

Proposal for **Manhattan Beach Fire Department**

Prepared by **South Coast Fire Equipment, Inc**

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South Coast Fire Equipment is pleased to submit a proposal to Manhattan Beach Fire Department for a **Pierce®75' Heavy Duty Aerial Ladder** per your request for quotation. The following paragraphs will describe in detail the apparatus, construction methods, and equipment proposed. This proposal will indicate size, type, model and make of components parts and equipment, providing proof of compliance with each and every item (except where noted) in the departments advertised specifications.

PIERCE MANUFACTURING was founded in 1913. Since then, we have been building bodies with one philosophy, "BUILD THE FINEST". Our skilled craftsmen take pride in their work, which is reflected, in the final product. We have been building fire apparatus since the early "forties" giving Pierce Manufacturing over 75 years of experience in the fire apparatus market. Pierce Manufacturing has built and put into service more than 62,500 apparatus, including more than 33,900 on Pierce custom chassis designed and built specifically for fire and emergency applications. Our Appleton, Wisconsin facility has over 870,000 total square feet of floor space situated on approximately 105 acres of land. Our Bradenton, Florida facility has 300,000 square feet of floor space situated on approximately 38 acres of land.

Our beliefs in high ethical standards are carried through in all of our commitments and to everyone with whom we do business. Honesty, Integrity, Accountability and Citizenship are global tenets by which we all live and work. Consequently, we neither engage in, nor have we ever been convicted of price fixing, bid rigging, or collusion in any domestic or international fire apparatus market.

Pierce has only one brand of fire apparatus "Pierce", ensuring you are receiving top of the line product that meets your specification.

In accordance with the current edition of applicable NFPA standards, this proposal will specify whether the fire department, manufacturer, or apparatus dealership will provide required loose equipment.

Images and illustrative material in this proposal are as accurate as known at the time of publication, but are subject to change without notice. Images and illustrative material is for reference only, and may include optional equipment and accessories and may not include all standard equipment.

GENERAL DESIGN AND CONSTRUCTION

To control quality, ensure compatibility, and provide a single source for service and warranty, the custom cab, chassis, pump module and body will be entirely designed, assembled/welded and painted in Pierce owned manufacturing facilities. This includes, but not limited to the cab weldment, the pumphouse module assembly, the chassis assembly, the body and the electrical system.

QUALITY AND WORKMANSHIP

Pierce has set the pace for quality and workmanship in the fire apparatus field. Our tradition of building the highest quality units with craftsmen second to none has been the rule right from the beginning and we demonstrate that ongoing commitment by: Ensuring all steel welding follows American Welding Society D1.1-2004 recommendations for structural steel welding. All aluminum welding follows American Welding society and ANSI D1.2-2003 requirements for structural welding of aluminum. All sheet metal welding follows American welding Society B2.1-2000 requirements for structural welding of sheet metal. Our flux core arc welding uses alloy rods, type 7000 and is performed to American Welding Society standards A5.20-E70T1. Furthermore, all employees classified as welders are tested

and certified to meet the American welding Society codes upon hire and every three (3) years thereafter. Pierce also employs an American Welding Society certified welding inspector in plant during working hours to monitor weld quality.

Pierce Manufacturing operates a Quality Management System under the requirements of ISO 9001. These standards sponsored by the International Organization for Standardization (ISO) specify the quality systems that are established by the manufacturer for design, manufacture, installation and service. A copy of the certificate of compliance is included with this proposal.

In addition to the Quality Management system, we also employ a Quality Achievement Supplier program to insure the vendors and suppliers that we utilize meet the high standards we demand. That is just part of our overall "Quality at the Source" program at Pierce.

To demonstrate the quality of our products and services, a list of at least fifteen (15) fire departments/municipalities that have purchased vehicles for a second time is provided.

DELIVERY

The apparatus will be delivered under its own power to insure proper break-in of all components while the apparatus is still under warranty. A qualified delivery representative shall deliver the apparatus and remain for a sufficient length of time to instruct personnel in proper operation, care and maintenance of the equipment delivered.

MANUAL AND SERVICE INFORMATION

At time of delivery, complete operation and maintenance manuals covering the apparatus will be provided. A permanent plate will be mounted in the driver's compartment specifying the quantity and type of fluids required including engine oil, engine coolant, transmission, pump transmission lubrication, pump primer and drive axle.

SAFETY VIDEO

At the time of delivery Pierce will also provide one (1) 39-minute, professionally produced apparatus safety video, in DVD format. A link to the video is also available on the Pierce Training website. This video will address key safety considerations for personnel to follow when they are driving, operating, and maintaining the apparatus, including the following: vehicle pre-trip inspection, chassis operation, pump operation, aerial operation, and safety during maintenance.

PERFORMANCE TESTS

A road test will be conducted with the apparatus fully loaded and a continuous run of no less than ten (10) miles. During that time the apparatus will show no loss of power nor will it overheat. The transmission drive shaft or shafts and the axles will run quietly and be free of abnormal vibration or noise. The apparatus when fully loaded will not have less than 25 percent nor more than 50 percent on the front axle, and not less than 50 percent nor more than 75 percent on the rear axle. The apparatus will meet the current edition of applicable NFPA standards acceleration and braking requirements.

SERVICE AND WARRANTY SUPPORT

Pierce dealership support will be provided by South Coast Emergency Vehicle Service by operating in conjunction with a Pierce authorized service center. The service center will have factory-trained

mechanics on staff versed in Pierce fire apparatus. The service facility will be located within seventy five (75) miles of the fire department.

In addition to the dealership, Pierce has service facilities located in both, Weyauwega, Wisconsin and Bradenton, Florida. Pierce also maintains a dedicated parts facility of over 100,000 square feet in Appleton, Wisconsin. The parts facility stocks in excess of \$5,000,000 in parts dedicated to service and replacement parts. The parts facility employs a staff dedicated solely for the distribution and shipment of service and replacement parts.

Service parts for the apparatus being proposed can be found via Pierceparts.com which, is an interactive online tool that delivers information regarding your specific apparatus as well as the opportunity to register for training classes.

As a Pierce customer you have the ability to view the complete bill of materials for your specific apparatus, including assembly drawings, piece part drawings, and beneficial parts notations. You will also have the ability to search the complete Pierce item master through a parts search function which offers all Pierce SKU's and descriptions offered on all Pierce apparatus. Published component catalogs, which include proprietary systems along with an extensive operators manual library is available for easy reference.

Pierce Manufacturing maintains a dedicated service and warranty staff of over 35 personnel, dedicated to customer support, which also maintains a 24 hour 7 day a week toll free hot line, four (4) on staff EVTs, and offers hands-on repair and maintenance training classes multiple times a year.

LIABILITY

The successful bidder will defend any and all suits and assume all liability for the use of any patented process including any device or article forming a part of the apparatus or any appliance furnished under the contract.

INSURANCE PROVIDED BY BIDDER

Commercial General Liability Insurance

The successful bidder will, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of commercial general liability insurance:

Each Occurrence:	\$1,000,000
Products/Completed Operations Aggregate:	\$1,000,000
Personal and Advertising Injury:	\$1,000,000
General Aggregate:	\$2,000,000

Coverage will be written on a Commercial General Liability form. The policy will be written on an occurrence form and will include Contractual Liability coverage for bodily injury and property damage subject to the terms and conditions of the policy. The policy will include Owner as an additional insured when required by written contract.

Commercial Automobile Liability Insurance

The successful bidder will, during the performance of the contract, keep in force at least the following minimum limits of commercial automobile liability insurance and coverage will be written on a Commercial Automobile liability form:

Each Accident Combined Single Limit:	\$1,000,000
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Umbrella/Excess Liability Insurance

The successful bidder will, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance:

Aggregate:	\$3,000,000
Each Occurrence:	\$3,000,000

The umbrella policy will be written on an occurrence basis and at a minimum provide excess to the bidder's General Liability and Automobile Liability policies.

The required limits can be provided by one (1) or more policies provided all other insurance requirements are met.

Coverage will be provided by a carrier(s) rated A- or better by A.M. Best.

All policies will provide a 30-day notice of cancellation to the named insured. The Certificate of Insurance will provide the following cancellation clause: Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

Bidder agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with the bid. The certificate will show the purchaser as certificate holder.

INSURANCE PROVIDED BY MANUFACTURER

Product Liability Insurance

The manufacturer will, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of Product Liability insurance:

Each Occurrence:	\$1,000,000
Products/Completed Operations Aggregate:	\$1,000,000

Coverage will be written on a Commercial General Liability form. The policy will be written on an occurrence form. The manufacturer's policy will include the owner as additional insured when required by written contract between the Owner and a Pierce authorized dealer.

Umbrella/Excess Liability Insurance

The manufacturer will, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance:

Each Occurrence:	\$25,000,000
Aggregate:	\$25,000,000

The umbrella policy will be written on an occurrence basis and provide excess to the manufacturer's General Liability/Products policies.

The required limits can be provided by one (1) or more policies provided all other insurance requirements are met.

Coverage will be provided by a carrier(s) rated A- or better by A.M. Best.

All policies will provide a 30-day notice of cancellation to the named insured. The Certificate of Insurance will provide the following cancellation clause: Should any of the above described policies be cancelled before the expiration date thereof, notice will be delivered in accordance with the policy provisions.

Manufacturer agrees to furnish owner with a current Certificate of Insurance with the coverages listed above along with the bid. The certificate will show the purchaser as the certificate holder.

SINGLE SOURCE MANUFACTURER

Pierce Manufacturing, Inc. provides an integrated approach to the design and manufacture of our products that delivers superior apparatus and a dedicated support team. From our facilities, the chassis, cab weldment, cab, pump house (including the sheet metal enclosure, valve controls, piping and operators panel) body and aerial device will be entirely designed, tested, and hand assembled to the customer's exact specifications. The electrical system either hardwired or multiplexed, will be both designed and integrated by Pierce Manufacturing. The warranties relative to these major components (excluding component warranties such as engine, transmission, axles, pump, etc.) will be provided by Pierce as a single source manufacturer. Pierce's single source solution adds value by providing a fully engineered product that offers durability, reliability, maintainability, performance, and a high level of quality.

Your apparatus will be manufactured in Appleton, Wisconsin.

NFPA 2024 STANDARDS

This unit will comply with the NFPA standards effective January 1, 2024, except for fire department directed exceptions. These exceptions will be set forth in the Statement of Exceptions.

Certification of slip resistance of all stepping, standing and walking surfaces will be supplied with delivery of the apparatus.

All horizontal surfaces designated as a standing or walking surface that are greater than 48.00" above the ground must be defined by a 1.00" wide line along its outside perimeter. Perimeter markings and

designated access paths to destination points will be identified on the customer approval print and are shown as approximate. Actual location(s) will be determined based on materials used and actual conditions at final build. Access paths may pass through hose storage areas and opening or removal of covers or restraints may be required. Access paths may require the operation of devices and equipment such as the aerial device or ladder rack.

A plate that is highly visible to the driver while seated will be provided. This plate will show the overall height, length, and gross vehicle weight rating.

The manufacturer will have programs in place for training, proficiency testing and performance for any staff involved with certifications.

An official of the company will designate, in writing, who is qualified to witness and certify test results.

NFPA COMPLIANCY

Apparatus proposed by the bidder will meet the applicable requirements of the National Fire Protection Association (NFPA) as stated in current edition at time of contract execution. Fire department's specifications that differ from NFPA specifications will be indicated in the proposal as "non-NFPA".

INSPECTION CERTIFICATE

A third party inspection certificate for the aerial device will be furnished upon delivery of the aerial device. The certificate will be Underwriters Laboratories Inc. Type 1 and will indicate that the aerial device has been inspected on the production line and after final assembly.

Visual structural inspections will be performed on all welds on both aluminum and steel ladders.

On critical weld areas, or on any suspected defective area, the following tests will be conducted:

- Magnetic particle inspection will be conducted on steel aerials to assure the integrity of the weldments and to detect any flaws or weaknesses. Magnets will be placed on each side of the weld while iron powder is placed on the weld itself. The powder will detect any crack that may exist. This test will conform to ASTM E709 and be performed prior to assembly of the aerial device.
- A liquid penetrant test will be conducted on aluminum aerials to assure the integrity of the weldments and to detect any flaws or weaknesses. This test will conform to ASTM E165 and be performed prior to assembly of the aerial device.
- Ultrasonic inspection will be conducted on all aerials to detect any flaws in pins, bolts and other critical mounting components.

In addition to the tests above, functional tests, load tests, and stability tests will be performed on all aerials. These tests will determine any unusual deflection, noise, vibration, or instability characteristics of the unit.

PUMP TEST

The pump will be tested, approved and certified by Underwriter's Laboratory at the manufacturer's expense. The test results and the pump manufacturer's certification of hydrostatic test; the engine

manufacturer's certified brake horsepower curve; and the manufacturer's record of pump construction details will be forwarded to the Fire Department.

GENERATOR TEST

If the unit has a generator, the generator will be tested, approved, and certified by Underwriters Laboratories at the manufacturer's expense. The test results will be provided to the Fire Department at the time of delivery.

BREATHING AIR TEST

If the unit has breathing air, Pierce Manufacturing will draw an air sample from the air system and certify that the air quality meets the requirements of NFPA 1989, *Standard on Breathing Air Quality for Fire and Emergency Services Respiratory Protection*.

VEHICLE INSPECTION PROGRAM CERTIFICATION

To assure the vehicle is built to current NFPA 1900 standards, the apparatus, in its entirety, will be third-party, independent, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition. The certification includes: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed on the apparatus.

A placard will be affixed in the driver's side area stating the third party agency, the date, the standard and the certificate number of the whole vehicle audit.

INSPECTION TRIP(S)

The bidder will provide two (2) factory inspection trip(s) for three customer representative(s). The inspection trip(s) will be scheduled at times mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging and meals will be the responsibility of the bidder.

BID BOND NOT REQUESTED

A bid bond will not be included. If requested, the following will apply:

All bidders will provide a bid bond as security for the bid in the form of a 5 percent bid bond to accompany their bid. This bid bond will be issued by a Surety Company who is listed on the U.S. Treasury Departments list of acceptable sureties as published in Department Circular 570. The bid bond will be issued by an authorized representative of the Surety Company and will be accompanied by a certified power of attorney dated on or before the date of bid. The bid bond will include language, which assures that the bidder/principal will give a bond or bonds as may be specified in the bidding or contract documents, with good and sufficient surety for the faithful performance of the contract, including the Basic One (1) Year Limited Warranty, and for the prompt payment of labor and material furnished in the prosecution of the contract.

Notwithstanding any document or assertion to the contrary, any surety bond related to the sale of a vehicle will apply only to the Basic One (1) Year Limited Warranty for such vehicle. Any surety bond related to the sale of a vehicle will not apply to any other warranties that are included within this bid (OEM or otherwise) or to the warranties (if any) of any third party of any part, component, attachment or

accessory that is incorporated into or attached to the vehicle. In the event of any contradiction or inconsistency between this provision and any other document or assertion, this provision will prevail.

PERFORMANCE BOND NOT REQUESTED

A performance bond will not be included. If requested at a later date, one will be provided to you for an additional cost and the following will apply:

The successful bidder will furnish a Performance and Payment bond (Bond) equal to 100 percent of the total contract amount within 30 days of the notice of award. Such Bond will be in a form acceptable to the Owner and issued by a surety company included within the Department of Treasury's Listing of Approved Sureties (Department Circular 570) with a minimum A.M. Best Financial Strength Rating of A and Size Category of XV. In the event of a bond issued by a surety of a lesser Size Category, a minimum Financial Strength rating of A+ is required.

Bidder and Bidder's surety agree that the Bond issued hereunder, whether expressly stated or not, also includes the surety's guarantee of the vehicle manufacturer's Bumper to Bumper warranty period included within this proposal. Owner agrees that the penal amount of this bond will be simultaneously amended to 25 percent of the total contract amount upon satisfactory acceptance and delivery of the vehicle(s) included herein. Notwithstanding anything contained within this contract to the contrary, the surety's liability for any warranties of any type will not exceed three (3) years from the date of such satisfactory acceptance and delivery, or the actual Bumper to Bumper warranty period, whichever is shorter.

Due to global supply chain constraints, any delivery date contained herein is a good faith estimate as of the date of this order/contract, and merely an approximation based on current information. Delivery updates will be made available, and a final firm delivery date will be provided as soon as possible.

APPROVAL DRAWING

A drawing of the proposed apparatus will be prepared and provided to the purchaser for approval before construction begins. The Pierce sales representative will also be provided with a copy of the same drawing. The finalized and approved drawing will become part of the contract documents. This drawing will indicate the chassis make and model, location of the lights, siren, horns, compartments, major components, etc.

A "revised" approval drawing of the apparatus will be prepared and submitted by Pierce to the purchaser showing any changes made to the approval drawing.

COMPARTMENT LAYOUT DRAWING

A sales drawing will be provided as if the rear body compartment doors are open. This drawing will be provided for graphic representation only and will include such things as shelves, trays, reels, dividers, air control panels, air bottle storage bins, poly boxes, etc.

ELECTRICAL WIRING DIAGRAMS

Two (2) electrical wiring diagrams, prepared for the model of chassis and body, will be provided.

ENFORCER CHASSIS

The Pierce Enforcer™ is the custom chassis developed exclusively for the fire service. Chassis provided will be a new, tilt-type custom fire apparatus. The chassis will be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis will be designed and manufactured for heavy-duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis will be the manufacturer's first line tilt cab.

WHEELBASE

The wheelbase of the vehicle will be 226.5".

GVW RATING

The gross vehicle weight rating will be 53,800 lbs.

FRAME

The chassis frame will be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus. The side rails will have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to 10.75" over the rear axle. Each rail will have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 in-lb over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 in-lb over the rear axle. The frame rails will be constructed of 120,000 psi yield strength heat-treated 0.38" thick steel with 3.50" wide flanges.

FRAME REINFORCEMENT

In addition, a mainframe internal liner will be provided. The liner will be an internal "C" design that steps to an internal "L" design over the rear axle. It will be heat-treated steel measuring 12.50" x 3.00" x 0.25" through the front portion of the liner, stepping to 9.38" x 3.00" x 0.25" through the rear portion of the liner. Each liner will have a section modulus of 13.58 cubic inches, yield strength of 110,000 psi, and rbm of 1,494,042 in-lb. Total rbm at wheelbase center will be 4,391,869 in-lb.

The frame liner will be mounted inside of the chassis frame rail and extend the full length of the frame.

FRONT NON DRIVE AXLE

The Oshkosh TAK-4® front axle will be of the independent suspension design with a ground rating of 22,800 lb.

Upper and lower control arms will be used on each side of the axle. Upper control arm castings will be made of 100,000-psi yield strength 8630 steel and the lower control arm casting will be made of 55,000-psi yield ductile iron.

The center cross members and side plates will be constructed out of 80,000-psi yield strength steel.

Each control arm will be mounted to the center section using elastomer bushings. These rubber bushings will rotate on low friction plain bearings and be lubricated for life. Each bushing will also have a flange end to absorb longitudinal impact loads, reducing noise and vibrations.

There will be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

The upper control arm will be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

Camber at load will be zero degrees for optimum tire life.

The ball joint bearing will be of low friction design and be maintenance free.

Toe links that are adjustable for alignment of the wheel to the center of the chassis will be provided.

The wheel ends will have little to no bump steer when the chassis encounters a hole or obstacle.

The steering linkage will provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

The axle will have a turning angle of up to 45 degrees.

FRONT SUSPENSION

Front Oshkosh TAK-4™ independent suspension will be provided with a minimum ground rating of 22,800 lb.

The independent suspension system will be designed to provide maximum ride comfort. The design will allow the vehicle to travel at highway speeds over improved road surfaces and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel will have torsion bar type spring. In addition, each front wheel end will also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design will be such that there is at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. One can adjust for a lean within 15 minutes per side. Anchor adjustment design is such that it allows for ride height adjustment on each side.

The independent suspension was put through a durability test that simulated 140,000 miles of inner city driving.

FRONT SHOCK ABSORBERS

KONI heavy-duty telescoping shock absorbers will be provided on the front suspension.

FRONT OIL SEALS

Oil seals with viewing window will be provided on the front axle.

FRONT TIRES

Front tires will be Goodyear 425/65R22.50 radials, 20 ply Armor Max MSA, rated for 22,800 lb maximum axle load and 68 mph maximum speed.

