shall be manufactured of 1" plate steel that is bolted to the chassis frame rail with a minimum of 6 grade 8 bolts.

PAINT SPECIFICATIONS

All bright metal fittings, if unavailable in stainless steel, shall be heavily chrome plated. Critical body and sub-frame area which cannot be primed after assembly shall be pre-painted. All welded metal surfaces shall be ground to a smooth surface prior to a degreasing and high pressure, high temperature phosphatizing process. The entire surface shall be sprayed with a non-chromate sealing compound to prevent formulation of stains or flash rust on previously phosphatized parts.

The paint applied to the apparatus shall be PPG Industries Delta® brand, applied throughout a multi-step process including at least two coats of each color and clear coat finish.

The coating shall be an infra-red, baked air dried. The coatings shall provide full gloss finished suitable for application by high-pressure airless or conventional low pressure air atomizing spray.

The coatings shall not contain lead, cadmium or arsenic. The polyisocyanate component shall consist of only aliphatic isocyanates, with no portion being aromatic isocyanates in character. The solvents used in all components and products shall not contain ethylene glycol mono-ethyl ethers or their acetates (commercially recognized as cello solves), nor shall they contain any chlorinated hydrocarbons. The products shall have no adverse effects on the health or nor present any unusual hazard to personnel when used according to manufacturer's

recommendations for handling and proper protective safety equipment, and for its intended use.

The coating system, as supplied and recommended for application, shall meet all applicable federal, state and local laws and regulations now in force or at any time during the courses of the bid.

The manufacturer shall supply (upon request) for each product and component of the system, a properly complete OSHA "Material Data Safety Sheet".

The following documents of the issue in effect on the date of the invitation to quote form a part of this document to the extent specified herein:

Federal Standards: Number 141A and 141B paint, varnish, lacquer and related material: methods of inspection, sampling, and testing.
Military Standard: MIL-C 83486B Coating, Urethane, Aliphatic Isocyanates, for Aerospace applications. Industry Methods and Standards: ASTM Method of Analysis (American Society for testing and Materials), BMS 10-72A (Boeing Material Specifications).

The coating will meet the following test performance properties as a minimum standard. (See PDF).

The entire exterior body structure (excluding roll-up doors) shall receive the primer coats and the finish coats. The apparatus body, will be painted in a down draft type paint booth to reduce dust, dirt or impurities in the finish paint. The painted surfaces shall have a finish with no runs, sags, craters, pinholes or other defects.

The apparatus shall be painted PPG Industries Delta® 71528.

SPARLINER COMPARTMENT FINISH

The compartment interiors shall be coated with Sparliner.

COMPARTMENT FINISH COLOR

The Sparliner Color shall be Medium Gray.

LOW-VOLTAGE ELECTRICAL SYSTEM

The apparatus shall be equipped with a Weldon Logic Controlled, Low-Voltage (12v) Electrical System compliant with the latest revision of the NFPA 1901 guideline.

The system shall be capable of performing total load management, load management sequencing, and load shedding via continuous monitoring of the low-voltage electrical system. In addition, the system shall be capable of switching loads (like operating as an

Bidder Complies	
Yes	No

emergency warning lamp flasher) eliminating the dependency on many archaic electrical components such as conventional flasher modules. The system shall also incorporate provisions for future expansion or modification.

The low-voltage electrical system shall be designed to distribute the placement of electrical system hardware throughout the apparatus thereby enabling a smaller, optimized wire harness. The programmable, logic controlled system shall eliminate redundant electrical hardware such as harnesses, circuit boards, relays, circuit breakers, and separate electrical or interlock subsystems and associated electronics for controlling various electrical loads and inputs.

As-built electrical system drawings and a vehicle-specific reference of I/O shall be furnished in the delivery manuals. These drawings shall show the electrical system broken down into separate functions, or small groups of related functions. Drawings shall depict circuit numbers, electrical components and connectors from beginning to end. A single drawing for all electrical circuits installed by the apparatus builder shall not be accepted.