The tires will be mounted on Alcoa 22.50" x 12.25" polished aluminum disc type wheels with a ten (10) stud, 11.25" bolt circle.

REAR AXLE

The rear axle will be a Meritor™, Model RS-30-185, with a capacity of 31,000 lb.

TOP SPEED OF VEHICLE

A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 68 mph / 109 kph.

REAR SUSPENSION

The rear suspension will be Standens, semi-elliptical, 3.00" wide x 52.50" long, with a ground rating of 31,000 lbs. The spring hangers will be castings.

The two (2) top leaves will wrap the forward spring hanger pin, and the rear of the spring will be a slipper style end that will ride in a rear slipper hanger.

A steel encased rubber bushing will be used in the spring eye. The steel encased rubber bushing will be maintenance free and require no lubrication.

REAR OIL SEALS

Oil seals will be provided on the rear axle(s).

AUXILIARY SPRING

The rear suspension will be furnished with a Timbren auxiliary spring package.

REAR TIRES

Rear tires will be four (4) Goodyear 315/80R22.50 radials with 20 ply G289 WHA tread, rated for 36,360 lb maximum axle load and 68 mph maximum speed.

The tires will be mounted on Accuride® 22.50" x 9.00" polished aluminum disc wheels with a ten (10) stud, 11.25" bolt circle.

TIRE BALANCE

All tires will be balanced with Counteract balancing beads. The beads will be inserted into the tire and eliminate the need for wheel weights.

TIRE PRESSURE MANAGEMENT

There will be a RealWheels LED AirSecure™ tire alert pressure management system provided, that will monitor each tire's pressure. A sensor will be provided on the valve stem of each tire for a total of six (6) tires.

The sensor will calibrate to the tire pressure when installed on the valve stem for pressures between 10 and 200 psi. The sensor will activate an integral battery operated LED when the pressure of that tire drops 5 to 8 psi.

Removing the cap from the sensor will indicate the functionality of the sensor and battery. If the sensor and battery are in working condition, the LED will immediately start to flash.

CHROME LUG NUT COVERS

Chrome lug nut covers will be supplied on front and rear wheels.

FRONT HUB COVERS

Stainless steel hub covers will be provided on the front axle. An oil level viewing window will be provided.

REAR HUB COVERS

A pair of stainless steel high hat hub covers will be provided on rear axle hubs.

MUD FLAPS

Mud flaps with a Pierce logo will be installed behind the front and rear wheels.

WHEEL CHOCKS

There will be one (1) pair of folding Ziamatic, Model SAC-44-E, aluminum alloy, Quick-Choc wheel blocks, with easy-grip handle provided.

Wheel Chock Brackets

There will be one (1) pair of Zico, Model SQCH-44-H, horizontal mounting wheel chock brackets provided for the Ziamatic, Model SAC-44-E, folding wheel chocks. The brackets will be made of aluminum and consist of a quick release spring loaded rod to hold the wheel chocks in place. The brackets will be mounted forward of the left side rear tire.

ELECTRONIC STABILITY CONTROL

A vehicle control system will be provided as an integral part of the ABS brake system from Meritor Wabco.

The system will monitor and update the lateral acceleration of the vehicle and compare it to a critical threshold where a side roll event may occur. If the critical threshold is met, the vehicle control system will automatically reduce engine RPM, engage the engine retarder (if equipped), and selectively apply brakes to the individual wheel ends of the front and rear axles to reduce the possibility of a side roll event.

The system will monitor directional stability through a lateral accelerometer, steer angle sensor and yaw rate sensor. If spinout or drift out is detected, the vehicle control system will selectively apply brakes to the individual wheel ends of the front and rear axles to bring the vehicle back to its intended direction.

ANTI-LOCK BRAKE SYSTEM

The vehicle will be equipped with a Wabco 4S4M, anti-lock braking system. The ABS will provide a four (4) channel anti-lock braking control on both the front and rear wheels. A digitally controlled system that utilizes microprocessor technology will control the anti-lock braking system. Each wheel will be monitored by the system. When any wheel begins to lockup, a signal will be sent to the control unit. This control unit will then reduce the braking of that wheel for a fraction of a second and then reapply the brake. This anti-lock brake system will eliminate the lockup of any wheel thus helping to prevent the apparatus from skidding out of control.

AUTOMATIC TRACTION CONTROL

An anti-slip feature will be included with the ABS. The Automatic Traction Control will be used for traction in poor road and weather conditions. The Automatic Traction Control will act as an electronic differential lock that will not allow a driving wheel to spin, thereby supplying traction at all times. The

ABS electronic control unit (ECU) will work with the engine ECU, sharing information concerning wheel slip. Engine ECU will use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. An "off road traction" switch will be provided on the instrument panel. Activation of the switch will allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

BRAKES

The service brake system will be full air type.

The front brakes will be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance.

The brake system will be certified, third party inspected, for improved stopping distance.

The rear brakes will be Meritor™ 16.50" x 8.63" cam operated with automatic slack adjusters. Dust shields cannot be provided.

BRAKE SYSTEM AIR COMPRESSOR

The air compressor will be a Cummins/WABCO with 18.7 cubic feet per minute output.

BRAKE SYSTEM

The brake system will include:

- Brake treadle valve
- Heated automatic moisture ejector on air dryer
- Total air system minimum capacity of 5,376 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve
- A parking "brake on" indicator light on instrument panel
- Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, with an automatic spring brake application at 40 psi
- A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)
- 1/4 turn drain valves on each air tank

The air tank will be primed and painted to meet a minimum 750 hour salt spray test.

The air tanks will be painted same as frame color.

To reduce the effects of corrosion, the air tank will be mounted with stainless steel brackets.

BRAKE SYSTEM AIR DRYER

The air dryer will be WABCO System Saver 1200 with spin-on coalescing filter cartridge and 100 watt heater.

BRAKE LINES

Color-coded nylon brake lines will be provided. The lines will be wrapped in a heat protective loom in the chassis areas that are subject to excessive heat.

AIR INLET

One (1) air inlet with 3D series male coupling will be provided. It will allow station air to be supplied to the apparatus brake system through a shoreline hose. The inlet will be located forward in the driver side lower step well of cab. A check valve will be provided to prevent reverse flow of air. The inlet will discharge into the "wet" tank of the brake system. A mating female fitting will also be provided with the loose equipment.

RECESSED BOX FOR AIR FITTING

One (1) air inlet will have a smooth aluminum recessed box provided. The box will allow the air fitting(s) to be recessed inside the stepwell within the same box as the cab lift receptacle to prevent damage. in the driver side stepwell.

A treadplate door with lift and turn latch will be provided over the opening.

ALL WHEEL LOCK-UP

An all wheel lock-up system will be installed which applies air to the front brakes and uses the spring brake at the rear.

Front brakes will apply with the standard parking brake control.

AUTOMATIC MOISTURE EJECTOR(S)

Three (3) automatic moisture ejectors will be installed in the brake system.

The moisture ejector(s) will be provided on the on the primary, secondary and aux tanks reservoir(s).

ENGINE

The chassis will be powered by an electronically controlled engine as described below:

Make:	Cummins®
Model:	X15
Power:	605 hp at 1800 rpm
Torque:	1850 lb-ft at 1000 rpm
Governed Speed:	2100 rpm
Emissions Level:	EPA 2027
Fuel:	Diesel
Cylinders:	Six (6)
Displacement:	912 cubic inches (14.9L)
Starter:	Delco 39MT™
Fuel Filters:	Spin-on style filter from Cummins®.

The engine will include On-board diagnostics (OBD), which provides self diagnostic and reporting. The system will give the owner or repair technician access to state of health information for various vehicle

sub systems. The system will monitor vehicle systems, engine and after treatment. The system will illuminate a malfunction indicator light on the dash console if a problem is detected.

The engine will be filled with FA-4 10W30 oil as required by Cummins.

REMOTE MOUNTED ENGINE FILTERS

The engine fuel and oil filters will be remote mounted for ease of maintenance.

HIGH IDLE

A high idle switch will be provided, inside the cab, on the instrument panel, that will automatically maintain a preset engine rpm. A switch will be installed, at the cab instrument panel, for activation/deactivation.

The high idle will be operational only when the parking brake is on and the truck transmission is in neutral. A green indicator light will be provided, adjacent to the switch. The light will illuminate when the above conditions are met. The light will be labeled "OK to Engage High Idle."

ENGINE BRAKE

A Jacobs® engine brake is to be installed with the controls located on the instrument panel within easy reach of the driver.

The driver will be able to turn the engine brake system on/off and have a high, medium and low setting.

The engine brake will activate when the system is on and the throttle is released.

The high setting of the brake application will activate and work simultaneously with the variable geometry turbo (VGT) provided on the engine.

The engine brake will be installed in such a manner that when the engine brake is slowing the vehicle the brake lights are activated.

The ABS system will automatically disengage the auxiliary braking device, when required.

CLUTCH FAN

A fan clutch will be provided. The fan clutch will be automatic when the pump transmission is in "Road" position, and constantly engaged when in "Pump" position.

ENGINE AIR INTAKE

The engine air intake will be located above the engine cooling package. It will draw fresh air from the front of the apparatus through the radiator grille.

The ember separator is designed to prevent road dirt and recirculating hot air from entering the engine.

The ember separator will be easily accessible by tilting the cab.

EXHAUST SYSTEM

The exhaust system will be stainless steel from the turbo to the engine's aftertreatment device. The exhaust system will include an aftertreatment device to meet current EPA standards. An insulation wrap

will be provided on all exhaust pipe between the turbo and the aftertreatment device to minimize the transfer of heat to the cab.

The exhaust will terminate horizontally ahead of the right side rear wheels and will be flush with the body rub rail. The exhaust pipes will be aluminized steel.

There will be an aluminized steel exhaust diffuser with a standard straight tip on the end provided to reduce the temperature of the exhaust as it exits. Heat deflector shields will be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

EXHAUST MODIFICATION

An adapter for the Plymovent bladder exhaust extraction system will be provided on the end of the tail pipe.

RADIATOR

The radiator and the complete cooling system will meet or exceed the current edition of applicable NFPA and engine manufacturer cooling system standards.

For maximum corrosion resistance and cooling performance, the entire radiator core will be constructed using long life aluminum alloy. The radiator core will consist of aluminum fins, having a serpentine design, brazed to aluminum tubes.

The radiator core will have a minimum front area of 1060 square inches.

The radiator will be compatible with commercial antifreeze solutions.

The radiator assembly will be isolated from the chassis frame rails with rubber isolators to prevent the development of leaks caused by twisting or straining when the apparatus operates over uneven terrain.

The radiator will include a de-aeration/expansion tank. For visual coolant level inspection, the radiator will have a built-in sight glass. The radiator will be equipped with a 15 psi pressure relief cap.

A drain port will be located at the lowest point of the cooling system and/or the bottom of the radiator to permit complete flushing of the coolant from the system.

Shields or baffles will be provided to prevent recirculation of hot air to the inlet side of the radiator.

COOLANT LINES

Gates, or Goodyear, rubber hose will be used for all engine coolant lines installed by Pierce Manufacturing.

Hose clamps will be stainless steel constant torque type to prevent coolant leakage. They will expand and contract according to coolant system temperature thereby keeping a constant clamping pressure on the hose.

FUEL TANK

A 65 gallon fuel tank will be provided and mounted at the rear of the chassis. The tank will be constructed of 12-gauge, hot rolled steel. It will be equipped with swash partitions and a vent. To eliminate the effects of corrosion, the fuel tank will be mounted with stainless steel straps.

A 0.75" drain plug will be located in a low point of the tank for drainage.

A fill inlet will be located on the rear of the body and is covered with a hinged, spring loaded, stainless steel door that is marked "Ultra Low Sulfur - Diesel Fuel Only".

A 0.50" diameter vent will be installed from tank top to just below fuel fill inlet.

The fuel tank will meet all FHWA 393.67 requirements including a fill capacity of 95 percent of tank volume.

All fuel lines will be provided as recommended by the engine manufacturer.

DIESEL EXHAUST FLUID TANK

A 4.5 gallon diesel exhaust fluid (DEF) tank will be provided and mounted in the left side body forward of the rear axle.

A 0.50" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will be provided and marked "Diesel Exhaust Fluid Only". The fill inlet will be located below the air bottle storage behind a common door on the left side of the vehicle.

The tank will meet the engine manufacturers requirement for 10 percent expansion space in the event of tank freezing.

The tank will include an integrated heater unit that utilizes engine coolant to thaw the DEF in the event of freezing.

FUEL PRIMING PUMP

A Cummins automatic electronic fuel priming pump will be integrated as part of the engine.

FUEL SHUTOFF

A shutoff valve will be installed in the fuel line, at the fuel tank.

FUEL COOLER

An air to fuel cooler will be installed in the engine fuel return line.

FUEL SEPARATOR

The engine will be equipped with a Racor in-line spin-on fuel and water separator in addition to the engine fuel filters.

TRANSMISSION

An Allison 6th generation, Model EVS 4000P, electronic, torque converting, automatic transmission will be provided.

The transmission will be equipped with prognostics to monitor oil life, filter life, and transmission health. A wrench icon on the shift selector's digital display will indicate when service is due.

Two (2) PTO openings will be located on left side and top of converter housing (positions 8 o'clock and 1 o'clock).

A transmission temperature gauge with an amber light and buzzer will be installed on the cab instrument panel.

TRANSMISSION SHIFTER

A six (6)-speed push button shift module will be mounted to right of driver on console. Shift position indicator will be indirectly lit for after dark operation.

The transmission ratio will be:

1st	3.51 to 1.00
2nd	1.91 to 1.00
3rd	1.43 to 1.00
4th	1.00 to 1.00
5th	0.75 to 1.00
6th	0.64 to 1.00
R	4.80 to 1.00

TRANSMISSION COOLER

A Modine plate and fin transmission oil cooler will be provided using engine coolant to control the transmission oil temperature.

DRIVELINE

Drivelines will be a heavy-duty metal tube and be equipped with Spicer® 1810 universal joints.

The shafts will be dynamically balanced before installation.

A splined slip joint will be provided in each driveshaft where the driveline design requires it. The slip joint will be coated with Glidecoat® or equivalent.

STEERING

Dual Sheppard, Model M110, steering gears, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and an Eaton, Model VN20, hydraulic pump with integral pressure and flow control. All power steering lines will have wire braded lines with crimped fittings.

A tilt and telescopic steering column will be provided to improve fit for a broader range of driver configurations.

STEERING WHEEL

The steering wheel will be 18.00" in diameter, have tilting and telescoping capabilities, and a four (4)-spoke design.

There will be a switch pod provided on each side of the steering wheel between the spokes. The switch pods will be an integral part of the steering wheel. Each switch pod will contain four (4) switches. The following switches will be provided:

- Air horn

- Emergency lighting
- Area lighting
- Front dome light
- Rear dome light
- Q2B siren activate
- Q2B siren brake
- Wiper mist
- Full floating horn pad

LOGO AND CUSTOMER DESIGNATION ON DASH

The dash panel will have an emblem containing the Pierce logo and customer name. The emblem will have three (3) rows of text for the customer's department name. There will be a maximum of eight (8) characters in the first row, 11 characters in the second row and 11 characters in the third row.

The first row of text will be: Manhattan Beach

The second row of text will be: Fire

The third row of text will be: Dept.

BUMPER

A one (1)-piece, ten (1) gauge, 304-2B type polished stainless steel bumper, a minimum of 10.00" high, will be attached to a bolted modular extension frame constructed of 50,000 psi tensile steel "C" channel mounted directly behind it to provide adequate support strength.

The bumper will be extended 19.00" from front face of cab.

Gravel Pan

A gravel pan, constructed of bright aluminum treadplate, will be furnished between the bumper and cab face. The gravel pan will be properly supported from the underside to prevent flexing and vibration of the aluminum treadplate.

CENTER HOSE TRAY

A hose tray, constructed of aluminum, will be placed in the center of the bumper extension.

The tray will have a capacity of 125' of 1.75" double jacket cotton-polyester hose.

Black rubber grating will be provided at the bottom of the tray. Drain holes are also provided.

Center Hose Tray Restraint

There will be one (1) pair of hose tray restraint straps located over the center mounted tray.

The restraints will be a pair of 2.00" wide black nylon straps with Velcro® fasteners provided. The strap(s) will be used to secure the hose in the tray.

LEFT SIDE HOSE TRAY

A hose tray will be placed in the left side of the extended bumper.

The tray will have a capacity of 25' of 4"

Black rubber grating will be provided at the bottom of the tray. Drain holes will be provided.

Left Side Hose Tray Restraint

There will be one (1) pair hose tray restraint straps located over the left side mounted tray.

The restraints will be a pair of 2.00" wide black nylon straps with Velcro® fasteners provided. The strap(s) will be used to secure the hose in the tray.

LIFT AND TOW MOUNTS

Mounted to the frame extension will be lift and tow mounts. The lift and tow mounts will be designed and positioned to adapt to certain tow truck lift systems.

The lift and tow mounts with eyes will be painted the same color as the frame.

TOW HOOKS

Two (2) chromed steel tow hooks will be installed under the bumper and attached to the front frame members. The tow hooks will be designed and positioned to allow up to a 6,000 lb straight horizontal pull in line with the centerline of the vehicle. The tow hooks will not be used for lifting of the apparatus.

BUMPER HOSE RESTRAINT

There will be one (1) pair hose tray restraint straps located center.

The restraints will be a pair of 2.00" wide black nylon straps with Velcro fasteners provided. The strap(s) will be used to secure the hose in the tray.

CAB

The Enforcer cab will be designed specifically for the fire service and manufactured by the chassis builder.

The cab will be built by the apparatus manufacturer in a facility located on the manufacturer's premises.

For reasons of structural integrity and enhanced occupant protection, the cab will be a heavy duty design, constructed to the following minimal standards.

The cab will have 12 main vertical structural members located in the A-pillar (front cab corner posts), B-pillar (side center posts), C-pillar (rear corner posts), and rear wall areas. The A-pillar will be constructed of solid A356-T5 aluminum castings. The B-pillar and C-pillar will be constructed from 0.13" wall extrusions. The rear wall will be constructed of two (2) 2.00" x 2.00" outer aluminum extrusions and two (2) 2.00" x 1.00" inner aluminum extrusions. All main vertical structural members will run from the floor to 4.625" x 3.864" x 0.090" thick roof extrusions to provide a cage-like structure with the A-pillar and roof extrusions being welded into a 0.25" thick corner casting at each of the front corners of the roof assembly.

The front of the cab will be constructed of a 0.13" firewall plate, covered with a minimum 0.090" front skin thickness, and reinforced with a full width x 0.50" thick cross-cab support located just below the windshield and fully welded to the engine tunnel. The cross-cab support will run the full width of the cab and weld to each A-pillar, the 0.13" firewall plate, and the front skin.

The cab floors will be constructed of 0.125" thick aluminum plate and reinforced at the firewall with an additional 0.25" thick cross-floor support providing a total thickness of 0.375" of structural material at the front floor area. The front floor area will also be supported with two (2) triangular 0.30" wall extrusions that also provides the mounting point for the cab lift. This tubing will run from the floor wireway of the cab to the engine tunnel side plates, creating the structure to support the forces created when lifting the cab.

The cab will be 96.00" wide (outside door skin to outside door skin) to maintain maximum maneuverability.

The centerline of front axle to the rear of the cab will be 70.00" long.

The overall height (from the cab roof to the ground) of approximately 99.00". The overall height listed will be calculated based on a truck configuration with the lowest suspension weight rating, the smallest diameter tires for the suspension, no water weight, no loose equipment weight, and no personnel weight. Larger tires, wheels, and suspension will increase the overall height listed.

The floor to ceiling height inside the crew cab will be 54.50" in the center and outboard positions.

The crew cab floor will measure 46.00" from the rear wall to the back side of the rear facing seat risers.

The medium block engine tunnel, at the rearward highest point (knee level), will measure 61.50" to the rear wall. The big block engine tunnel will measure 51.50" to the rear wall.

The crew cab will be a totally enclosed design with the interior area completely open to improve visibility and verbal communication between the occupants.

The cab will be a full tilt cab style.

A 3-point cab mount system with rubber isolators will improve ride quality by isolating chassis vibrations from the cab.

CAB ROOF DRIP RAIL

For enhanced protection from inclement weather, a drip rail will be furnished on the sides of the cab. The drip rail will be painted to match the cab roof, and bonded to the sides of the cab. The drip rail will extend the full length of the cab roof.

FENDER LINERS

Full circular inner fender liners in the wheel wells will be provided.

PANORAMIC WINDSHIELD

A one (1)-piece safety glass windshield will be provided with over 2,775 square inches of clear viewing area. The windshield will be full width and will provide the occupants with a panoramic view. The

windshield will consist of three (3) layers: outer light, middle safety laminate, and inner light. The outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage. The inner light will provide yet another chip resistant layer. The cab windshield will be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern will be applied on the outside perimeter of the windshield for a finished automotive appearance.

WINDSHIELD WIPERS

Three (3) electric windshield wipers with washer will be provided that meet FMVSS and SAE requirements.

The washer reservoir will be able to be filled without raising the cab.

ENGINE TUNNEL

Engine tunnel side walls will be constructed of 0.375" aluminum. The top will be constructed of 0.125" aluminum and will be tapered at the top to allow for more driver and passenger elbow room.

The engine tunnel will be insulated for protection from heat and sound. Perforated foil faced insulation will be over a 1.00" thick closed cell foam affixed with pressure sensitive adhesive and further secured with mechanical fasteners. Thermal rating for this insulation will be -40 degrees Fahrenheit to 300 degrees Fahrenheit. The noise insulation keeps the dBA level within the limits stated in the current edition of applicable NFPA standards.

The engine tunnel will be no higher than 18.00" off the crew cab floor.

INTERIOR CAB INSULATION

The cab will include 1.00" insulation in the ceiling, 1.50" insulation in the side walls, a minimum of 1.00" insulation in the crew cab floor, and 2.00" insulation in the rear wall to maximize acoustic absorption and thermal insulation.

INTERIOR CREW CAB REAR WALL ADJUSTABLE SEATING (PATENT PENDING)

The interior rear wall of the crew cab will have mounting holes every 2.75" to allow for adjustability of the forward facing crew cab seating along the rear wall. Seats will be adjustable with use of simple hand tools allowing departments flexibility of their seating arrangement should their department needs change.

CAB REAR WALL EXTERIOR COVERING

The exterior surface of the rear wall of the cab will be overlaid with brushed stainless steel except for areas that are not typically visible when the cab is lowered.

CAB LIFT

A hydraulic cab lift system will be provided consisting of an electric powered hydraulic pump, dual lift cylinders, and necessary hoses and valves.

Hydraulic pump will have a manual override for backup in the event of electrical failure.

Lift controls will be located in the driver side stepwell.

The cab will be capable of tilting 43 degrees to accommodate engine maintenance and removal.

The cab will be locked down by a 2-point normally closed spring loaded hook type latch that fully engages after the cab has been lowered. The system will be hydraulically actuated to release the normally closed locks when the cab lift control is in the raised position and cab lift system is under pressure. When the cab is completely lowered and system pressure has been relieved, the spring loaded latch mechanisms will return to the normally closed and locked position.

The hydraulic cylinders will be equipped with a velocity fuse that protects the cab from accidentally descending when the control is located in the tilt position.

For increased safety, a redundant mechanical stay arm will be provided that must be manually put in place on the left side between the chassis and cab frame when the cab is in the raised position. This device will be manually stowed to its original position before the cab can be lowered.

Cab Lift Interlock

The cab lift system will be interlocked to the parking brake. The cab tilt mechanism will be active only when the parking brake is set and the ignition switch is in the on position. If the parking brake is released, the cab tilt mechanism will be disabled.

GRILLE

A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, will be provided on the front center of the cab.

MIRRORS

One (1) Ramco, Model 8001-PCHR, polished aluminum mirror will be mounted on each of the side of the cab corners. The mirrors will be 9.25" wide x 13.50" high, with a convex section. The mirror head will have a highly polished aluminum finish.

The flat glass in each mirror will be heated and adjustable, with remote controls that are convenient to the driver.

The convex section in each mirror will be heated and adjustable, with remote controls that are convenient to the driver.

DOORS

To enhance entry and egress to the cab, the forward cab door openings will be a minimum of 37.50" wide x 63.37" high. The crew cab doors will be located on the sides of the cab and will be constructed in the same manner as the forward cab doors. The crew cab door openings will be a minimum of 34.30" wide x 63.37" high.

The forward cab and crew cab doors will be constructed of extruded aluminum with a nominal material thickness of 0.093". The exterior door skins will be constructed from 0.090" aluminum.

A customized, vertical, pull-down type door handle will be provided on the exterior of each cab door. The finish of the door handle will be chrome/black. The exterior handle will be designed specifically for the fire service to prevent accidental activation, and will provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands.

Each door will also be provided with an interior flush, open style paddle handle that will be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles will provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

The cab doors will be provided with both interior (rotary knob) and exterior (keyed) locks exceeding FMVSS standards. The keys will be Model 751. The locks will be capable of activating when the doors are open or closed. The doors will remain locked if locks are activated when the doors are opened, then closed.

A full length, heavy duty, stainless steel, piano-type hinge with a 0.38" pin and 11 gauge leaf will be provided on all cab doors. There will be double automotive-type rubber seals around the perimeter of the door framing and door edges to ensure a weather-tight fit.

A chrome handle will be provided on the inside of each cab door for ease of entry.

A red webbed grab handle will be installed on the crew cab door stop strap. The grab handles will be securely mounted.

The bottom cab step at each cab door location will be located below the cab doors and will be exposed to the exterior of the cab.

Door Panels

The inner cab door panels will be constructed out of brushed stainless steel.

ELECTRIC OPERATED CAB DOOR WINDOWS

All four (4) cab doors will be equipped with electric operated windows with one (1) flush mounted automotive style switch on each door. The driver's door will have four (4) switches, one (1) to control each door window.

Each switch will allow intermittent or auto down operation for ease of use. Auto down operation will be actuated by holding the window down switch for approximately 1 second.

ELECTRIC CAB DOOR LOCKS

The front driver and officer doors will have a door lock master switch that will control all front and rear crew cab door locks. Each rear crew cab door will have its own lock control.

There will be one (1) concealed switch located in an easily accessible chassis specific location that will unlock all the doors.

The lock system will include two (2) key FOBs that allow for keyless entry into the vehicle. The key FOB system will use code hopping technology for high security and be FCC part 15 compliant.

CAB STEPS

The forward cab and crew cab access steps will be a full size two (2) step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps will be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps will be a bolt-in design to minimize repair costs should they need to be

replaced. The forward cab steps will be a minimum 25.00" wide, and the crew cab steps will be 21.65" wide with a 10.00" minimum depth. The inside cab steps will not exceed 16.50" in height.

The vertical surfaces of the step well will be aluminum treadplate.

CAB EXTERIOR HANDRAILS

A Hansen knurled aluminum handrail will be provided adjacent to each cab and crew cab door opening to assist during cab ingress and egress. Each handrail will be provided with red LED lights. The lights will be activated with a separate switch in the cab. The LED lights may be load managed.

STEP LIGHTS

There will be six (6) white LED step lights with chrome housing installed for cab and crew cab access steps.

- One (1) light for the left side cab access steps.
- Two (2) lights for the left side crew cab access steps.
- Two (2) lights for the right side crew cab access steps.
- One (1) light for the right side cab access step.

In order to ensure exceptional illumination, each light will provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The lights will be activated when the battery switch is on and the adjacent door is opened.

FENDER CROWNS

Stainless steel fender crowns will be installed at the cab wheel openings.

CREW CAB WINDOWS

One (1) fixed window with tinted glass will be provided on each side of the cab, to the rear of the front cab door. The windows will be sized to enhance light penetration into the cab interior. The windows will measure 18.70" wide x 23.75" high.

BEHIND RIGHT SIDE CAB DOOR WINDOW TINT

The window behind the right side front cab door will be tinted privacy dark gray.

LEFT SIDE ROLLUP CREW CAB DOOR WINDOW TINT

The rollup window in the left side crew cab door will be tinted privacy dark gray.

RIGHT SIDE ROLLUP CREW CAB DOOR WINDOW TINT

The rollup window in the right side crew cab door will be tinted privacy dark gray.

BEHIND LEFT SIDE CAB DOOR WINDOW TINT

The window behind the left side front cab door will be tinted privacy dark gray.

STORAGE COMPARTMENTS

Provided on each side of the cab, to the rear of the crew cab access doors, will be a storage compartment.

The compartments will be 16.50" wide x 25.50" high x 15.00" deep.

A 8.00" diameter tube will be provided in the compartment located on each side of the cab. Part of the tube will be recessed below the compartment floor. The overall height of the tube will be 5.50" high at the back and 4.00" high at the front of the compartment for ease of removing the extinguisher.

There will be two (2) double pan doors painted to match the cab exterior with a locking D-Ring latch with #751 key, one (1) on each side of the cab. A chain for each exterior door will be used as a doorstop. The clear door opening will be 10.25" wide x 22.50" high.

The compartment interior will be painted spatter gray.

Compartment Lights

There will be two (2) white LED strip lights provided, one (1) each hinged side of compartment door openings.

CAB ROOF COVERING

Horizontal cab roof surfaces will be covered with bright aluminum treadplate. The fastening screws and the perimeter between the roof and the bottom of the aluminum treadplate, no more than 1.00" in from the edge of the aluminum treadplate, will be properly caulked to prevent water from leaking under aluminum. Front and side warning lights will not be mounted on top of treadplate. The treadplate will extend and terminate next to the warning lights.

PIKE POLE MOUNTING

A total of one (1) set(s) of Fire Hooks Unlimited, model Hooks Nest 4 and PAC Handlelok, model 1004, mounting brackets will be provided for the mounting of Fire Hooks Unlimited pike poles. The Hooks Nest 4 head bracket will be used to secure the upper portion of the pike pole in conjunction with the Handlelok to secure the handle of the pike pole. The lower pinned portion of the Nest 4 bracket will be shipped with loose equipment. The brackets will be installed on the passenger side rear of the cab.

PIKE POLE STORAGE

There will be one (1) set(s) of holders for mounting of pike pole(s). The holders will be mounted vertically on the driver side rear of the cab. The head of the pole will be held in place with a Handlelok, part number 1004, adjustable mounting bracket and the base in a cup holder.

WEDGE FOOT REST

A wedge foot rest will be provided in each rear facing seat riser in place of the rear facing heaters. They will be constructed of bright aluminum treadplate. Each foot rest will be removable.

CAB DASH

The driver side dash, switch panel located to the right of the driver, and center console will be constructed of metal and painted black.

The officer side dash will be a flat top design with an upper beveled edge to provide easy maintenance and will be constructed out of aluminum and painted to match the cab interior.

The instrument gauge cluster will be surrounded with a high impact ABS plastic contoured to the same shape of the instrument gauge cluster.

MOUNTING PLATE ON ENGINE TUNNEL

Equipment installation provisions will be installed on the engine tunnel.

A 0.25" smooth aluminum plate will be bolted to the top surface of the engine tunnel. The plate will follow the contour of the engine tunnel and will run the entire length of the engine tunnel. The plate will be spaced off the engine tunnel .50" to allow for wire routing below the plate.

The mounting surface will be painted to match the cab interior.

CAB INTERIOR

The cab interior will be constructed of primarily metal (painted aluminum) to withstand the severe duty cycles of the fire service.

The engine tunnel will be padded and covered, on the top and sides, with dark silver gray 36 ounce leather grain vinyl resistant to oil, grease, and mildew.

To provide a deluxe automotive interior the side walls and rear wall will be covered by a leather grain vinyl that is resistant to oil, grease, and mildew.

The headliner will be installed in both forward and rear cab sections. Headliner material will be vinyl. A sound barrier will be part of its composition. Material will be installed on aluminum sheet and securely fastened to interior cab ceiling.

Forward portion of cab headliner will permit easy access for service of electrical wiring or other maintenance needs.

All wiring will be placed in metal raceways.

CAB INTERIOR UPHOLSTERY

The cab interior upholstery will be 36 oz dark silver gray vinyl.

CAB INTERIOR PAINT

The cab interior metal surfaces, excluding the rear heater panels, will be painted fire smoke gray, vinyl texture paint.

The rear heater panels will be painted black, vinyl textured paint.

CAB FLOOR

The cab and crew cab floor areas will be covered with Polydamp™ acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

The top surface of the material has a series of raised pyramid shapes evenly spaced, which offer a superior grip surface. Additionally, the material has a 0.25" thick closed cell foam (no water absorption) which offers a sound dampening material for reducing sound levels.

DEFROST/AIR CONDITIONING SYSTEM

A ceiling mounted combination heater, defroster and air conditioning system will be installed in the cab above the engine tunnel area.

Cab Defroster

A 54,000 BTU heater-defroster unit with 690 SCFM of air flow will be provided inside the cab. The heater-defrost will be installed in the forward portion of the cab ceiling. Air outlets will be strategically located in the cab header extrusion per the following:

- One (1) adjustable outlet directed towards the left side cab window.
- One (1) adjustable outlet directed towards the right side cab window.
- Six (6) fixed outlets directed at the windshield.

The defroster will be capable of clearing 98 percent of the windshield and side glass when tested under conditions where the cab has been cold soaked at 0 degrees Fahrenheit for 10 hours, and a 2 ounce per square inch layer of frost/ice has been able to build up on the exterior windshield. The defroster system will meet or exceed SAE J382 requirements.

Cab/Crew Auxiliary Heater

There will be no auxiliary heater provided in the rear facing seat risers.

Air Conditioning

A 19.10 cubic inch compressor will be installed on the engine.

A roof-mounted condenser with a 78,000 BTU output at 2,400 SCFM that meets and exceeds the performance specification will be installed on the cab roof. The condenser cover to be painted #10 white.

The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 75 degrees Fahrenheit at 50 percent relative humidity within 30 minutes. The cooling performance test will be run only after the cab has been heat soaked at 100 degrees Fahrenheit for a minimum of 4 hours.

The evaporator unit will be installed in the rear portion of the cab ceiling over the engine tunnel. The evaporator will include one (1) high performance heating core, one (1) high performance cooling core with (1) plenum directed to the front and one (1) plenum directed to the rear of the cab. The rear plenum will be covered with a metal cover painted to match the cab interior.

The evaporator unit will have a 52,000 BTU at 690 SCFM rating that meets and exceeds the performance specifications.

Adjustable air outlets will be strategically located on the forward plenum cover per the following:

- Four (4) outlets directed towards the seating position on the left side of the cab.
- Four (4) outlets directed towards the seating position on the right side of the cab.

Adjustable air outlets will be strategically located on the evaporator cover per the following:

- Minimum of five (5) outlets directed towards crew cab area.

A high efficiency particulate air (HEPA) filter will be included for the system. Access to the filter cover will be secured with four (4) screws.

The air conditioner refrigerant will be R-134A and will be installed by a certified technician.

Climate Control

An automotive style controller will be provided to control the heat and air conditioning system within the cab. The controller will have three (3) functional knobs for fan speed, temperature, and air flow distribution (front to rear) control.

The system will control the temperature of the cab and crew cab automatically by pushing the center of the fan speed control knob. Rotate the center temperature control knob to set the cab and crew cab temperature.

The AC system will be manually activated by pushing the center of the temperature control knob. Pushing the center of the air flow distribution knob will engage the AC for max defrost, setting the fan speeds to 100 percent and directing all air flow to the overhead forward position.

The system controller will be located within panel position #12.

Gravity Drain Tubes

Two (2) condensate drain tubes will be provided for the air conditioning evaporator. The drip pan will have two (2) drain tubes plumbed separately to allow for the condensate to exit the drip pan. No pumps will be provided.

SUN VISORS

There will be two (2) vinyl covered sun visors provided. The sun visors will be located above the windshield with one (1) mounted on each side of the cab.

There will be a black plastic thumb latch provided to help secure each sun visor in the stowed position.

GRAB HANDLES

A black rubber covered grab handle will be mounted on the door post of the driver and officer's side cab door to assist in entering the cab. The grab handles will be securely mounted to the post area between the door and windshield.

ENGINE COMPARTMENT LIGHTS

There will be one (1) Whelen, Model 3SC0CDCR, 12 volt DC, 3.00" white LED light(s) with Whelen, Model 3FLANGEC, chrome flange kit(s) installed under the cab to be used as engine compartment illumination.

These light(s) will be activated automatically when the cab is raised.

ACCESS TO ENGINE DIPSTICKS

For access to the engine oil and transmission fluid dipsticks, there will be a door on the engine tunnel, inside the crew cab. The door will be on the rear wall of the engine tunnel, on the vertical surface.

The engine oil dipstick will allow for checking only. The transmission dipstick will allow for both checking and filling.

The door will have a rubber seal for thermal and acoustic insulation. One (1) Southco C2 black powder coated flush latch will be provided on the access door.

PORTABLE RADIO AND CUP HOLDER STORAGE

There will be four (4) storage box(es) designed to hold a portable radio and cup holder located to be placed at final.

The portable radio bin will be 5.50" wide x 3.50" long x 4.00" deep. The cup holder bin will be 5.50" wide x 5.00" long x 4.00" deep and 3.25" in diameter.

The storage box(es) will be constructed of aluminum and painted to match the cab interior.

CUP HOLDER/STORAGE CONSOLE

There will be one (1) console(s) to be placed at final. Each console will be 20.00" wide x 5.00" deep x 4.00" high.

There will be two (2) cup holders, one on each side. The cup holder bin will be 5.50" wide x 5.00" long x 4.00" deep and 3.25" in diameter. The area will be sealed from the other compartments. An open top tray with a divider will be provided in the space between the cup holders. The divider will split the tray into two (2) equal spaces.

The bin will be constructed of .125" aluminum and will be painted to match the cab interior.

OPEN TOP STORAGE BIN

An open top bin, will be installed to be placed at final. The bin will be 3.00" high x 19.00" wide x 13.00" long. The bin will be constructed of .125" aluminum and will be painted to match the cab interior. 2.00" half moon cutout at the center of the box to allow for easy removal of map books, centered on the 19.00" wide side of the bin.

MAP BOX

A map box with four (4) bins, open from top, will be installed to be mounted at final. The map box will be divided into four (4) bins, each being 12.50" wide x 2.25" high x 12.00" deep. Each bin will slant 30 degrees from horizontal. The map box will be constructed of .125" aluminum and will be painted to match the cab interior.

SEATING CAPACITY

The seating capacity of the vehicle (including tiller cab and belted seat positions in the rescue body) will be four (4).

DRIVER SEAT

A USSC Valor air suspension R-back seat will be provided in the cab for the driver. For increased convenience, the seat will include a manual control to adjust the horizontal position. To provide flexibility for multiple driver configurations, the seat will have a reclining back, adjustable from 15 degrees back to 45 degrees forward.

The seat will be furnished with a 3-point, shoulder type seat belt.

There will be no additional contaminant mitigation vinyl covers shipped loose with the seat.

OFFICER SEAT

A USSC, P1A, air suspension seat will be provided in the cab for the officer. For optimal comfort, the seat will be provided with a 20.00" wide x 18.00" deep cushion. For increased convenience, the seat will include a manual control to adjust the height (3.00" travel) and horizontal position (2.50" travel). The seat will have a reclining, R-back style seat back.

The seat will be furnished with a 3-point, shoulder type seat belt.

There will be no additional contaminant mitigation vinyl covers shipped loose with the seat.

REAR FACING LEFT SIDE CABINET

A rear facing cabinet will be provided in the crew cab at the left side outboard position. The cabinet will be mounted so that the rollup door handle is flush with the edge of the seat riser.

The cabinet will be 23.00" wide x 26.00" high x 24.75" deep with one (1) Gortite rollup door with satin anodized finish, locking with #751 key. The door will be a radius track style. That is, it will travel over the top and down the back of the cabinet. Front top corners of the cabinet will be radiused. This will allow access through the front and top section of the cabinet. A shield will be installed to keep items in this cabinet from falling into the door tracking area and jamming the door. The frame to frame opening will be 20.50" wide x 25.75" high. The minimum clear door opening of the cabinet will be 17.75" wide x 23.25" high.

The cabinet will include one (1) infinitely adjustable shelf with a 0.75" up-turned lippainted to match the cab interior.

The cabinet will include no louvers.

The cabinet will be constructed of smooth aluminum and painted to match the cab interior.

Cabinet Light

There will be one (1) white LED strip light installed on the right side of the interior cabinet door opening. The lights will be controlled by an automatic door switch.

REAR FACING RIGHT SIDE CABINET

A rear facing cabinet will be provided in the crew cab at the right side outboard position. The cabinet will be mounted so that the rollup door handle is flush with the edge of the seat riser.