LED DOT LIGHTING

There shall be seven (7) lights located on the rear of the vehicle. Three (3) of the lights shall be mounted on the upper rear face of the body just below the hosebed area in a cluster for use as identification lamps. Two (2) lights shall be located outboard on the upper rear, one each side and two (2) lights on the upper vertical area of Zones B & D facing the side, for use as clearance lamps.

The lights shall be Weldon brand 9186-1500 series LED red and amber markers

DOT ADDITIONAL MARKER LIGHTS

There shall be two (2) amber LED intermediate turn signals/intermediate marker lights installed in the rub rail, forward of the rear wheel well, one (1) each side.

The lights shall be Weldon brand 9186-1500 series LED amber markers/turn.

EMERGENCY WARNING LIGHTS/ZONE C UPPER

Two (2) Whelen model #L31HRFN, LED beacon lights with red lenses shall be provided. One (1) installed on each side of the upper rear of the apparatus body.

Lower Zone A-chassis provided

EMERGENCY WARNING LIGHTS/ZONE B LOWER

One (1) Whelen Model 60R02FCR Super LED surface mounted lights with clear lenses shall be provided on the lower side portion of the apparatus, rearward.

Bidder Complies	
Yes	No

EMERGENCY WARNING LIGHTS/ZONE C LOWER

Two (2) Whelen Model 60R02FCR Super LED surface mounted lights with clear lenses shall be provided on the rear of the apparatus body above the taillight cluster, one (1) each side.

EMERGENCY WARNING LIGHTS/ZONE D LOWER

One (12) Whelen Model 60R02FCR Super LED surface mounted lights with clear lenses shall be provided on the lower side portion of the apparatus, One (1) rearward.

EMERGENCY WARNING LIGHTS/ZONE B & D LOWER

Two (2) Whelen 500 Series Super LED surface mounted lights with clear lenses shall be provided on the lower side portion of the pump house module, one (1) each side.

LOWER ZONES B&D CAST ALUMINUM LIGHT HOUSING

A cast aluminum light housing shall be used for the rearmost warning lights in zones B & D to ensure the lights are mounted as far rearward as possible.

REAR TAIL LIGHT CLUSTER

There shall be a rear tail light cluster furnished and installed in individually mounted polished bezels and flanges at the rear of the apparatus, one cluster each side. The lights shall be manufactured by Whelen and consist of the following:

1 - Whelen #60 LED series amber turn signal light populated in the shape of an arrow 1 - Whelen #60 LED series red brake light
1 - Whelen #60 LED clear backup light

ENGINE COMPARTMENT LIGHT

There shall be one (1)12 volt work light, Weldon LED light(s) model #2631-0000-30, installed in the engine compartment. The light shall be enclosed in a water resistant enclosure and shall have an on/off switch.

COMPARTMENT LIGHTING

Two (2) LED Tube lights model #RX-15T16-5050, shall be installed in each body compartment. The tube lights shall be centered vertically along each side of the door framing.

The lights in each compartment shall be on a separate circuit, turning on only those lights that have open compartment doors.

ADDITIONAL LED PERIMETER LIGHTS

There shall be four (4) additional LED perimeter lights installed on the apparatus, one (1) under each side of the body, and two (2) under the rear step to illuminate the ground around the truck. They shall be manufactured by Trucklite and be model # 44308C. The perimeter lights shall activate with park brake.

REAR VIEW CAMERA SYSTEM

The camera shall be surface mounted on the center rear of the apparatus body below the intermediate step for maximum viewing capability. A protective shroud shall be installed over the system to protect against damage.

12 VOLT TELESCOPING SCENE LIGHTING

Two (2) side mounted, bottom raise telescoping scene lights shall be installed on the rear of the apparatus.