The cabinet will be 22.00" wide x 26.00" high x 24.75" deep with one (1) Gortite rollup door with satin anodized finish, locking with #751 key. The door will be a radius track style. That is, it will travel over the top and down the back of the cabinet. Front top corners of the cabinet will be radiused. This will allow access through the front and top section of the cabinet. A shield will be installed to keep items in this cabinet from falling into the door tracking area and jamming the door. The frame to frame opening will be 19.50" wide x 25.75" high. The minimum clear door opening of the cabinet will be 16.75" wide x 23.25" high.

The cabinet will include one (1) infinitely adjustable shelf with a 0.75" up-turned lippainted to match the cab interior.

The cabinet will include no louvers.

The cabinet will be constructed of smooth aluminum and painted to match the cab interior.

Cabinet Light

There will be one (1) white LED strip light installed on the left side of the interior cabinet door opening. The lighting will be controlled by an automatic door switch.

FORWARD FACING DRIVER SIDE OUTBOARD SEAT

There will be one (1) forward facing, USSC Valor foldup high back seat provided at the driver side outboard position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep cushion and an adjustable recline back. To ensure safe operation, the seat will be equipped with a sensor in the seat cushion and belt receptacle that will activate an alarm indicating the seat is occupied but not buckled.

The seat will be furnished with a 3-point, shoulder type seat belt.

There will be no additional contaminant mitigation vinyl covers shipped loose with the seat.

FORWARD FACING CENTER CABINET

A forward facing cabinet will be provided in the crew cab at the center position.

The cabinet will be 28.00" wide x 28.00" high x 16.00" deep. The door will be web netting. The netting is to be made with 1.00" wide nylon material with 2.00" openings. The nylon webbing will be permanently fastened at the bottom side of the cabinet and have 1.00" cam buckle fasteners on the opposite side to secure it. The clear door opening will be 25.50" wide x 25.00" high.

The cabinet will include one (1) infinitely adjustable shelf with a 0.75" up-turned lip painted to match the cab interior.

The cabinet will include no louvers.

The cabinet will be constructed of smooth aluminum, and painted to match the cab interior.

Cabinet Light

There will be one (1) white LED strip light installed horizontally above the interior cabinet door opening. The lighting will be controlled by a rocker switch on the front of the cabinet.

FORWARD FACING PASSENGER SIDE OUTBOARD SEAT

There will be one (1) forward facing, USSC, foldup high back seat provided in the passenger side outboard position in the crew cab. The seat back will be a R-back style with an adjustable recline angle. For optimal comfort, the seat will be provided with 17.00" deep cushion. To ensure safe operation, the seat will be equipped with a sensor in the seat cushion and belt receptacle that will activate an alarm indicating the seat is occupied but not buckled.

The seat will be furnished with a 3-point, shoulder type seat belt.

There will be no additional contaminant mitigation vinyl covers shipped loose with the seat.

SEAT UPHOLSTERY

All seat upholstery will be black, sewn with red stitching, ValorTechXD anti-microbial material.

STORAGE COMPARTMENT IN CREW CAB

There will be one (1) compartment(s) to enclose the in the forward facing center forward facing seat riser(s). The enclosure will be made of aluminum and painted to match the cab interior. An aluminum drop down door will be provided on the front of the enclosure to gain access to the compartment. Each door will include flush lift and turn latch.

SEAT BELTS

All cab and tiller cab (if applicable) seating positions will have red seat belts. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length will meet or exceed the current edition of applicable NFPA and CAN/ULC - S515 standards.

The 3-point shoulder type seat belts will include height adjustment. This adjustment will optimize the belts effectiveness and comfort for the seated firefighter. The 3-point shoulder type seat belts will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

The 3-point shoulder type belts will also include the ReadyReach® D-loop assembly to the shoulder belt system. The ReadyReach feature adds an extender arm to the D-loop location placing the D-loop in a closer, easier to reach location.

Any flip up seats will include a 3-point shoulder type belts only.

To ensure safe operation, the seats will be equipped with seat belt sensors in the seat cushion and belt receptacle that will activate an alarm indicating a seat is occupied but not buckled.

HELMET STORAGE PROVIDED BY FIRE DEPARTMENT

NFPA 1900, 2024 edition, section 11.1.8.4.1 and CAN/ULC S515:2024 edition, section 5.2, requires a location for helmet storage be provided.

There is no helmet storage on the apparatus as manufactured. The fire department will provide a location for storage of helmets.

CAB DOME LIGHTS

There will be four (4) dual LED dome lights with black bezels provided. Two (2) lights will be mounted above the inside shoulder of the driver and officer and two (2) lights will be installed and located, one (1) on each side of the crew cab.

The color of the LED's will be red and white.

The white LED's will be controlled by the door switches and the lens switch.

The color LED's will be controlled by the lens switch.

All dome lights on the apparatus will be illuminated per the current edition of applicable NFPA standards per seating position.

ENHANCED SOFTWARE FOR CAB AND CREW CAB DOME LIGHTS

The cab and crew cab dome lights will remain on for 10 seconds for improved visibility after the doors are closed.

The dome lights will dim after 10 seconds or immediately if the vehicle's transmission is put into gear.

PORTABLE HAND LIGHTS PROVIDED BY FIRE DEPARTMENT

The hand lights are not on the apparatus as manufactured. The fire department will provide and mount these hand lights.

CAB INSTRUMENTATION

The cab instrument panel include gauges, an LCD display, telltale indicator lamps, control switches, alarms, and a diagnostic panel. The function of the instrument panel controls and switches will be identified by a label adjacent to each item. Actuation of the headlight switch will illuminate the labels in low light conditions. Telltale indicator lamps will not be illuminated unless necessary. The cab instruments and controls will be conveniently located within the forward cab section, forward of the driver. The gauge assembly and switch panels are designed to be removable for ease of service and low cost of ownership.

Gauges

The gauge panel will include the following ten (10) black faced gauges with black bezels to monitor vehicle performance:

- Voltmeter gauge (volts):
 - Low volts (11.8 VDC)
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
 - High volts (15.5 VDC)
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
 - Very low volts (11.3 VDC)
 - Red warning indicator on the information center with a steady alarm
 - Amber caution light on gauge assembly
 - Very high volts (16.0 VDC)
 - Red warning indicator on the information center with a steady alarm
 - Amber caution light on gauge assembly
- Engine Tachometer (RPM)
- Speedometer MPH (Major Scale), KM/H (Minor Scale)
- Fuel level gauge (Empty - Full in fractions):
 - Low fuel (1/8 full)
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
 - Very low fuel (1/32 full)
 - Red caution indicator on the information center with steady alarm
 - Amber caution light on gauge assembly

- Engine Oil pressure Gauge (PSI):
 - Low oil pressure to activate engine warning lights and alarms
 - Red caution indicator on the information center with steady alarm
 - Amber caution light on gauge assembly
- Front Air Pressure Gauges (PSI):
 - Low air pressure to activate warning lights and alarm
 - Red warning indicator on the information center with a steady alarm
 - Amber caution light on gauge assembly
- Rear Air Pressure Gauges (PSI):
 - Low air pressure to activate warning lights and alarm
 - Red warning indicator on the information center with a steady alarm
 - Amber caution light on gauge assembly
- Transmission Oil Temperature Gauge (Fahrenheit):
 - High transmission oil temperature activates warning lights and alarm
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
- Engine Coolant Temperature Gauge (Fahrenheit):
 - High engine temperature activates an engine warning light and alarms
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
 - Low fluid (1/8 full)
 - Amber indicator light in gauge dial

All gauges will perform prove out at initial power-up to ensure proper performance.

Indicator Lamps

To promote safety, the following telltale indicator lamps will be located on the instrument panel in clear view of the driver. The indicator lamps will be "dead-front" design that is only visible when active. The colored indicator lights will have descriptive text or symbols.

The following amber telltale lamps will be present:

- Low coolant
- Trac cntl (traction control) (where applicable)
- Check engine
- Check trans (check transmission)
- Aux brake overheat (Auxiliary brake overheat)
- Air rest (air restriction)
- Caution (triangle symbol)
- Water in fuel
- DPF (engine diesel particulate filter regeneration)
- Trailer ABS (where applicable)
- Wait to start (where applicable)
- HET (engine high exhaust temperature) (where applicable)

- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- Side roll fault (where applicable)
- Front air bag fault (where applicable)

The following red telltale lamps will be present:

- Warning (stop sign symbol)
- Seat belt
- Parking brake
- Stop engine
- Rack down

The following green telltale lamps will be provided:

- Left turn
- Right turn
- Battery on

The following blue telltale lamp will be provided:

- High beam

Alarms

Audible steady tone warning alarm: A steady audible tone alarm will be provided whenever a warning message is present.

Audible pulsing tone caution alarm: A pulsing audible tone alarm (chime/chirp) will be provided whenever a caution message is present without a warning message being present.

Alarm silence: Any active audible alarm will be able to be silenced by holding the ignition switch at the top position for three (3) to five (5) seconds. For improved safety, silenced audible alarms will intermittently chirp every 30 seconds until the alarm condition no longer exists. The intermittent chirp will act as a reminder to the operator that a caution or warning condition still exists. Any new warning or caution condition will enable the steady or pulsing tones respectively.

Indicator Lamp and Alarm Prove-Out

A system will be provided which automatically tests telltale indicator lights and alarms located on the cab instrument panel. Telltale indicators and alarms will perform prove-out at initial power-up to ensure proper performance.

Control Switches

For ease of use, the following controls will be provided immediately adjacent to the cab instrument panel within easy reach of the driver. All switches will have backlit labels for low light applications.

Headlight/Parking light switch: A three (3)-position maintained rocker switch will be provided. The first switch position will deactivate all parking and headlights. The second switch position will activate the parking lights. The third switch will activate the headlights.

Panel back lighting intensity control switch: A three (3)-position momentary rocker switch will be provided. Pressing the top half of the switch, "Panel Up" increases the panel back lighting intensity and pressing the bottom half of the switch, "Panel Down" decreases the panel back lighting intensity. Pressing the half or bottom half of the switch several times will allow back lighting intensity to be gradually varied from minimum to maximum intensity level for ease of use.

Ignition switch: A three (3)-position maintained/momentary rocker switch will be provided. The first switch position will turn off and deactivate vehicle ignition. The second switch position will activate vehicle ignition and will perform prove-out on the telltale indicators and alarms for 3 to 5 seconds after the switch is turned on. A green indicator lamp is activated with vehicle ignition. The third momentary position will temporarily silence all active cab alarms. An alarm "chirp" may continue as long as alarm condition exists. Switching ignition to off position will terminate the alarm silence feature and reset function of cab alarm system.

Engine start switch: A two (2)-position momentary rocker switch will be provided. The first switch position is the default switch position. The second switch position will activate the vehicle's engine. The switch actuator is designed to prevent accidental activation.

Hazard switch will be provided on the instrument panel or on the steering column.

Heater, defroster, and air conditioning control panel.

Turn signal arm: A self-canceling turn signal with high beam headlight controls will be provided.

Windshield wiper control will have high, low and intermittent modes.

Parking brake control: An air actuated push/pull park brake control valve will be provided.

Chassis horn control: Activation of the chassis horn control will be provided through the center of the steering wheel.

High idle engagement switch: A momentary rocker switch with integral indicator lamp will be provided. The switch will activate and deactivate the high idle function. The "OK To Engage High Idle" indicator lamp must be active for the high idle function to engage. A green indicator lamp integral to the high idle engagement switch will indicate when the high idle function is engaged.

"OK To Engage High Idle" indicator lamp: A green indicator light will be provided next to the high idle activation switch to indicate that the interlocks have been met to allow high idle engagement.

Emergency switching will be controlled by multiple individual warning light switches for various groups or areas of emergency warning lights. An Emergency Master switch provided on the instrument panel that enables or disables all individual warning light switches is included.

An additional "Emergency Master" button will be provided on the lower left hand corner of the gauge panel to allow convenient control of the "Emergency Master" system from inside the driver's door when standing on the ground.

Custom Switch Panels

The design of cab instrumentation will allow for emergency lighting and other switches to be placed within easy reach of the operator thus improving safety. There will be positions for up to four (4) switch panels in the lower instrument console and up to six (6) switch panels in the overhead visor console. All switches have backlit labels for low light conditions.

Diagnostic Panel

A diagnostic panel will be accessible while standing on the ground and located inside the driver's side door left of the steering column. The diagnostic panel will allow diagnostic tools such as computers to connect to various vehicle systems for improved troubleshooting providing a lower cost of ownership. Diagnostic switches will allow ABS systems to provide blink codes should a problem exist.

The diagnostic panel will include the following:

- Engine diagnostic port
- Transmission diagnostic port
- ABS diagnostic port
- Roll sensor diagnostic port
- Command Zone USB diagnostic port
- ABS diagnostic switch (blink codes flashed on ABS telltale indicator)
- Diesel particulate filter regeneration switch (where applicable)
- Diesel particulate filter regeneration inhibit switch (where applicable)

Cab LCD Display

A digital four (4)-row by 20-character dot matrix display will be integral to the gauge panel. The display will be capable of showing simple graphical images as well as text. The display will be split into three (3) sections. Each section will have a dedicated function. The upper left section will display the outside ambient temperature.

The upper right section will display the following, along with other configuration specific information:

- Odometer
- Trip mileage
- PTO hours
- Fuel consumption
- Engine hours

The bottom section will display INFO, CAUTION, and WARNING messages. Text messages will automatically activate to describe the cause of an audible caution or warning alarm. The LCD will be capable of displaying multiple text messages should more than one caution or warning condition exist.

AIR RESTRICTION INDICATOR

A high air restriction warning indicator light LCD message with amber warning indicator and audible alarm will be provided.

"DO NOT MOVE APPARATUS" INDICATOR

A flashing red indicator light, located in the driving compartment, will be illuminated automatically per the current NFPA requirements. The light will be labeled "Do Not Move Apparatus If Light Is On."

The same circuit that activates the Do Not Move Apparatus indicator will activate a pulsing alarm when the parking brake is released.

DO NOT MOVE TRUCK MESSAGES

Messages will be displayed on the Command Zone™, color display located within sight of the driver whenever the Do Not Move Truck light is active. The messages will designate the item or items not in the stowed for vehicle travel position (parking brake disengaged).

The following messages will be displayed (where applicable):

- Do Not Move Truck
- DS Cab Door Open (Driver Side Cab Door Open)
- PS Cab Door Open (Passenger's Side Cab Door Open)
- DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
- PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
- DS Body Door Open (Driver Side Body Door Open)
- PS Body Door Open (Passenger's Side Body Door Open)
- Rear Body Door Open
- DS Ladder Rack Down (Driver Side Ladder Rack Down)
- PS Ladder Rack Down (Passenger Side Ladder Rack Down)
- Deck Gun Not Stowed
- Lt Tower Not Stowed (Light Tower Not Stowed)
- Fold Tank Not Stowed (Fold-A-Tank Not Stowed)
- Aerial Not Stowed (Aerial Device Not Stowed)
- Stabilizer Not Stowed
- Steps Not Stowed
- Handrail Not Stowed

Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause major damage to the apparatus if the apparatus is moved will be displayed as a caution message after the parking brake is disengaged.

SWITCH PANELS

The emergency light switch panel will have a master switch for ease of use plus individual switches for selective control. Each switch panel will contain eight (8) membrane-type switches each rated for one million (1,000,000) cycles. Panels containing less than eight (8) switch assignments will include non-

functioning black appliqués. The built-in switch panels will be located in the lower console or overhead console of the cab.

Additional switch panel(s) will be located in the overhead position(s) above the windshield or in designated locations on the lower instrument panel layout.

The switches will be membrane-type and also act as an integral indicator light. For quick, visual indication the entire surface of the switch will be illuminated white whenever back lighting is activated and illuminated green whenever the switch is active. An active illuminated switch will flash when interlock requirements are not met or device is actively being load managed. For ease of use, a two (2)-ply, scratch resistant laser engraved Gravoply label indicating the use of each switch will be placed in the center of the switch. The label will allow light to pass through the letters for ease of use in low light conditions.

WIPER CONTROL

For simple operation and easy reach, the windshield wiper control will be an integral part of the directional light lever located on the steering column. The wiper control will include high and low wiper speed settings, an intermittent wiper control and windshield washer switch. The control will have a "return to park" provision, which allows the wipers to return to the stored position when not in use.

HOURLMETER - AERIAL DEVICE

An hourmeter for the aerial device will be provided and located within the cab display or instrument panel.

AERIAL MASTER

There will be a master switch for the aerial operating electrical system provided.

AERIAL PTO SWITCH

A PTO switch for the aerial with indicator light will be provided.

SPARE CIRCUIT

There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The wires will have the following features:

- The positive wire will be connected directly to the battery switched power
- The negative wire will be connected to ground
- Wires will be capable of carrying 20 amps
- Power and ground will terminate on the rear wall of the crew cab, centered
- Termination will be with a 10-place bus bar with screws and removable cover
- Wires will be protected to meet the NFPA Automotive Fire Apparatus standard.

The circuit(s) may be load managed when the parking brake is set.

SPARE CIRCUIT

There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The wires will have the following features:

- The positive wire will be connected directly to the head light switch power
- The negative wire will be connected to ground
- Wires will be capable of carrying 15 amps
- Power and ground will terminate under the passenger side rear body bulkhead
- Termination will be with heat shrinkable butt splicing
- Wires will be protected to meet the NFPA Automotive Fire Apparatus standard.

The circuit(s) may be load managed when the parking brake is set.

SPARE CIRCUIT

There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The wires will have the following features:

- The positive wire will be connected directly to the battery power.
- The negative wire will be connected to ground.
- Wires will be capable of carrying 15 amps.
- Power and ground will terminate under each forward facing flip down seat.
- Termination will be with heat shrinkable butt splicing.
- Wires will be protected to meet the NFPA Automotive Fire Apparatus standard.

Battery direct loads cannot be Load Managed.

SPARE CIRCUIT

There will be four (4) pair of wires, including a positive and a negative, installed on the apparatus.

The wires will have the following features:

- The positive wire will be connected directly to the battery switched power.
- The negative wire will be connected to ground.
- Wires will be capable of carrying 15 amps.
- Power and ground will terminate near all outboard forward facing seat positions.
- Termination will be with heat shrinkable butt splicing.
- Wires will be protected to meet the NFPA Automotive Fire Apparatus standard.

The circuit(s) may be load managed when the parking brake is set.

SPARE CIRCUIT

There will be one (1) pair of wires, including a positive and a negative, installed on the apparatus.

The wires will have the following features:

- The positive wire will be connected directly to the battery power
- The negative wire will be connected to ground
- Wires will be capable of carrying 15 amps
- Power and ground will terminate one on each side of the dash
- Termination will be with 15 amp, power point plug with rubber cover

- Wires will be protected to meet the NFPA Automotive Fire Apparatus standard

Battery direct loads cannot be Load Managed

SPARE CIRCUIT

There will be four (4) pair of wires, including a positive and a negative, installed on the apparatus.

The wires will have the following features:

- The positive wire will be connected directly to the battery power.
- The negative wire will be connected to ground.
- Wires will be capable of carrying 6 amps.
- Power and ground will terminate in the cab/crewcab one at each seat position.
- Termination will be a Kussmaul part number 091-264 switch panel dual USB-A, 18 watt and USB-C, 45 watt SVR, charger socket.
- Wires will be protected to meet the NFPA Automotive Fire Apparatus standard.

Battery direct loads cannot be Load Managed

PROGRAMMABLE REMOTE CONTROL

There will be a wired remote control integrated into the switch panel Top left corner of the center switch panel. The remote will have three (3) individually programmable buttons for most garage door openers, and gate operators as well as the capability of controlling many lighting and security systems.

STEREO RADIO

There will be one heavy duty AM/FM / Weatherband / Bluetooth stereo radio. The radio will be installed per instrument panel layout. There will be 5.25" speakers installed one (1) pair of 5.25" speakers in the cab and one (1) pair of 5.25" speakers in the crew cab. The antenna will be a roof-mounted rubber antenna located in an open space, on the cab roof.

The following Jensen features will be included:

- 180 watts max power (45W x 4); 100 watts RMS (25W x 4)
- Bluetooth® streaming audio (A2DP/AVRCP)
- Weatherband
- AM/FM tuner with 30 presets
- Audio settings (volume/bass/treble/balance/fade)
- Toggle switch between day and night display
- Daylight-readable, segmented LCD
- Two-wire power with non-volatile memory and clock support
- Low battery alert

INFORMATION CENTER

An information center employing a 7.00" diagonal touch screen color LCD display will be encased in an ABS plastic housing.

The information center will have the following specifications:

- Operate in temperatures from -40 to 158 degrees Fahrenheit
- LCD optically bonded to hardened AR glass lens
- Five weather resistant user interface switches
- Grey with black accents
- Sunlight Readable
- Linux operating system
- Minimum of 1000nits rated display
- Display can be changed to an available foreign language
- A LCD display integral to the cab gauge panel will be included as outlined in the cab instrumentation area.
- Programmed to read US Customary

General Screen Design

Where possible, background colors will be used to provide "At a Glance" vehicle information. If information provided on a screen is within acceptable limits, a green background will be used.

If a caution or warning situation arises the following will occur:

- An amber background/text color will indicate a caution condition
- A red background/text color will indicate a warning condition
- The information center will utilize an "Alert Center" to display text messages for audible alarm tones. The text messages will be written to identify the item(s) causing the audible alarm to sound. If more than one (1) text message occurs, the messages will cycle every second until the problem(s) have been resolved. The background color for the "Alert Center" will change to indicate the severity of the "warning" message. If a warning and a caution condition occur simultaneously, the red background color will be shown for all alert center messages.
- A label for each button will exist. The label will indicate the function for each active button for each screen. Buttons that are not utilized on specific screens will have a button label with no text or symbol.

Home/Transit Screen

This screen will display the following:

- Vehicle Mitigation (if equipped)
- Water Level (if the water level system includes compatible communications to the information center)
- Foam Level (if the foam level system includes compatible communications to the information center)
- Seat Belt Monitoring Screen
- Tire Pressure Monitoring (if equipped)
- Digital Speedometer
- Active Alarms

On Scene Screen

This screen will display the following and will be auto activated with pump engaged (if equipped):

- Battery Voltage
- Fuel
- Oil Pressure
- Coolant Temperature
- RPM
- Water Level (if equipped)
- Foam Level (if equipped)
- Foam Concentration (if equipped)
- Water Flow Rate (if equipped)
- Water Used (if equipped)
- Active Alarms

Virtual Buttons

There will be four (4) virtual switch panel screens that match the overhead and lower lighting and HVAC switch panels.

Page Screen

The page screen will display the following and allow the user to progress into other screens for further functionality:

- Diagnostics
 - Faults
 - Listed by order of occurrence
 - Allows to sort by system
 - Interlock
 - Throttle Interlocks
 - Pump Interlocks (if equipped)
 - Aerial Interlocks (if equipped)
 - PTO Interlocks (if equipped)
 - Load Manager
 - A list of items to be load managed will be provided. The list will provide a description of the load.
 - The lower the priority numbers the earlier the device will be shed should a low voltage condition occur.
 - The screen will indicate if a load has been shed (disabled) or not shed.
 - "At a glance" color features are utilized on this screen.
 - Systems
 - Command Zone
 - Module type and ID number
 - Module Version
 - Input or output number
 - Circuit number connected to that input or output
 - Status of the input or output
 - Power and Constant Current module diagnostic information

- Foam (if equipped)
 - Pressure Controller (if equipped)
 - Generator Frequency (if equipped)
 - Live Data
 - General Truck Data
- Maintenance
 - Engine oil and filter
 - Transmission oil and filter
 - Pump oil (if equipped)
 - Foam (if equipped)
 - Aerial (if equipped)
- Setup
 - Clock Setup
 - Date & Time
 - 12 or 24 hour format
 - Set time and date
 - Backlight
 - Daytime
 - Night time
 - Sensitivity
 - Unit Selection
 - Home Screen
 - Virtual Button Setup
 - On Scene Screen Setup
 - Configure Video Mode
 - Set Video Contrast
 - Set Video Color
 - Set Video Tint
- Do Not Move
 - The screen will indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices will be indicated
 - Driver Side Cab Door
 - Passenger's Side Cab Door
 - Driver Side Crew Cab Door
 - Passenger's Side Crew Cab Door
 - Driver Side Body Doors
 - Passenger's Side Body Doors
 - Rear Body Door(s)
 - Ladder Rack (if applicable)
 - Deck Gun (if applicable)
 - Light Tower (if applicable)
 - Hatch Door (if applicable)
 - Stabilizers (if applicable)
 - Steps (if applicable)

- Notifications
 - View Active Alarms
 - Shows a list of all active alarms including date and time of the occurrence is shown with each alarm
 - Silence Alarms - All alarms are silenced
- Timer Screen
- HVAC (if equipped)
- Tire Information (if equipped)
- Ascendant Set Up Confirmation (if equipped)

Button functions and button labels may change with each screen.

COLLISION MITIGATION

There will be a HAAS Alert®, Model HA7 Responder-to-Vehicle (R2V) collision avoidance system provided on the apparatus. The HA7 cellular transponder module will be installed behind the cab windshield, as high and near to the center as practical, to allow clear visibility to the sky. The module dimensions are 5.40" long x 2.70" wide x 1.30" high, and operating temperature range is -40 degrees Celsius to 85 degrees Celsius.

The transponder will be connected to the vehicle's emergency master circuit and battery direct power and ground.

While responding with emergency lights on, the HA7 transponder sends alert messages via cellular network to motorists in the vicinity of the responding truck that are equipped with the WAZE app.

While on scene with emergency lights on, the HA7 transponder sends road hazard alerts to motorists in the vicinity of the truck that are equipped with the WAZE app.

The HA7 Responder-to-Vehicle (R2V) collision avoidance system will include the transponder and a 5 year cellular plan subscription.

Activation of the HAAS Alert system requires a representative of the customer to accept the End User License Agreement (EULA) via an on-line portal.

VEHICLE DATA RECORDER

There will be a vehicle data recorder (VDR) capable of reading and storing vehicle information provided.

The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A USB cable can be used to connect the VDR to a laptop to retrieve required information. The program to download the information from the VDR will be available to download on-line.

The vehicle data recorder will be capable of recording the following data via hardwired and/or CAN inputs:

- Vehicle Speed - MPH

- Acceleration - MPH/sec
- Deceleration - MPH/sec
- Engine Speed - RPM
- Engine Throttle Position - % of Full Throttle
- ABS Event - On/Off
- Seat Occupied Status - Yes/No by Position
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Internal clock syncs the time and date when a laptop is connected

Seat Belt Monitoring System

A seat belt monitoring system (SBMS) will be provided on the Command Zone™ color display and in the center overhead of the cab instrument panel. The SBMS will be capable of monitoring up to 10 seating positions indicating the status of each seat position per the following:

- Seat Occupied & Buckled = Green LED indicator illuminated
- Seat Occupied & Unbuckled = Red LED indicator with audible alarm
- No Occupant & Buckled = Red LED indicator with audible alarm
- No Occupant & Unbuckled = No indicator and no alarm
- FAULT = Blue LED indicator illuminated

The seat belt monitoring screen will become active on the Command Zone color display when:

- The home screen is active:
 - and there is any occupant seated but not buckled or any belt buckled with an occupant.
 - and there are no other Do Not Move Apparatus conditions present. As soon as all Do Not Move Apparatus conditions are cleared, the SBMS will be activated.

The SBMS will include an audible alarm that will warn that an unbuckled occupant condition exists and the parking brake is released, or the transmission is not in park.

INTERCOM SYSTEM

There will be digital, triple (3) radio interface, intercom located in location 8 in the cab. The front panel will have master volume, and squelch controls with illuminated indicators, allowing for independent level setting of radio and auxiliary audio devices.

There will be three (3) radio listen only / transmit control with select, monitor, receive, and transmit indicators. There will be three (3) auxiliary audio input with select, and receive indicators.

Headset jacks will be provided for the driver, officer, and two (2) crew, located at both forward facing seats.

The following Firecom components will be provided:

- One (1) 5300D Intercom
- Four (4) HM-10 Interior headset jacks

- All necessary power and station cabling

RADIO / INTERCOM INTERFACE CABLES

The apparatus manufacturer will supply and install three (3) radio interface cables before delivery of the vehicle. The radio equipment to be used by the customer will be:

- Motorola High Power , model number tbd
- Motorola High Power , model number tbd
- Motorola High Power , model number tbd

OVER THE HEAD, RADIO TRANSMIT HEADSET

There will be four (4) over the head, radio transmit headset(s) provided driver's seat, officer seat, driver's side outboard forward facing seat and passenger's side outboard forward facing seat.

Each Firecom, Model FH-51 headset will feature:

- Coiled cord with rugged angled plug
- Noise cancelling electric microphone
- Flex boom rotates for left or right dress
- Adjustable volume control
- ComLeather ear seals with 24dB noise reduction
- Radio Push To Transmit button. Mic is always live for intercom communication

CUSTOMER SUPPLIED REMOTE MICROPHONE

There will be one (1) customer supplied two-way radio microphone sent to the apparatus manufacturers preferred radio installer for installation. No other components will be installed with this option.

Specific shipping requirements will be followed.

TWO WAY RADIO INSTALLATION

There will be two (2) customer supplied two way radio(s) with dual heads sent to the apparatus manufacturers preferred radio installer to be installed pump panel per the shipping document.

The remote radio heads will be located Position 5 and 6.

No antenna mount or whip will be included in this option.

Specific radio shipping requirements will be followed.

COMPLETE MDT INSTALLATION

There will be one (1) customer supplied Mobile Data Terminal (MDT), docking station, mounting bracket, power supply, antenna, GPS, modem, and all cabling sent to the apparatus manufacturers preferred installer to be installed on the officer dash. Specific shipping requirements will be followed.

TWO WAY RADIO SPEAKER INSTALLATION

There will be five (5) customer supplied two way radio speakers sent to the apparatus manufacturers preferred third party installer to be installed 3 in the cab on the drain covers, 2 on the driver side pump panel.

Specific shipping requirements will be followed.

TWO WAY RADIO INSTALLATION

There will be one (1) customer supplied two way radio(s) with a single remote head sent to the apparatus manufacturers preferred radio installer to be installed position 4 per the shipping document.

The remote radio head will be located position 4.

No antenna mount or whip will be included in this option.

Specific shipping requirements will be followed.

RADIO ANTENNA MOUNT

There will be five (5) standard 1.125", 18 thread antenna-mounting base(s) installed on the right side on the cab roof with high efficiency, low loss, coaxial cable(s) routed to the instrument panel area. A weatherproof cap will be installed on the mount.

VEHICLE CAMERA SYSTEM

There will be a color vehicle camera system provided with the following:

- One (1) camera located at the rear of the apparatus, pointing rearward, displayed automatically with the vehicle in reverse
- One (1) camera located on the right side of the apparatus, pointing rearward, displayed automatically with the right side turn signal

The camera images will be displayed on the left side vehicle information center display. Audio from the microphone on the rear camera will be emitted by an amplified speaker with volume control located behind the driver seat.

The following components will be included:

- One (1) SV-CW134639CAI SD Camera
- One (1) CS134404CI Side SD Camera
- All necessary cables

Camera Switcher

A camera switcher is not required.

ELECTRICAL POWER CONTROL SYSTEM

The primary power distribution will be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located

strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be easily accessible.

Distribution centers located throughout the vehicle will contain battery powered studs for supplying customer installed equipment thus providing a lower cost of ownership.

Circuit protection devices, which conform to SAE standards, will be utilized to protect electrical circuits. All circuit protection devices will be rated per NFPA requirements to prevent wire and component damage when subjected to extreme current overload. General protection circuit breakers will be Type-I automatic reset (continuously resetting). When required, automotive type fuses will be utilized to protect electronic equipment. Control relays and solenoid will have a direct current rating of 125 percent of the maximum current for which the circuit is protected per NFPA.

Solid-State Control System

A solid-state electronics based control system will be utilized to achieve advanced operation and control of the vehicle components. A fully computerized vehicle network will consist of electronic modules, electronic control modules to include a see through housing, a power indicator, a status indicator and circuit indicators located near their point of use to reduce harness lengths and improve reliability. The control system will comply with SAE J1939-11 recommended practices.

The control system will operate as a master-slave system whereas the main control module instructs all other system components. The system will contain patented Mission Critical software that maintains critical vehicle operations in the unlikely event of a main controller error. The system will utilize a Real Time Operating System (RTOS) fully compliant with OSEK/VDX™ specifications providing a lower cost of ownership.

For increased reliability and simplified use the control system modules will include the following attributes:

- Green LED indicator light for module power
- Red LED indicator light for network communication stability status
- Control system self test at activation and continually throughout vehicle operation
- No moving parts due to transistor logic
- Software logic control for NFPA mandated safety interlocks and indicators
- Integrated electrical system load management without additional components
- Integrated electrical load sequencing system without additional components
- Customized control software to the vehicle's configuration
- Factory and field programmable to accommodate changes to the vehicle's operating parameters

To assure long life and operation in a broad range of environmental conditions, the solid-state control system modules will meet the following specifications:

- Module circuit board will meet SAE J771 specifications
- Operating temperature from -40 degrees Celsius to +70 degrees Celsius
- Storage temperature from -40 degrees Celsius to +70 degrees Celsius

- Vibration to 50g
- IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary immersion between 15 centimeters and one (1) meter)
- Operating voltage from eight (8) volts to 32 volts DC

The main controller will activate status indicators and audible alarms designed to provide warning of problems before they become critical.

Circuit Protection and Control Diagram

Copies of all job-specific, computer network input and output (I/O) connections will be provided with each chassis. The sheets will indicate the function of each module connection point, circuit protection information (where applicable), wire numbers, wire colors and load management information.

On-Board Electrical System Diagnostics

The on-board information center will include the following diagnostic information:

- Text description of active warning or caution alarms
- Simplified warning indicators
- Amber caution indication with intermittent alarm
- Red warning indication with steady tone alarm

Advanced diagnostic feature will be provided in this control system. From the Command Zone display or connected wireless device, these features allow the user to monitor the real-time status of every input or output on the vehicle. It also allows users logged in as an administrator to force on inputs or outputs to assist the troubleshooting process.

TCU Module with WiFi

An in cab module will provide WiFi wireless interface and data logging capability. The WiFi interface will comply with IEEE 802.11 b/g/n capabilities while communicating at 2.4 Gigahertz. The module will communicate through a black WiFi antenna allowing a line of site communication range of up to 300 feet with a roof mounted antenna.

The module will transmit a password protected web page to a WiFi enabled device (i.e. most smart phones, tablets or laptops) allowing two levels of user interaction. The firefighter level will allow vehicle monitoring of the vehicle and firefighting systems on the apparatus. The technician level will allow diagnostic access to inputs and outputs installed on the Command Zone™, control and information system.

The TCU capability will record faults from the engine, transmission, ABS and Command Zone™, control and information systems as they occur. No other data will be recorded at the time the fault occurs. The data TCU will provide up to 2 Gigabytes of data storage.

The TCU will provide a means to download the TCU information and update software in the device.

Indicator Light and Alarm Prove-Out System

A system will be provided which automatically tests basic indicator lights and alarms located on the cab instrument panel.

Voltage Monitor System

A voltage monitoring system will be provided to indicate the status of the battery system connected to the vehicle's electrical load. The system will provide visual and audible warning when the system voltage is below or above optimum levels.

The alarm will activate if the system falls below 11.8 volts DC for more than two (2) minutes.

Dedicated Radio Equipment Connection Points

There will be three (3) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment. The studs will consist of the following:

- 12-volt 40-amp battery switched power
- 12-volt 60-amp ignition switched power
- 12-volt 60-amp direct battery power

There will also be a 12-volt 100-amp ground stud located in or adjacent to the power distribution center.

EMI/RFI Protection

To prevent erroneous signals from crosstalk contamination and interference, the electrical system will meet, at a minimum, SAE J551/2, thus reducing undesired electromagnetic and radio frequency emissions. An advanced electrical system will be used to ensure radiated and conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.

EMI/RFI susceptibility will be controlled by applying appropriate circuit designs and shielding. The electrical system will be designed for full compatibility with low-level control signals and high-powered two-way radio communication systems. Harness and cable routing will be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

ELECTRICAL SYSTEM PROGNOSTICS

There will be a software based vehicle tool provided to predict remaining life of the vehicles critical fluid and events.

The system will send automatic indications to the Command Zone™ information center and/or wireless enabled devices to proactively alert of upcoming service intervals.

Prognostics will include the following:

- Engine oil and filter
- Transmission oil and filter

ELECTRICAL

All 12-volt electrical equipment installed by the apparatus manufacturer will conform to modern automotive practices. All wiring will be high temperature crosslink type. Wiring will be run, in loom or conduit, where exposed and have grommets where wire passes through sheet metal. Automatic reset circuit breakers will be provided which conform to SAE Standards. Wiring will be color, function and number coded. Function and number codes will be continuously imprinted on all wiring harness conductors at 2.00" intervals. Exterior exposed wire connectors will be positive locking, and environmentally sealed to withstand elements such as temperature extremes, moisture and automotive fluids.

Electrical wiring and equipment will be installed utilizing the following guidelines:

1. All holes made in the roof will be caulked with silicon. Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
2. Any electrical component that is installed in an exposed area will be mounted in a manner that will not allow moisture to accumulate in it. Exposed area will be defined as any location outside of the cab or body.
3. Electrical components designed to be removed for maintenance will not be fastened with nuts and bolts. Metal screws will be used in mounting these devices. Also a coil of wire will be provided behind the appliance to allow them to be pulled away from mounting area for inspection and service work.
4. Corrosion preventative compound will be applied to all terminal plugs located outside of the cab or body. All non-waterproof connections will require this compound in the plug to prevent corrosion and for easy separation (of the plug).
5. All lights that have their sockets in a weather exposed area will have corrosion preventative compound added to the socket terminal area.
6. All electrical terminals in exposed areas will have silicon applied completely over the metal portion of the terminal.

All lights and reflectors, required to comply with Federal Motor Vehicle Safety Standard #108, will be furnished. Rear identification lights will be recessed mounted for protection. Lights and wiring mounted in the rear bulkheads will be protected from damage by installing a false bulkhead inside the rear compartments.

An operational test will be conducted to ensure that any equipment that is permanently attached to the electrical system is properly connected and in working order.

The results of the tests will be recorded and provided to the purchaser at time of delivery.

BATTERY SYSTEM

Six (6) 12 volt, Deka, Model 1231MF, maintenance free group 31 batteries that include the following features, each, will be provided:

- 1000 CCA (cold cranking amps)

- 185 reserve capacity
- High cycle
- Ref. CA of 1190 at 0 degrees Fahrenheit
- 185 reserve capacity
- Threaded studs

BATTERY SYSTEM

There will be a single starting system with an ignition switch and starter button provided and located on the cab instrument panel.

MASTER BATTERY SWITCH

There will be a master battery switch provided within the cab within easy reach of the driver to activate the battery system.

An indicator light will be provided on the instrument panel to notify the driver of the status of the battery system.

BATTERY COMPARTMENTS

Batteries will be placed on non-corrosive mats and be stored in well ventilated compartments located under the cab and bolted directly to the chassis frame. The battery boxes will have reinforced sides. The battery compartments will be constructed of 0.188" steel plate and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The battery hold-downs will be of a non-corrosive material. All bolts and nuts will be stainless steel.

Heavy-duty, 2/0 gauge, color coded battery cables will be provided. Battery terminal connections will be coated with anti-corrosion compound.

Battery solenoid terminal connections will be encapsulated with semi-permanent rubberized compound.

JUMPER STUDS

One (1) set of battery jumper studs with plastic color-coded covers will be included on the battery compartments.

BATTERY CHARGER

There will be an IOTA, Model DLS 75, 75 amp battery charger with IQ4 controller provided.

The battery charger will be wired to the AC shoreline inlet through an AC receptacle adjacent to this battery charger.

The battery charger will be located in the cab behind the driver seat.

REMOTE CONTROL PANEL - BATTERY CHARGER

There will be a Kussmaul™, Model 091-94-12 universal display panel included. It will be wired directly to the chassis batteries.

The battery charger indicator will be located on the driver's seat riser.

AUTO EJECT FOR SHORELINE

There will be one (1) Kussmaul™, Model 091-55-20-120, 20 amp 120 volt AC shoreline inlet(s) provided to operate the dedicated 120 volt AC circuits on the apparatus.