The telescoping lights shall be model Whelen Pioneer Plus Model #PCP2P side mounted, bottom raise.

The 150 watt - 12 volt DC Pioneer light head shall incorporate Super-LED® combination flood/spot light installed in a die-cast white powder coated aluminum housing.

The PCP2P configuration shall consist of 30 white Super-LEDs for the spot light with an eight degree TIR reflector on the left side, 30 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the right side, and a clear non-optic polycarbonate lens. The PCP2P shall have extended LED operation with low current consumption and low operating temperature.

The Pioneer spot light shall draw 12 amps and generate 16,000 usable lumens. The lamp head shall measure 9.75 inches high (including black fiberglass handle) x 14.00 inches wide.

There shall be 3 PCP2P Supr LED Lights, one mounted in the front center in the cab above the windshield and one on each side above the driver and officer doors. Lights shall be 150 watt - 12 volt DC Pioneer light head shall incorporate Super-LED® combination flood/spot light installed in a die-cast white powder coated aluminum housing.

The up/down indicator switch to be provided and wired to the open door warning light in the cab. The lights shall not extend past the top of the hose bed in the lower position.
The lights shall be activated by a switch on the pump panel

HYDRAULIC GENERATOR
The generator shall be one (1) Harrison MSV Hydraulic Driven Generator rated at 6,000 watts, 25/50 amps, 120/240VAC, 60Hz, 1-phase.

Bidder Complies	
Yes	No

GENERATOR & 110/220-VOLT UL TESTING

The apparatus generator system shall be tested and UL certified.

HARRISON HYDRAULICALLY DRIVEN GENERATOR (MSV)

The generator shall be designed and assembled by a company with no less than 20 years' experience in the manufacture of hydraulic driven generators.
The generator components shall be housed in a structural steel frame which affords protection to the components and provides a unitized mounting module.
The generator shall have top access to the oil filter, oil fill tube and electrical interface box.
The hydraulic oil reservoir shall include an oil level sight gauge visible from three sides; an oil temperature gauge; an oil fill cap; an oil filter and an internal venturi boost unit to provide positive pressure to the pump suction port.
The hydraulic oil reservoir shall be shipped attached to the structural steel frame. The hydraulic oil reservoir shall have an option to be remote mounted if required.
The generator shall have a cover consisting of NFPA approved diamond tread plate.

A voltmeter shall be provided.
The generator shall not utilize electronic controls or a multiplex system to control the frequency.
The generator shall include a bypass solenoid to remotely turn the generator on/off with a 12 VDC signal.
The generator shall be a commercial type with a heavy-duty bearing and of brushless design to ensure low maintenance. No brushes or slip rings shall be allowed.
The system shall be capable of producing the full nameplate power when driven from the vehicle PTO from idle to maximum engine speed.
The generator shall be able to be used while vehicle is either stationary or in motion.
The generator shall provide an option for a self-sealing air intake to prevent re circulation of exhaust air.
The generator shall provide an option for a vertical exhaust fan in addition to the air intake fan. Single fan systems shall not be allowed.
The generator shall provide a dedicated air intake duct for the alternator and a dedicated air intake duct for the heat exchanger. Both air intake ducts shall be located on the same side of the generator.
The hydraulic pump shall be of axial piston design to provide low internal leakage and a high degree of frequency stability.
The hydraulic motor shall be a balanced plate gear motor.

GENERATOR MOUNTING

The generator shall be installed in the hose bed area near the front of the apparatus body above the water tank.

Bidder Complies	
Yes	No

There shall be two (2) outlet(s) installed in the following specified location on the apparatus. The outlet(s) shall be 120 vac/20 amp twist lock (NEMA L5-20), single receptacle with a weather resistant cover.

One (1) outlet(s) shall be located in the wheel well area on the driver's side of the apparatus, behind the rear axle in the lower position.

One (1) outlet(s) shall be located in the wheel well area on the passenger's side of the apparatus, behind the rear axle in the lower position.

There shall be a weather resistant electrical load center installed in the apparatus. The load center shall include provisions for eight (8) 20 amp manual reset type circuit breakers, and shall be installed on the forward upper wall of the L1 compartment.

CORD REEL

One (1)Hannay model #ECR series electric rewind cord reel(s) shall be installed on the apparatus as specified in the top of the drivers side front compartment similar to the current East Haven Fire Department Squad 1.

There shall be a four way roller assembly provided and installed to guide the cord on and off of the spool to prevent chafing on the body or opening. There shall also be a cord stop supplied. The reel shall come equipped with 150 feet of yellow 10-4 electrical cord.

A weather resistant push button switch to activate the rewind shall be located next to the reel. The switch shall be labeled “CORD REEL”.

A Circle D remote power distribution box with (2) two NEMA L5-20 single receptacles and (2) two NEMA 5-20 receptacles shall be provided. The distribution box shall be wired to a 12" (.3m) long 4 conductor pigtail with the corresponding NEMA 14-30 series cord end that is supplied for the cord reel. The distribution box shall be stored in a mounting bracket when not in use. The box shall be equipped with a light to indicate when distribution box is energized.
The distribution box shall be equipped with the following receptacles: Position 1: NEMA L5-20 R
Position 2: NEMA L5-20 R Position 3: NEMA 5-20 R
Position 4: NEMA 5-20 R

Mounted in the drivers side front compartment, either on the back wall high as possible or ceiling.

REFLECTIVE STRIPING

Bidder Complies	
Yes	No

The reflective stripe applied to the outside perimeter of the chassis and apparatus as directed by the Fire Department shall be applied by the Dealership prior to the truck being placed into service. Shall be black in color identical to the current East Haven Fire Department Squad 1.

REAR RETRO-REFLECTIVE CHEVRON STRIPING

A minimum of 50 percent of the rear-facing vertical surface, visible from the rear of the apparatus, shall be equipped with Diamond Grade, retro-reflective striping in a chevron pattern, sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. The stripe shall be 6” wide alternating in colors in compliance with the current edition of NFPA 1901.

The retro-reflective chevron striping shall be red and fluorescent yellow-green in color.

CUSTOMER SUPPLIED BODY LETTERING

The lettering shall be provided and installed by the customer after final delivery of the completed apparatus.

A Cast Products, model LP0005, cast aluminum license plate bracket shall be installed on the apparatus. The bracket shall incorporate proper lighting provisions to illuminate the license plate to meet DOT requirements.

ZICO WHEEL CHOCKS

One (1) set(s) of NFPA compliant Ziamatic folding wheel chocks model # SAC-44 shall be supplied with the apparatus

ZICO WHEEL CHOCK MOUNTING BRACKETS

One (1) set(s) Ziamatic folding wheel chock underbody horizontal mounts model # SGCH-44-H shall be installed on the apparatus under the body in front of the rear wheels, driver’s side.

GROUND LADDERS

The following ground ladders shall be provided:

There shall be a Duo-Safety 24' two (2) section aluminum extension ladder, model 900A, provided with the apparatus. There shall be a total of one (1).

There shall be a Duo-Safety 14' aluminum roof ladder with folding hooks, model 775A, provided with the apparatus. There shall be a total of one (1).

There shall be a Duo-Safety 10' aluminum attic ladder, model 585A, provided with the apparatus. There shall be a total of one (1).

PIKE POLES

The following pike poles shall be provided:

There shall be a Fire Hooks Unlimited 12' solid fiberglass All Purpose Hook(s), model APH-12 provided with the apparatus. There shall be a total of one (1).

There shall be a Fire Hooks Unlimited 8' solid fiberglass All Purpose Hook(s), model APH-8 provided with the apparatus. There shall be a total of one (1).