The shoreline inlet(s) will include red weatherproof flip up cover(s).

There will be a release solenoid wired to the vehicle's starter to eject the AC connector when the engine is starting.

The shoreline(s) will be connected to the battery charger.

There will be a mating connector body supplied with the loose equipment.

There will be a label installed near the inlet(s) that state the following:

- Line Voltage
- Current Rating (amps)
- Phase
- Frequency

The shoreline receptacle will be located on the driver side of cab, above wheel.

ALTERNATOR

A Delco Remy®, Model 55SI, alternator will be provided. It will have a rated output current of 430 amps, as measured by SAE method J56. The alternator will feature an integral regulator and rectifier system that has been tested and qualified to an ambient temperature of 257 degrees Fahrenheit (125 degrees Celsius). The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

ELECTRONIC LOAD MANAGER

An electronic load management (ELM) system will be provided that monitors the vehicles 12-volt electrical system, automatically reducing the electrical load in the event of a low voltage condition, and automatically restoring the shed electrical loads when a low voltage condition expires. This ensures the integrity of the electrical system.

For improved reliability and ease of use, the load manager system will be an integral part of the vehicle's solid state control system requiring no additional components to perform load management tasks. Load management systems which require additional components will not be allowed.

The system will include the following features:

- System voltage monitoring.
- A shed load will remain inactive for a minimum of five minutes to prevent the load from cycling on and off.
- Sixteen available electronic load shedding levels.
- Priority levels can be set for individual outputs.
- High Idle to activate before any electric loads are shed and deactivate with the service brake.

- If enabled:
 - "Load Man Hi-Idle On" will display on the information center.
 - Hi-Idle will not activate until 30 seconds after engine start up.
- Individual switch "on" indicator to flash when the particular load has been shed.
- The information center indicates system voltage.

The information center, where applicable, includes a "Load Manager" screen indicating the following:

- Load managed items list, with priority levels and item condition.
- Individual load managed item condition:
 - ON = not shed
 - SHED = shed

SEQUENCER

A sequencer will be provided that automatically activates and deactivates vehicle loads in a preset sequence thereby protecting the alternator from power surges. This sequencer operation will allow a gradual increase or decrease in alternator output, rather than loading or dumping the entire 12 volt load to prolong the life of the alternator.

For improved reliability and ease of use, the load sequencing system will be an integral part of the vehicle's solid state control system requiring no additional components to perform load sequencing tasks. Load sequencing systems which require additional components will not be allowed.

Emergency light sequencing will operate in conjunction with the emergency master light switch. When the emergency master switch is activated, the emergency lights will be activated one by one at half-second intervals. Sequenced emergency light switch indicators will flash while waiting for activation.

When the emergency master switch is deactivated, the sequencer will deactivate the warning light loads in the reverse order.

Sequencing of the following items will also occur, in conjunction with the ignition switch, at half-second intervals:

- Cab Heater and Air Conditioning
- Crew Cab Heater (if applicable)
- Crew Cab Air Conditioning (if applicable)
- Exhaust Fans (if applicable)
- Third Evaporator (if applicable)

HEADLIGHTS

There will be four (4) JW Speaker®, Model 8800, 4" x 6" rectangular LED lights mounted in the front quad style, chrome housing on each side of the cab grille:

- the outside light on each side will contain a part number 055***1 low beam module
- the inside light on each side will contain a part number 055***1 high beam module
- the headlights to include chrome bezels

The low beam lights will be activated when the headlight switch is on.

The high beam and low beam lights will be activated when the headlight switch and the high beam switch is activated.

DIRECTIONAL LIGHTS

There will be two (2) Whelen 600 series, LED combination directional/marker lights provided. The lights will be located on the outside cab corners, next to the headlights.

The color of the lenses will be clear.

INTERMEDIATE LIGHT

There will be two (2) Truck-Lite®, part number 30375Y, 2.24" diameter lights with amber LEDs, grommet mount and chrome cover furnished, one (1) each side in the rear fender panel. The light will double as a turn signal and marker light.

CAB CLEARANCE/MARKER/ID LIGHTS

There will be two (2) amber LED lights provided to indicate the presence and overall length of the vehicle in the following locations:

- Two (2) lights with amber LEDs as front side clearance lights will be installed, one (1) on each side above the cab doors.

All other forward facing clearance lights will be included with the visor scene light.

FRONT CAB SIDE DIRECTIONAL/MARKER LIGHTS

There will be two (2) Truck-Lite®, Model 19036Y, amber LED lights installed to the outside of the chrome wrap around bezel, one (1) on each side of the cab.

The lights will activate as marker lights with the headlight switch and directional lights with the corresponding directional circuit.

REAR CLEARANCE/MARKER/ID LIGHTING

There will be three (3) Truck-Lite®, Model 33050R, LED lights used as identification lights recessed and located at the rear of the apparatus per the following:

- As close as practical to the vertical centerline
- Centers spaced not less than 6.00" or more than 12.00" apart
- Red in color
- All at the same height

There will be two (2) Truck-Lite, Model 33050R, LED lights recessed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

- To indicate the overall width of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color

- To be visible from the rear
- All at the same height

There will be two (2) Truck-Lite, Model 33050R, LED lights recessed on the side of the apparatus as marker lights as close to the rear as practical per the following:

- To indicate the overall length of the vehicle
- One (1) each side of the vertical centerline
- As near the top as practical
- Red in color
- To be visible from the side
- All at the same height

There will be two (2) red reflectors located on the rear of the truck facing to the rear. One (1) each side, as far to the outside as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

There will be two (2) red reflectors located on the side of the truck facing to the side. One (1) each side, as far to the rear as practical, at a minimum of 15.00", but no more than 60.00", above the ground.

Per FMVSS 108 and CMVSS 108 requirements.

MARKER LIGHTS

There will be one (1) pair of amber and red LED marker lights with rubber arm, located at the rear most lower corner of the body. The amber lens will face the front and the red lens will face the rear of the truck.

These lights will be activated with the running lights of the vehicle.

REAR FMVSS LIGHTING

The rear stop/tail and directional lighting included in the rear tail light housing will include the following:

- Two (2) Whelen®, Model M62BTT, 4.30" high x 6.70" wide x 1.40" deep brake/tail lights with red LEDs
- Two (2) Whelen, Model M62T, 4.30" high x 6.70" wide x 1.40" deep directional lights with amber LEDs. The directional lights will be set to Steady On (Arrow) flash pattern.
- The lens color(s) to be clear.

There will be two (2) Whelen Model M62BU, LED backup lights provided in the tail light housing.

LICENSE PLATE BRACKET

One (1) license plate bracket constructed of stainless steel will be provided at the rear of the apparatus.

One (1) white LED light with chrome housing will be provided to illuminate the license plate. A stainless steel light shield will be provided over the light that will direct illumination downward, preventing white light to the rear.

LIGHTING BEZEL

There will be two (2) Whelen, Model M6FCV4P, four (4) place chromed ABS housings with Pierce logos provided for the rear M6 series stop/tail, directional, back up, scene lights or warning lights.

BACK-UP ALARM

A PRECO, Model 1040, solid-state electronic audible back-up alarm that actuates when the truck is shifted into reverse will be provided. The device will sound at 60 pulses per minute and automatically adjust its volume to maintain a minimum ten (10) dBA above surrounding environmental noise levels.

SWITCH, BACK-UP ALARM OVERRIDE

There will be a momentary switch provided in the cab for the back-up alarm. The switch will be within reach of the driver. The switch will cancel the back-up alarm when the switch is pushed and automatically reset when the apparatus is shifted out of reverse.

CORNERING/SCENE LIGHTS

There will be two (2) Whelen®, Model PEL*C, 79.6 candle power 2.18" high x 8.00" long x 1.50" deep 12 volt DC LED lights with 45 degree chrome trim provided one each side above the rear axle.

The lights will be wired so they activate and cancel when the battery switch is on, the headlight switch is on and with the directional light activation.

CAB PERIMETER SCENE LIGHTS

There will be four (4) Amdor, Model AY-LB-12HW012, 190 lumens each, 12.00" white LED strip lights provided.

- One (1) under the driver's side cab access step.
- One (1) under the passenger's side cab access step.
- One (1) under the passenger's side crew cab access step.
- One (1) under the driver's side crew cab access step.

The lights will be activated when the battery switch is on and the respective door is open and whenever control has been selected for the body perimeter lights.

PUMP HOUSE PERIMETER LIGHTS

There will be one (1) Amdor, Model AY-LB-12HW020, 350 lumens, 20.00" LED weatherproof strip light with bracket provided under the passenger's side pump panel running board.

If the combination of options in the vehicle does not permit clearance for a 20.00" light, a 12.00" version of the Amdor light will be installed.

The light will be activated when the battery switch is on, and controlled by the same means as the body perimeter lights.

BODY PERIMETER SCENE LIGHTS

There will be two (2) Amdor, Model AY-LB-12HW020, 350 lumens, 20.00" long, white LED's, 12 volt DC lights provided at the rear step area of the body, one (1) each side shining to the rear.

The perimeter scene lights will be activated when a switch within reach of the driver is activated and the parking brake is applied.

ENHANCED SOFTWARE FOR PERIMETER LIGHTS

All perimeter lights will be deactivated when the parking brake is released unless alternate control is selected.

The cab and crew cab perimeter lights will remain on for ten (10) seconds for improved visibility after the doors closed.

STEP LIGHTS

Two (2) white LED step lights will be provided on the aerial body.

The step lights will be actuated by the aerial master switch in the cab.

All steps on the apparatus will be illuminated per the current edition of applicable NFPA standards.

12 VOLT LIGHTING

There will be a HiViz Model FT-B-72-ML-*, 2.56" high x 75.00" long x 2.45" deep 21,407 effective lumens 12 volt DC light with vertical surface brackets on the front vertical face of the cab roof per the following:

- 54 white scene LEDs configured in spot and flood optics
- three (3) amber LED identification lights
- two (2) amber LED clearance lights

The painted parts of the light housing and brackets to be white.

The light will be activated by a switch at the driver's side switch panel and by a switch at the left side pump panel.

The identification and clearance lights will be activated with the headlight switch.

The scene LEDs may be load managed when the parking brake is applied.

12 VOLT DC SCENE LIGHTS

There will be one (1) Whelen® Model P*H2*, 17,750 lumens 12 volt DC powered lights with white LEDs and a combination of flood and spot optics installed on the apparatus located, over the passenger side crew cab door.

The light(s) to be installed on adjustable bail bracket(s).

The painted parts of this light assembly to be white.

The lights will be activated by a switch at the driver's side switch panel and by a switch at the right side pump panel.

The light(s) may be load managed when the parking brake is applied.

12 VOLT DC SCENE LIGHTS

There will be one (1) Whelen® Model P*H2*, 17,750 lumens 12 volt DC powered lights with white LEDs and a combination of flood and spot optics installed on the apparatus located, over the driver side crew cab door.

The light(s) to be installed on adjustable bail bracket(s).

The painted parts of this light assembly to be white.

The lights will be activated by a switch at the driver's side switch panel and by a switch at the left side pump panel.

The light(s) may be load managed when the parking brake is applied.

12 VOLT LIGHTING

There will one (1) HiViz Model FT-MB-33-*-* , 12,196.8 effective lumens 2.06" high x 42.44" long x 2.45" deep 12 volt DC light(s) with white LEDs and a combination of flood and spot optics provided on the apparatus body located, centered on the driver side body.

The painted parts of the light housing and brackets to be white.

The light(s) will be controlled by a switch at the driver's side switch panel and by a switch at the left side pump panel.

The light(s) may be load managed when the parking brake is applied.

12 VOLT LIGHTING

There will one (1) HiViz Model FT-MB-33-*-* , 12,196.8 effective lumens 2.06" high x 42.44" long x 2.45" deep 12 volt DC light(s) with white LEDs and a combination of flood and spot optics provided on the apparatus body located, centered on the Ps body.

The painted parts of the light housing and brackets to be white.

The light(s) will be controlled by a switch at the driver's side switch panel and by a switch at the right side pump panel.

The light(s) may be load managed when the parking brake is applied.

12 VOLT LIGHTING

There will be two (2) Whelen® Model MP** 12 volt DC light(s) with white LEDs installed on the apparatus body located, one each side of the rear body.

The painted parts of this light assembly to be white.

The light(s) to be installed on adjustable bail bracket(s).

The lights will be controlled by a switch at the driver's side switch panel and by a switch in a stainless steel cup located on the driver's side at the rear of the apparatus no more than 72.00" from the ground.

The light(s) may be load managed when the parking brake is applied.

WALKING SURFACE LIGHT

There will be Model FRP, 4.00" round black 12 volt DC LED floodlight(s) with bolt mount provided to illuminate the entire designated walking surface on top of the body.

The light(s) will be activated when the body step lights are on.

WATER TANK

It will have a capacity of 300 gallons and will be constructed of polypropylene plastic in a rectangular shape. The joints and seams will be nitrogen welded inside and out. The tank will be baffled in accordance with the current edition of applicable NFPA standards. The baffles will have vent openings at both the top and bottom of each baffle to permit movement of air and water between compartments. The longitudinal partitions will be constructed of .38" polypropylene plastic and extend from the bottom of the tank through the top cover to allow positive welding. The transverse partitions extend from 4" off the bottom to the underside of the top cover. All partitions interlock and will be welded to the tank bottom and sides. The tank top will be constructed of .50" polypropylene. It will be recessed .38" and will be welded to the tank sides and the longitudinal partitions. It will be supported to keep it rigid during fast filling conditions. Construction will include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two of the dowels will be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes. A sump will be provided at the bottom of the water tank. The sump will include a drain plug and the tank outlet. Tank will be installed in a fabricated "cradle" assembly constructed of aluminum. Sufficient crossmembers are provided to properly support bottom of tank. Crossmembers are constructed of aluminum channel. Tank "floats" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50 x 3.00", are placed on all horizontal surfaces that the tank rests on. Stops are provided to prevent an empty tank from bouncing excessively while moving vehicle. Tank mounting system is approved by the manufacturer.

Fill tower will be constructed of 0.50" polypropylene and will be a minimum of 8.00" wide x 14.00" long.

Fill tower will be furnished with a 0.25" thick polypropylene screen and a hinged cover.

An overflow pipe, constructed of 4.00" schedule 40 polypropylene, will be installed approximately halfway down the fill tower and extend through the water tank and exit to the rear of the rear axle.

HOSE BED

The hose bed will be fabricated of .125" 5052-H32 aluminum with a tensile strength range of 31,000 to 38,000 psi. The sides of the hose bed will not form any portion of the fender compartments. The upper and rear edges of the hose bed side panels will have a double break for rigidity. The hose bed will be located ahead of the ladder turntable.

There will be two (2) hose chutes to the rear of the hose bed on the left and right sides to allow for payout/removal of the hose.

The hose bed flooring will consist of removable aluminum grating with a top surface that is perforated to aid in hose aeration.

The hose bed/cargo area walls will be unpainted and dual action finished.

Hose capacity will be a minimum of 850' of 4", 650' of 2.5".

AERIAL HOSE BED HOSE RESTRAINT

The hose in the hose beds will be restrained by black nylon Velcro® straps at the top of the hose bed and 1.00" black nylon web design with a 2.00" box pattern at the rear of the hose beds. The Velcro strap will be installed to the top of the hose bed side sheets. The rear webbing will have 1.00" web straps that loop through footman loops and fasten with spring clip and hook fasteners.

RUNNING BOARDS

The running boards will be fabricated of 0.125" bright aluminum treadplate and supported by structural steel angle assemblies bolted to the chassis frame rails.

Running boards will be 13.00" deep and are spaced away from the body 0.50".

A splash guard will be provided to keep road dirt or water from splashing up onto the pump panels.

The running boards will have a riser on the body to protect the painted surface from damage by stepping on the running boards.

The entire surface of the running boards will be covered with bright aluminum treadplate.

TURNTABLE STEPS

Access to the turntable will be provided by a set of steps.

The access steps will be located at the center rear of the unit.

All steps will have a height no greater than 17.00" from top surface to top surface.

The steps will be constructed of bright aluminum treadplate with Morton Cass inserts.

The bottom step will be a camper style pull out and have a step height not exceeding 24.00" from the ground to the top surface of the step at any time.

Handrails will be provided for the access steps.

The step in front of the rear compartment will swing up for access to the compartment and be able to be locked in an up or down position. This step will be connected to the "Do Not Move Truck" indicator.

STEP LIGHTS

There will be seven (7) white P25 LED step lights with chrome housing provided for the aerial turntable access steps. One (1) light will be provided on either side of the steps leading to the aerial turntable, and one (1) light will be provided for the top flip up step.

In order to ensure exceptional illumination, each light will provide a minimum of 25 foot-candles (fc) covering an entire 15" x 15" square placed ten (10) inches below the light and a minimum of 1.5 fc covering an entire 30" x 30" square at the same ten (10) inch distance below the light.

The step lights will be activated when the parking brake is applied.

75' HAL QUINT REAR WALL - BODY MATERIAL

The rear wall will be smooth and the same material as the body. The center section as well as any inboard facing surfaces of the rear wall will be aluminum treadplate.

TOW EYES

Two (2) rear painted tow eyes will be located at the rear of the apparatus and will be mounted directly to the frame rails. The inner and outer edges of the tow eyes will be radiused. Each tow eye will be rated for 9000lb. The tow eyes will be painted to match the lower job color.

HOSE TRAY

One (1) hose tray will be recessed one (1) in each side running board.

Capacity of the tray will be 1 roll of 50' of 4", 1 roll of 25', make tray as large as possible.

Rubber matting will be installed on the floor of the tray to provide proper ventilation. Drain holes will be provided.

EXTINGUISHER BIN IN HOSE TRAY

There will be a quantity of two (2) circular recessed extinguisher bin(s) provided in the passenger side running board in the running board(s). A piece of aluminum treadplate will be formed in a "L" shape. It will be inverted with a circle cut in the top to fit over the circular bin and the long side will serve as a partition in the hose tray.

The bin(s) will be 9.00" in interior diameter and as deep as the tray allows. Footman loops and Velcro® straps will be provided for each bin to restrain the extinguisher.

COMPARTMENTATION

Compartmentation will be fabricated of .125" 5052 aluminum.

Side compartments will be an integral assembly with the rear fenders.

Circular fender liners will be provided. For prevention of rust pockets and ease of maintenance, the fender liners will be formed from aluminum and removable for maintenance.

Compartment flooring will be of the sweep out design with the floor higher than the compartment door lip.

Drip protection will be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.

The top of the compartment will be covered with bright aluminum treadplate rolled over the edges on the front, rear and outward side. These covers will have the corners welded.

Side compartment covers will be separate from the compartment tops.

All screws and bolts, which are not Grade 8, will be stainless steel and where they protrude into a compartment will have acorn nuts on the ends to prevent injury.

UNDERBODY SUPPORT SYSTEM

Due to the severe loading requirements of this aerial, a method of body and compartment support suitable for the intended load will be provided.

The backbone of the body support system will begin with the chassis frame rails, which is the strongest component of the chassis and is designed for sustaining maximum loads. The support system will include lateral frame rail extensions that are formed from .25" 80k steel and bolted to the chassis frame rails with .625" diameter Grade 8 bolts. The vertical and horizontal members of the frame rail extensions are to be reinforced with welded gussets and extend to the outside edge of the body.

An aluminum body structure will be mounted on the top of these supports to create a floating substructure which will result in an 800 lb equipment support rating per lower compartment and provide up to .31" accumulative floor thickness.

The floating substructure will be separated from the lateral frame extensions with neoprene elastomer isolators. These isolators will reduce the natural flex stress of the chassis from being transmitted to the body.

The isolators will have a broad load range, proven viability in vehicular applications, be of a fail-safe design and allow for all necessary movement in three (3) transitional and rotational modes.

AGGRESSIVE WALKING SURFACE

All exterior surfaces designated as stepping, standing, and walking areas will comply with the required average slip resistance of the current NFPA standards.

LOUVERS

All body compartments will be vented to provide one (1) way airflow out of the compartment that prevents water and dirt from gaining access to the compartment.

TESTING OF BODY DESIGN

Body structural analysis will be fully tested. Proven engineering and test techniques such as finite element analysis, model analysis, and strain gauging have been performed with special attention given to fatigue, life and structural integrity of the body and substructure.