SUCTION HOSE

Two (2)10' length(s) of 6" clear PVC suction hose with lightweight couplings shall be supplied and installed on the apparatus; Location: Both on top left side of body. Trays shall be installed as per sales drawing.

All NFPA required strainers (suction hose) will be supplied and installed by the Customer before the truck is placed into service.

LOOSE EQUIPMENT

The following loose equipment shall be provided:

All NFPA required salvage covers will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required traffic cones will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required traffic vest will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required flares will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required fire extinguisher will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required AED will be supplied and installed by the Customer before the truck is placed into service.

Bidder Complies	
Yes	No

All NFPA required First Aid Kit will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required Axes will be supplied by and installed by the Customer before the truck is placed into service.

All NFPA required spanner and hydrant wrenches will be supplied by and installed by the Customer before the truck is placed into service.

All NFPA required nozzles will be supplied by and installed by the Customer before the truck is placed into service.

All NFPA required rubber mallets will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required fire hose will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required Adaptors will be supplied and installed by the Customer before the truck is placed into service.

All NFPA required SCBA and Cylinders will be supplied and installed by the Customer before the truck is placed into service.

Bidder must also bid the following equipment with a separate price sheet, buyer reserves the right to select or reject any of the listed items and may order them separate from the award for the fire apparatus;

QUANT	DESCRIPTION	MANUF	ITEM NUMBER
4	Streamlite Vulcan LED	Circle D	44450
1	Halligan Bar	FHU	
1	Flathead Axe	FHU	
1	Pickhead Axe	FHU	
1	Elevator Keys	FHU	
2	6' NY Hook	FHU	
1	Vent Saw	UniFire / Stihl	
1	Rotary Rescue Saw	UniFire / Stihl	
1	Chain Saw*	UniFire / Stihl	
1	Akron Assault 1.5" 150@50*	Akron	4863
1	Akron Assault 2.5" 150@50*	Akron	4863
1	Akron Sm Bore 1.5" w/ 15/16" tip*	Akron	2127, 1499

Town of East Haven
Bid 19-28
Fire / Rescue Pumper

Bidder Complies	
Yes	No

1	Akron Sm Bore 2.5" w/ stacked tips*	Akron	2126, 1420
14	Angus Hi Vol HP 5"x100'*	Angus	
30	Angus Ultima 1.75"x50'*	Angus	
10	Angus Ultima 2.5"x50'*	Angus	
1	Eforce 17C combination spreader cutter	Genesis	
1	Eforce 14C combination spreader cutter	Genesis	
1	Spare 28V Battery*	Genesis	
2	3 Bank Charger*	Genesis	
2	110v Adapter*	Genesis	ART.106.042.6
2	TU-32 Griphoist*	Turfor	
1	Paratech Model 234, 7 Lift Bag Set G2*	Paratech	22-889234G2
1	Paratech 150psi Master Control Kit*	Paratech	22-890300G2-150
1	Tool and Equip Mount Hardware	Misc	
1	Knox KeySecure #6		
1	Knox narcotics safe		#5201 S2Y2K4-6

*No Substitutions

BIDDER NAME: _____

COMPANY NAME (IF APPLICABLE): _____

ADDRESS: _____

PHONE #: _____

FAX #: _____

EMAIL: _____

BUILD #1 PRICE (PER VEHICLE): _____

BUILD #1 ESTIMATED DELIVERY DATE (UPON ORDER): _____

BUILD #2 PRICE (PER VEHICLE): _____

BUILD #2 ESTIMATED DELIVERY DATE (UPON ORDER): _____

Town of East Haven Bid 19-28 Fire / Rescue Pumper	Bidder Complies	
	Yes	No
SIGNATURE: _____ **DATE:** _____		
**** NOTE: THIS SHEET MUST BE ENCLOSED WITH YOUR BID SUBMISSION. ATTACH ALL PRICING AND BID DOCUMENTATION TO THIS SHEET ****		