The body will be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure will include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.
- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.
- Driving the vehicle on at 35 mph on a washboard road.
- Driving the vehicle at 55 mph on a smooth road.
- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

LEFT SIDE COMPARTMENTATION

The full height roll-up compartment ahead of the rear wheels will be approximately 61.50" wide x 64.00" high x 26.00" deep inside the lower 24.50" and 12.00" deep inside the upper portion with a clear door opening of approximately 58.75" wide x 57.00" high. A drip pan below the roll of the door will be provided.

There will be two (2) lift-up door compartments above the wheelwell and stabilizer. Each compartment will be approximately 40.50" wide x 25.25" high x 12.00" deep inside with a clear door opening of approximately 38.00" wide x 22.25" high. There will be no partition between these compartments.

The full height roll-up door compartment behind the stabilizer will be approximately 47.00" wide x 57.00" high x 26.00" deep inside the lower 25.50" and 12.00" deep in the upper portion with a clear door opening of approximately 44.25" wide x 52.00" high.

The compartment will include a drip pan below the roll of the door.

RIGHT SIDE COMPARTMENTATION

The full height roll-up compartment, ahead of the rear wheels will be approximately 61.50" wide x 64.00" high x 26.00" deep inside the lower 25.50" and 12.00" deep inside the upper portion with a clear door opening of approximately 58.75" wide x 57.00" high. A drip pan below the roll of the door will be provided.

There will be two (2) lift-up door compartments above the wheelwell and stabilizer. Each compartment will be approximately 40.50" wide x 25.25" high x 12.00" deep inside with a clear door opening of approximately 38.00" wide x 22.25" high. There will be no partition between these compartments.

The full height roll-up door compartment behind the stabilizer will be 47.00" wide x 57.00" high x 26.00" deep inside the lower 25.50" and 12.00" deep in the upper portion with a clear door opening of 44.25" wide x 50.00" high.

The compartment will include a drip pan below the roll of the door.

REAR COMPARTMENT

A compartment will be provided at the rear of the unit.

Compartment will be 30.00" wide x 26.75" high x 14.00" deep with a clear door opening of 24.00" wide x 25.75" high.

The compartment will be furnished with a satin finish roll-up door.

SIDE COMPARTMENT DOORS

All hinged compartment doors will be lap style with double panel construction and fabricated of .09" 5052H32 aluminum. Doors will be a minimum of 1.50" thick. To provide additional door strength, a C section reinforcement will be installed between the outer and interior panels.

Doors will be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy-duty automotive rubber molding with a hollow core will be installed on the door framing that seals onto the interior panel, to ensure a weather resisting compartment.

All lap compartment doors will have polished stainless steel continuous hinge with a pin diameter of .25", that is bolted or screwed on with stainless steel fasteners. A dielectric substance will be applied to each hinge fastener.

All door lock mechanisms will be fully enclosed within the door panels to prevent fouling of the lock in the event equipment inside shifts into the lock area.

Doors will be latched with recessed, polished stainless steel D ring handles and Eberhard 106 locks.

To prevent corrosion caused by dissimilar metals, compartment door handles will not be attached to outer door panel with screws. A rubber gasket will be provided between the D ring handle and the door.

ROLL-UP DOOR(S)

The four (4) compartment doors will be painted one (1) color to match the lower portion of the body double faced, aluminum construction and manufactured by Gortite.

Lath sections will be a driven ball and socket design and individually replaceable without complete disassembly of door.

Between each slat at the pivoting joint will be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments. Seals will allow door to operate in extreme temperatures ranging from plus 180 to minus 40 degrees Fahrenheit. Side, top and bottom seals will be provided to resist ingress of dirt and weather and be made of Santoprene.

All hinges, barrel clips and end pieces will be nylon 66. All nylon components will withstand temperatures from plus 300 to minus 40 degrees Fahrenheit.

A polished stainless steel lift bar with locking key latches to be provided for each roll-up door. The keys to be Model 751 to match all compartment and cab doors. Lift bar will be located at the bottom of door and have latches on the outer extrusion of the doors frame. A ledge will be supplied over lift bar for additional area to aid in closing the door.

Doors will be constructed from an aluminum box section. The exterior surface of each slat will be flat. The interior surfaces will be concave to provide strength and prevent loose equipment from jamming the door from inside.

To conserve space in the compartments, the spring roller assembly will not exceed 3.00" in diameter.

The header for the roll-up door assembly will not exceed 4.00".

A heavy-duty magnetic switch will be used for control of open compartment door warning lights.

REAR BUMPER

A 4.50" stainless steel split rear bumper will be furnished. Bumper will be highly polished, have radiused ends and reinforcing ribs top and bottom. A 4.00" formed steel channel will be mounted directly behind the bumper for additional strength. The bumper will be a two piece design to allow for turntable access.

COMPARTMENT LIGHTING

There will be nine (9) compartment(s) with two (2) white 12 volt DC LED compartment light strips. The dual light strips will be centered vertically along each side of the door framing. There will be two (2) light strips per compartment. The dual light strips will be in all body compartment(s).

Any remaining compartments without light strips will have a 6.00" diameter Truck-Lite, Model: 79384 light. Each light will have a number 1076 one filament, two wire bulb.

Opening the compartment door will automatically turn the compartment lighting on.

MOUNTING TRACKS

There will be recessed tracks installed vertically to support the adjustable shelf(s).

Tracks will not protrude into any compartment in order to provide the greatest compartment space and widest shelves possible.

The tracks will be provided in each compartment except for the one that contains the pump operator's panel.

ADJUSTABLE SHELVES

There will be ten (10) shelves with a capacity of 500 lb provided.

The shelf construction will consist of .188" aluminum painted spatter gray with 2.00" sides.

Each shelf will be infinitely adjustable by means of a threaded fastener, which slides in a track.

The shelves will be held in place by .12" thick stamped plated brackets and bolts.

The location(s) will be determined at a later date.

SLIDE-OUT FLOOR MOUNTED TRAY

There will be four (4) floor mounted slide-out tray(s) provided.

Each tray will have 2.00" high sides and a minimum capacity rating of 500 lb in the extended position.

Each tray will be constructed of aluminum painted spatter gray

There will be two undermount-roller bearing type slides rated at 250lb each provided. The pair of slides will have a safety factor rating of 2.

To ensure years of dependable service, the slides will be coated with a finish that is tested to withstand a minimum of 1,000 hours of salt spray per ASTM B117.

To ensure years of easy operation, the slides will require no more than a 50lb force for push-in or pull-out movement when fully loaded after having been subjected to a 40 hour vibration (shaker) test under full load. The vibration drive file will have been generated from accelerometer data collected from a heavy truck chassis driven over rough gravel roads in an unloaded condition. Proof of compliance will be provided upon request.

Automatic locks will be provided for both the "in" and "out" positions. The trip mechanism for the locks will be located at the front of the tray for ease of use with a gloved hand.

The location(s) will be RS1, RS4, LS1 and LS4.

DRAWER ASSEMBLY

There will be a total of one (1) six (6) drawer cabinet(s) provided. The cabinet(s) will be installed in the RS1 compartment.

All drawers in the cabinet will be the same width and depth. The drawers in this cabinet will be 21.00" deep and will be as wide as possible up to a maximum of 24.00" wide. A full-width aluminum extruded rail will be provided at the top edge of each drawer. This rail will act as the latching mechanism as well as the handle for each drawer.

The height of each drawer, starting with the first drawer at the top of the cabinet will be:

- The first drawer will have a clear height of 3.00" with a face plate that is 4.00".
- The second drawer will have a clear height of 4.75" with a face plate that is 5.00".
- The third drawer will have a clear height of 3.75" with a face plate that is 4.00".
- The fourth drawer will have a clear height of 3.75" with a face plate that is 4.00".
- The fifth drawer will have a clear height of 3.75" with a face plate that is 4.00".
- The sixth drawer will have a clear height of 5.75" with a face plate that is 6.00".

Each drawer will have a maximum capacity of 250 lb.

The drawers will be mounted in a cabinet housing constructed of light gray powder coated aluminum with anodized aluminum frames. The housing will be 24.00" deep, and will completely enclose all of the drawers.

CTECH DRAWER LOCK

There shall be a total of six (6) locking drawer(s) in the CTECH cabinet located in compartment all drawers. The drawers that shall be locking are as follows: all drawers.

DRAWER ASSEMBLY

There will be a total of one (1) six (6) drawer cabinet(s) provided. The cabinet(s) will be installed in the LS4 compartment.

All drawers in the cabinet will be the same width and depth. The drawers in this cabinet will be 21.00" deep and will be as wide as possible up to a maximum of 36.00" wide. A full-width aluminum extruded rail will be provided at the top edge of each drawer. This rail will act as the latching mechanism as well as the handle for each drawer.

The height of each drawer, starting with the first drawer at the top of the cabinet will be:

- The first drawer will have a clear height of 2.00" with a face plate that is 3.00".
- The second drawer will have a clear height of 2.75" with a face plate that is 3.00".
- The third drawer will have a clear height of 2.75" with a face plate that is 3.00".

- The fourth drawer will have a clear height of 2.75" with a face plate that is 3.00".
- The fifth drawer will have a clear height of 4.75" with a face plate that is 5.00".
- The sixth drawer will have a clear height of 4.75" with a face plate that is 5.00".

Each drawer will have a maximum capacity of 250 lb.

The drawers will be mounted in a cabinet housing constructed of light gray powder coated aluminum with anodized aluminum frames. The housing will be 24.00" deep, and will completely enclose all of the drawers.

SWING OUT TOOLBOARD

A swing out aluminum toolboard will be provided.

It will be a minimum of .188" thick with a 1.00" x 1.00" aluminum tube frame welded around the edge.

The board will be mounted on a pivoting device at the front of the compartment on the top and bottom to allow easy movement in and out of the compartment. The maximum tool load will be 400 pounds.

The board will have positive lock in the stowed and extended position.

The board will have a D - ring handle to secure it in the stowed position.

The board will be mounted on adjustable tracks from front to back within the compartment.

There will be Two (2) toolboard(s) provided. The toolboard(s) will be spatter gray painted and installed tbd.

RUB RAIL

Bottom edge of the side compartments will be trimmed with a bright aluminum extruded rub rail.

Trim will be 3.12" high with 1.50" flanges turned outward for rigidity.

The rub rails will not be an integral part of the body construction, which allows replacement in the event of damage.

BODY FENDER CROWNS

Polished stainless steel fender crowns will be provided around the rear wheel openings.

An unpainted fender liner will be provided to avoid paint chipping. The liners will be removable to aid in the maintenance of rear suspension components.

A dielectric barrier will be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

The fender crowns will be held in place with stainless steel screws that thread directly into a composite nut and not directly into the parent body sheet metal to eliminate dissimilar metals contact and greatly reduce the chance for corrosion.

HARD SUCTION HOSE

Hard suction hose will not be required.

HANDRAILS

The handrails will be Hansen LED backlit knurled aluminum. The handrails will be lit with a red LED light. The handrails will be activated by the same means as the cab handrail light controls.

Chrome plated end stanchions will support the handrail. Plastic gaskets will be used between end stanchions and any painted surfaces.

Drain holes will be provided in the bottom of all vertically mounted handrails.

Handrails will be provided to meet current edition of applicable NFPA standards. The handrails will be installed as noted on the sales drawing.

There is to be a step provided below the right side running board.

AIR BOTTLE STORAGE

A total of three (3) air bottle compartments will be provided and located on the left side behind the rear wheel, on the right side ahead of the rear wheel and on the right side behind the rear wheel. The air bottle compartment will be 14.00" wide x 7.50" tall x 26.00" deep. A polished stainless steel door with a chrome plated flush lift & turn latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black rubber matting will be provided.

EXTENSION LADDER

There will be a 35' three (3) section aluminum Duo-Safety Series 1225-A extension ladder provided.

AERIAL EXTENSION LADDER

There will be one (1) 24' two (2) section aluminum Series 900-A extension ladder(s) provided and located in the ladder storage compartment.

ROOF LADDERS

There will be two (2) 16' aluminum Duo-Safety Series 875-A roof ladders provided.

AERIAL FOLDING LADDER

There will be one (1) 10' aluminum Duo-Safety Series 585-A folding ladder(s) provided and located in the ladder storage compartment.

GROUND LADDER STORAGE

Ladder tunnels will be provided at the rear of the apparatus on either side of the turntable.

Tunnels will be capable of holding up to two (2) two-section pumper style ladders on each side not in excess of 22.00" wide or 5-13/16" in thickness.

The ladders will be held captive top and bottom by stainless steel tracks. A polyethylene wear plate will be provided to prevent ladders from being scuffed by contacting metal parts. The plate will be mounted to the bottom of the entrance area of the ladder tunnels.

All ladders will be removable individually without having to remove any other ladder.

A Velcro® strap will be provided to help contain the ladders.

A smooth aluminum door will be provided on each ladder tunnel.

BACKBOARD STORAGE

one (1) storage trough for storage of backboard(s) will be provided in the existing storage compartment over the pump. The backboard(s) will be located [Location Within Compartment] in the storage compartment.

The size of the backboard(s) to be stored will be 72.00" long x 16.00" wide x 3.00" high.

LITTLE GIANT LADDER STORAGE

A storage trough constructed of aluminum treadplate will be provided on the top of the body on the center of the truck, over the water tank. The trough will be sized for a Little Giant Overhaul Model 17 - 15197. The ladder will be held in place by Velcro® straps.

PIKE POLES

There will be two (2) 12' Duo Safety pike pole(s) with fiberglass handles provided. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

8' PIKE POLE

There will be two (2) 8' Duo Safety pike pole(s) with fiberglass handle provided. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

6' PIKE POLE

There will be one (1) 6' Duo Safety pike pole(s) with fiberglass handle provided. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

3' PIKE POLE

There will be two (2) 3' Duo Safety pike pole(s) with fiberglass shaft and "D" handles shipped loose.

PIKE POLE STORAGE IN TORQUE BOX/LADDER STORAGE

There will be ABS tubing provided in the torque box/ladder storage area for a total of six (6) pike poles.

If the head of a pike pole can come into contact with a painted surface, a stainless steel scuffplate will be provided.

PUMP COMPARTMENT

The pump compartment will be separate from the hose body and compartments so that each may flex independently of the other. The pump compartment will be constructed of the same material as the body compartmentation.

The pump compartment substructure will be a fabricated assembly of steel tubing, angles and channels which supports both the fire pump and the side running boards.

The pump compartment will be mounted on the chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels will be removable from the chassis in a single assembly.

PUMP MOUNTING

Pump will be mounted to a substructure which will be mounted to the chassis frame rail using rubber isolators. The mounting will allow chassis frame rails to flex independently without damage to the fire pump.

LEFT SIDE PUMP CONTROL PANELS

All pump controls and gauges will be located at the left (driver's) side of the apparatus and properly identified.

Layout of the pump control panel will be ergonomically efficient and systematically organized.

The pump operator's control panel will be removable in two (2) main sections for ease of maintenance:

The upper section will contain sub panels for the mounting of the pump pressure control device, engine monitoring gauges, electrical switches, and foam controls (if applicable). Sub panels will be removable from the face of the pump panel for ease of maintenance. Below the sub panels will be located all valve controls and line pressure gauges.

The lower section of the panel will contain all inlets, outlets, and drains.

All push/pull valve controls will have 1/4 turn locking control rods with polished chrome plated zinc tee handles. Guides for the push/pull control rods will be chrome plated zinc castings securely mounted to the pump panel. Push/pull valve controls will be capable of locking in any position. The control rods will pull straight out of the panel and will be equipped with universal joints to eliminate binding.

IDENTIFICATION TAGS

The identification tag for each valve control will be recessed in the face of the tee handle.

All discharge outlets will have color coded identification tags, with each discharge having its own unique color. Color coding will include the labeling of the outlet and the drain for each corresponding discharge.

All line pressure gauges will be mounted directly above the corresponding discharge control tee handles and recessed within the same chrome plated casting as the rod guide for quick identification. The gauge and rod guide casting will be removable from the face of the pump panel for ease of maintenance. The casting will be color coded to correspond with the discharge identification tag.

All remaining identification tags will be mounted on the pump panel in chrome plated bezels.

The pump panel on the right (passenger's) side will be removable with lift and turn type fasteners.

Trim rings will be installed around all inlets and outlets.

MIDSHIP FIRE PUMP

Midship fire pump will be a Hale QMAX-200, 2000 gpm single (1) stage midship mounted centrifugal type.

Pump will be the class "A" type.

Pump will deliver the percentage of rated discharges at the pressures indicated below:

- 100% of rated capacity at 150 psi net pump pressure.
- 100% of rated capacity at 165 psi net pump pressure.
- 70% of rated capacity at 200 psi net pump pressure.
- 50% of rated capacity at 250 psi net pump pressure.

Entire pump and both suction and discharge passages will be hydrostatically tested to a pressure of 500 psi.

Pump will be fully tested at the pump manufacturer's factory to the performance requirements as outlined by the current edition of applicable NFPA standards and will be free from objectionable pulsation and vibration.

Pump body and related parts will be of fine grain, alloy cast iron with a minimum tensile strength of 30,000 psi (2041.2 bar).

All moving parts in contact with water will be of high quality bronze or stainless steel.

Pump body will be horizontally split, on a single plane in two (2) sections, for easy removal of entire impeller assembly, including wear rings and bearings from beneath the pump, without disturbing pump piping or the mounting of the pump in the chassis.

Pump will have one (1) double suction impeller. The pump body will have two (2) opposed discharge volute cutwaters to eliminate radial unbalance.

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

Impeller clearance rings will be bronze and easily renewable without replacing impeller or pump volute body. They will be of the wrap-around double labyrinth design for maximum efficiency.

Pump shaft will be electric furnace heat-treated, corrosion resistant stainless steel. It will be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft will be sealed with double oil seal to keep road dirt and water out of drive unit.

Pump shaft will be rigidly supported by three (3) bearings for minimum deflection. A high lead bronze sleeve bearing will be located immediately adjacent to the impeller (on the side opposite of the drive

unit). The sleeve bearing will be automatically oil lubricated and pressure balanced to exclude foreign material. The remaining bearings will be heavy-duty, deep groove ball bearings in the gearbox and will be splash lubricated.

PUMP PACKING

The pump shaft will have one (1) packing gland located on inlet side of the pump and will be of the split design for ease of repacking.

The packing gland will be a full-circle threaded design to exert uniform pressure on packing and prevent "cocking" and uneven packing load when it is tightened.

The packing gland will be easily adjusted by hand (with a rod or screwdriver, no special tools or wrenches required).

The packing rings will be of a unique, permanently lubricated, long-life graphite composition and have sacrificial zinc foil separators to protect the pump shaft from galvanic corrosion.

PUMP TRANSMISSION

The drive unit will be cast and completely manufactured and tested at the Hale Products, Inc. factory. The pump drive unit will be of sufficient size to withstand up to 16,000 foot/ pounds of torque from the engine in both the road and pump operating conditions. The drive unit is will be designed with ample lubrication reserve to maintain the proper operating temperature.

The gearbox drive shafts will be of heat treated chrome nickel steel and 2.75" in diameter on both the input and output drive shafts. They will be designed to withstand the full torque of the engine in both road and pump operating conditions.

All gears, both drive and pump, will be of the highest quality, electric furnace, chrome nickel steel. Bores will be ground to size and teeth integrated, crown-shaved and hardened, to give an extremely accurate gear for long life, smooth, quiet running and higher load carrying capability. An accurately cut spur design will be provided to eliminate all possible end thrust.

Pierce Manufacturing will select the pump ratio to provide the maximum performance with the engine and transmission selected. Three (3) green warning lights will be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two (2) lights will be located in the truck driving compartment and one (1) light on pump operator's panel adjacent to the throttle control.

PUMPING MODE

An interlock system will be provided to ensure that the pump drive system components are properly engaged so that the apparatus can be safely operated. The interlock system will be designed to allow stationary pumping only.

AIR PUMP SHIFT

Pump shift engagement will be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab.

Two (2) indicator lights will be provided adjacent to the pump shift inside the cab. One (1) green light will indicate the pump shift has been completed and be labeled "pump engaged". The second green light will indicate when the pump has been engaged and the chassis transmission is in pump gear. This indicator light will be labeled "OK to pump".

The pump shift will be interlocked to prevent the pump from being shifted out of gear when the chassis transmission is in gear to meet NFPA requirements.

The pump shift control in the cab will be illuminated to meet NFPA requirements.

TRANSMISSION LOCK-UP

The direct gear transmission lock-up for the fire pump operation will engage automatically when the pump shift control in the cab is activated.

AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system will be provided to allow the use of water from the discharge side of the pump for cooling the engine water. The heat exchanger will be a separate unit. It will be installed in the pump or engine compartment with the control located on the pump operator's control panel. The exchanger will be plumbed to the master drain valve.

PUMP INTAKE RELIEF VALVE

An Akron Style 53 relief valve will be installed on the suction side of the pump preset at 150 psig.

The relief valve will have a working range of 50 psi to 250 psi.

The outlet will terminate below the frame rails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

The relief valve pressure control will be located behind the right side pump panel with a stainless steel access door.

PRESSURE CONTROLLER

A FRC Pump Boss 500 electronic pressure controller with one (1) 600 PSI transducer on the pump discharge will be provided. All readouts will be standard PSI.

When a single 300 psi or single 600 psi pressure transducer is selected the transducer is installed in the discharge side of the water pump. The transducer continuously monitors pump pressure sending a signal to the electronic pressure controller.

When a dual 600 psi pressure transducer is selected the transducer are installed in the discharge side and intake side of the water pump. The discharge transducer continuously monitors pump pressure sending a signal to the electronic pressure controller. The intake transducer continuously monitors the pump intake sending a signal to the electronic pressure controller.

The pressure controller can be used in two (2) modes of operation, RPM mode and pressure modes. The controller will be programmed to turn on/default to RPM Setting mode.

In RPM mode, the controller can be activated after vehicle parking brake has been set. When in this mode, the controller will maintain the set engine speed, regardless of engine load (within engine operation capabilities).

In pressure mode, the controller can be activated after vehicle parking brake has been set. When in this mode, the controller will automatically maintain the discharge pressure set by the operator (within the discharge capabilities of the pump and water supply) regardless of flow.

A 2.00" diameter throttle control knob with no mechanical stops, a serrated grip, and a red idle push button in the center will be a integrated/part of the pressure controller. The throttle control knob will be programmed for Clockwise rotation to increase engine speed.

Individual LED indicators for ok to pump, throttle ready, pressure mode and rpm mode will be located on the pressure controller for easy viewing.

Safety features include recognition of low water and no water conditions with an automatic programmed response and a push button to return the engine to idle.

An additional audible alarm will NOT BE provided.

The pressure controller screen will be LCD. The LCD screen and LED intensity will be automatically adjust for day and nighttime operation. The LCD screen intensity can also be manually adjusted if needed.

The following information will be provided/displayed on the LCD screen:

- Engine RPM
- Check engine and stop engine warning indicators
- Engine oil pressure
- Engine coolant temperature
- Transmission Temp
- Battery voltage
- Operating mode (RPM or pressure)
- Pressure or RPM setting

On screen messaging show diagnostic and warning messages as they occur. It will show apparatus information, stored data, and program options when selected by the operator. It will monitor inputs outputs 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 water pump temperature
- Low engine oil pressure
- High engine coolant temperature
- No engine response (visual alarm only)

The pressure controller will store the accumulated operating hours for the pump and engine. These items are to be displayed within the pressure controller menu.

The pressure controller will include a USB port on the back of the controller for easy software upgrades if needed.

HALE ESP PRIMING PUMP

Priming pump will be a positive displacement vane type, electrically driven, and conforming to the current edition of applicable NFPA standards.

One (1) priming control will both open the priming valve and start the priming motor.

Primer will be environmentally safe, self lubricating style.

RECIRCULATING LINE

A 3/8" line will be run from the discharge side of the main pump to the water tank to help keep the pump cool when water is not being discharged. This line will be designed to circulate water from the pump back to the tank when the recirculating valve is open. This water circulation will help to maintain the pump water temperature at a safe level. The recirculation valve will be located on the left pump operator's panel.

THERMAL RELIEF VALVE

A Hale TRV120-L thermal protection device will be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump when the temperature of the pump water exceeds 120 Degrees F (49 C).

The thermal protection device will include a red warning light. The warning light with a test switch will be mounted on the pump operator panel.

The discharge line will be 3/8 inch diameter tubing plumbed to ground near pump operator's panel.

PUMP MANUALS

There will be a total of two (2) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals will be provided by the pump manufacturer in the form of two (2) electronic copies. Each manual will cover pump operation, maintenance, and parts.

PLUMBING, STAINLESS STEEL AND HOSE

All inlet and outlet lines will be plumbed with either stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hose's will be equipped with brass or stainless steel couplings. All stainless steel hard plumbing will be a minimum of a schedule 10 wall thickness.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping will be equipped with victaulic or rubber couplings.

Plumbing manifold bodies will be ductile cast iron or stainless steel.

All piping lines are to be drained through a master drain valve or will be equipped with individual drain valves. All drain lines will be extended with a hose to drain below the chassis frame.

All water carrying gauge lines will be of flexible polypropylene tubing.

All piping, hose and fittings will have a minimum of a 500 PSI hydrodynamic pressure rating.

FOAM SYSTEM PLUMBING

All piping that is in contact with the foam concentrate or foam/water solution will be stainless steel. The fittings will be stainless steel or brass. Cast iron pump manifolds will be allowed.

MAIN PUMP INLETS

A 6.00" pump manifold inlet will be provided on each side of the vehicle. The suction inlets will include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

SHORT SUCTION TUBE(S)

The suction tube(s) on the water pump will have short suction tube(s) installed to allow for installation of adapters, elbows or intake valves without excessive overhang.

INLET VALVE/DUMP

One (1) butterfly valve type Hale MIV 2.0 will be provided on the left side main pump inlet. The inlet valve will be a combination butterfly valve and pressure relief valve with a Hale bleeder valve. The pressure relief valve will have a range of 75 to 250 PSI and will be factory set to 150 psig . The valve, less relief valve, will be rated for 600 PSI hydrostatic pressure and 26 inHg of vacuum. The bleeder valve will be located near the valve control.

The valve will be fully recessed behind the pump panel and will be operated by an electric 12 VDC motor. A control panel with the electric switch and indicator lights will be provided on the pump operator's panel.

A manual override handwheel will be provided next to the inlet valve on the side pump panels.

MAIN PUMP INLET CAP

The main pump inlets will have National Standard Threads with a long handle chrome cap.

The cap will be the Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

VALVES

All ball valves will be Akron® Brass. The Akron valves will be the 8000 series heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

Valves will have a **ten (10) year** warranty.

The location of the valve for the one (1) inlet will be recessed behind the pump panel.

INLET CONTROL

The side auxiliary inlet(s) will incorporate a quarter-turn ball valve with the control located at the inlet valve. The valve operating mechanism will indicate the position of the valve.

LEFT SIDE INLET & DIRECT TANK FILL

There will be one (1) auxiliary inlet with a 2.50" valve at the left side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet will be provided with a strainer, chrome swivel and plug.

Tee'd into the 2.50" auxiliary inlet will be one (1) 2.50" gated external tank fill. The 2.50" ball valve will be recessed behind the pump panel with a Tee handle control.

Piping for the fill will be routed through the front wall of the tank and through one (1) baffle.

ADAPTER, INLET

Two (2) adapters for the inlets , TFT AJ7HNP-NX adapter(s), will be provided. The elbow adapter(s) will be furnished for the left and right main pump inlet(s). The elbow(s) will be 6.00" female NST threads converting to 4.00" female NST. A 4.00" plug will be provided with the elbow.

FRONT INLET

A 4.00" inlet front inlet that terminates on top of the right side bumper extension will be provided.

The plumbing will consist of 5.00" stainless steel and a 4.00" ball valve. Only radius elbows will be used in the piping, no mitered joints.

Drains will be furnished in all the low points of piping and have .75" valves with T swing handle.

Bleeder valves will be located near the threaded connection and the valve control.

Die cast zinc screens will be provided at the front inlet connection.

FRONT INLET CONTROL

The front inlet will be gated with an Akron 9333 electric valve controller provided on the pump operators panel. The electric control must be of a true position feedback design, requiring no clutches in the motor or current limiting. The unit must be completely sealed with momentary open, close as well and an optional one touch full open feature to operate the valve actuator. The controller will provide position indication on a full color, backlit LCD display. It will have manual adjustment of the brightness as well as an auto dimming option.

A manual override will be provided on the valve. A stainless steel door located on the right side pump panel will be provided for access to the manual override.

A maintain switch will be provided behind the stainless steel access door near the manual override. The switch will cut off power to the valve to allow for manual valve actuation.

FRONT INLET INTAKE RELIEF VALVE

An Akron Brass Style 53 intake pressure relief valve will be provided on the inlet side of the valve preset at 150 psig .

The pressure relief valve will be adjustable from 50 to 250 psi.

The outlet will be 2.50" National Standard hose thread and terminate below the frame rails and will have a "do not cap" warning tag near the discharge outlet.

FRONT INLET ELBOW

The front inlet will have a 4.00" inlet elbow with swivel, terminating with Male National Standard Hose Thread.

The swivel will be Chrome.

A quarter-turn style of bleeder will be provided on the front inlet elbow.

FRONT INLET CAP

The front inlet will have National Standard hose threads with a long handle cap.

The cap will incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

INLET BLEEDER VALVE

A 0.75" bleeder valve will be provided for each side gated inlet.

The valves will be located behind the panel with a "T" swing style handle control extended to the outside of the panel.

The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage.

The water discharged by the bleeders will be routed below the chassis frame rails.

TANK TO PUMP

The booster tank will be connected to the intake side of the pump with stainless steel piping and a quarter turn 3.00" full flow line valve with the control remotely located at the operator's panel. Tank to pump line will run straight (no elbows) from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling will be included in this line to prevent damage from vibration or chassis flexing.

A check valve will be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

TANK REFILL

A 1.50" combination tank refill and pump re-circulation line will be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

DISCHARGE OUTLET CONTROLS

The discharge outlets will incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism will indicate the position of the valve.

If a handwheel control valve is used, the control will be a minimum of a 3.9" diameter stainless steel handwheel with a dial position indicator built in to the center of the handwheel.

Any 3.00 inch or larger discharge valve will be a slow-operating valve in accordance with NFPA 16.7.5.3.

LEFT SIDE DISCHARGE OUTLETS

There will be Two (2) discharge outlets with a 2.50" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

LEFT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the left side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow will be Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

RIGHT SIDE DISCHARGE OUTLETS

There will be One (1) discharge outlet with a 2.50" valve on the right side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

RIGHT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the right side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

The elbow will be Pierce VLH, which incorporates an exclusive thread design to automatically relieve stored pressure in the line when disconnected.

LARGE DIAMETER DISCHARGE OUTLET

There will be an Akron 8800 4.00" flat ball valve with 4.00" plumbing terminating with a 4.00" MNST chrome adapter on the right side pump panel.

The valve will be controlled with a(n) Pierce large handwheel with indicator located at the pump operator's panel.

LARGE DIAMETER OUTLET ELBOWS

The 4.00" outlet will be furnished with a 4.00" (F) National Standard hose thread x 4.00" (M) National Standard 30 degree chrome elbow adapter with a long handle cap.

FRONT DISCHARGE OUTLET

There will be one (1) 1.50" discharge outlet piped to the front of the apparatus and located in the center bumper tray.

Plumbing will consist of 2.00" piping and flexible hose with a 2.00" ball valve with control at the pump operator's panel. A fabricated weldment made of stainless steel pipe will be used in the plumbing where appropriate. The piping will terminate with a 1.50" NST with 90 degree stainless steel swivel.

There will be automatic drains provided at all low points of the piping.

DISCHARGE CAPS/ INLET PLUGS

Chrome plated, rocker lug, caps with chain will be furnished for all discharge outlets 1.00" thru 3.00" in size, besides the pre-connected hose outlets.

Chrome plated, rocker lug, plugs with chain will be furnished for all auxiliary inlets 1.00" thru 3.00" in size.

The caps and plugs will incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

OUTLET BLEEDER VALVE

A 0.75" bleeder valve will be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves will be located behind the panel with a T swing style handle control extended to the outside of the side pump panel.

The handles will be chrome plated and provide a visual indication of valve position.

The T swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage.

Bleeders will be located at the bottom of the pump panel. They will be properly labeled identifying the discharge they are plumbed in to.

The water discharged by the bleeders will be routed below the chassis frame rails.

REDUCER

There will be two (2) adapters with 2.50" FNST x 1.50" MNST threads and a 1.50" chrome plated cap installed on on the number 1 and passenger side discharge.

AERIAL WATERWAY OUTLET

The aerial waterway will be plumbed from the water pump to the aerial device waterway with 5.00" pipe and a 4.00" Akron valve.

The valve will be controlled with a Pierce large handwheel with indicator located at the pump operator's panel.

CROSSLAY HOSE BEDS, 1.50"

Two (2) crosslays with 1.50" outlets will be provided. Each bed to be capable of carrying 150' of 1.75", 250' of 1.75 and will be plumbed with 2.00" i.d. pipe and gated with a 2.00" quarter turn ball valve.

Outlets to be equipped with a 1.50" National Standard hose thread 90 degree swivel located in the hose bed so that hose may be removed from either side of apparatus.

The crosslay controls will be at the pump operator's panel.

The center crosslay dividers will be fabricated of .25" aluminum and will provide adjustment from side to side. The divider will be unpainted with a brushed finish.

Vertical scuffplates, constructed of polished stainless steel, will be provided at the front and rear ends of the bed on each side of vehicle.

Crosslay bed flooring will consist of removable perforated brushed aluminum.

CROSSLAY HOSE BEDS

One (1) crosslay with 2.50" outlets will be provided. Each bed to be capable of carrying 150' and will be plumbed with 2.50" i.d. pipe and gated with a 2.50" quarter turn ball valve.

Outlets to be equipped with a 2.50" National Standard hose thread 90 degree swivel located in the hose bed so that hose may be removed from either side of apparatus.

The crosslay controls will be at the pump operator's panel.

The center crosslay dividers will be fabricated of 0.25" aluminum and will provide adjustment from side to side. The divider will be unpainted with a brushed finish. The remainder of the crosslay bed will be painted job color.

Polished stainless steel vertical scuffplates will be provided at hose bed ends (each side of vehicle). Bottom of hose bed ends (each side) will also be equipped with a polished stainless steel scuffplate.

Crosslay bed flooring will consist of removable perforated brushed aluminum.

CROSSLAY/DEADLAY HOSE RESTRAINT

There will be red vinyl end flap provided across each end of the two (2) crosslay/deadlay opening(s) to secure the hose during travel. Each vinyl end flap will be permanently attached at the top of the crosslay/deadlay opening(s). They will be attached with bungee cord and hook fasteners.

CROSSLAY COVER

A hinged .19" aluminum treadplate cover will be installed over the crosslay hose beds. It will include a latch at each end of the cover to hold it securely in place, a chrome grab handle at each end for opening and closing the cover and a foam rubber gasket where the cover comes into contact to a painted surface.

The cover will be provided with rubber latch hold open device.

The hinge will be to the front of the hose beds.

FOAM CONCENTRATE PROPORTIONING SYSTEM

A Hypro FoamPro®, Model 2001, foam system will be provided as the means for the proportioning of foam concentrate into the water stream. The FoamPro is an electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system.

This system will be capable of handling Class A foam concentrates, as well as most Class B foam concentrates.

The foam system will be plumbed to six (6) discharges. The discharges capable of dispensing foam will be front discharge, 3 crosslays, reel, rear discharge.

The foam proportioning system operation will be based on a direct measurement of water flows, and remain consistent within the specified flow and pressure. The system will be equipped with a digital electronic control display on the pump panel. Incorporated within the control display will be a microprocessor, which receives input from the system flow meter while also monitoring the foam concentrate pump output. The microprocessor will compare the values of the water flow versus the foam flow, to ensure the proportion rate is accurate.

One (1) paddle wheel will be installed to monitor all foam discharges.

Push button control for the foam proportioning rate will allow a ratio from .1 percent to 3 percent in .1 percent increments.

The rated capacity of this system will be 85 gpm at 3 percent and 500 gpm at .5 percent.

A 2.5 gpm @150 psi, positive displacement foam pump will be powered by a 1/2 hp 12 vdc electric motor.

One (1) check valve will be installed in the plumbing to prevent foam from contaminating the water pump. The check valve will be approved by the foam system manufacturer.

FOAM TANK

The foam tank will be an integral portion of the polypropylene water tank. The cell will have a capacity of 25 gallons of foam with the intended use of Class A foam. The foam cell will reduce the capacity of the water tank. The foam cell will have a screen in the fill dome and a breather in the lid.

FOAM TANK DRAIN

The foam tank drain will be a 1.00" drain valve located inside the pump compartment accessible through a door on the right side pump panel.

The following drawing(s) will be provided for approval by the customer. The drawing(s) will be made for up One (01) Truck apparatus and/or similar Pierce job number.

PUMP OPERATOR'S PANEL DRAWING

A detailed drawing to scale of the pump operator's panel will be provided for the customer to review. The drawing will include all of the gauges, controls, switching, etc., located on the pump operator's panel. The customer will be allowed to make changes and/or mark-ups to this approval drawing. The fire apparatus manufacturer will make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump operator's panel drawing will become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items will NOT be shown on any pump panel approval drawing(s). These item(s) will be placed on pump panel(s) at the fire apparatus manufacturer discretion.

REMAINING PUMP PANEL(S)

Detailed drawing(s) to scale of the remaining pump panel(s) will be provided for the customer to review. The drawing(s) will include all of the gauges, controls, switching, etc., located on the pump panel(s). The customer will be allowed to make changes and/or mark-ups to these approval drawing(s). The fire apparatus manufacturer will make revisions (If needed) to the drawing(s) per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump panel drawing(s) will become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items will NOT be shown on any pump panel approval drawing(s). These item(s) will be placed on pump panel(s) at the fire apparatus manufacturer discretion.

COLOR CODED TAGS

A detailed drawing/chart of the colors used on all of the inlet(s) and outlet(s) will be provided for the customer to review. The customer will be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer will make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the colors will become part of the contract documents.

SPECIAL TEXT/VERBIAGE TAGS

A detailed drawing/chart of the text/verbiage used on all of the inlet(s) and outlet(s) will be provided for the customer to review. The customer will be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer will make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the text/verbiage will become part of the contract documents.

PUMP PANEL CONFIGURATION

The pump panel configuration will be arranged and installed in an organized manner that will provide user-friendly operation.

PUMP OPERATOR'S PLATFORM

A pull out, flip down platform will be provided at the pump operator's control panel.

The front edge and the top surface of the platform will be made of DA finished aluminum with a Morton Cass insert.

The platform will be approximately 13.75" deep when in the stowed position and approximately 22.00" deep when extended. The platform stepping surface will be 35.00" wide. The platform will lock in the retracted and the extended position.

The sides, bottom and rear portions of the support assembly will be painted to match lower job color.

The platform will be wired to the "step not stowed" indicator in the cab.

PUMP OPERATOR'S PLATFORM PERIMETER LIGHT

There will be an On Scene Solutions, Model Night Stick Access, 20.00" white 12 volt DC LED strip light provided to illuminate the ground area.

PUMP AND GAUGE PANEL

The pump and gauge panels will be constructed of stainless steel with a brushed finish. A polished aluminum trim molding will be provided on both sides of the pump panel.

PUMP ACCESS

Right Side Panel

The right side upper pump panel will be removable.

Panel Fastener

The removable panels will be secured with chrome flush trigger latch.

The left side pump panels will be attached with screws.

The right side lower pump panel (drain bank) will be attached with screws.

PUMP COMPARTMENT LIGHT

There will be one (1) Whelen®, Model 3SC0CDCR, 3.00" white 12 volt DC LED light(s) with Whelen, Model 3FLANGEC, flange(s) installed in the pump compartment.

Engine monitoring graduated LED indicators will be incorporated with the pressure controller.

Also provided at the pump panel will be the following:

- Master Pump Drain Control

THROTTLE READY GREEN INDICATOR LIGHT

There will be a green indicator light integrated with the pressure governor and/or engine throttle installed on the pump operators panel that is activated when the pump is in throttle ready mode.

OK TO PUMP INDICATOR LIGHT

There will be a green indicator light installed on the pump operators panel that is activated when the pump is in Ok To Pump mode.

AIR HORN CONTROL

An air horn control switch will be provided at both side pump panels. The switch will be red in color and properly labeled.

VACUUM AND PRESSURE GAUGES

The pump vacuum and pressure gauges will be liquid filled and manufactured by Class 1 Incorporated.

The gauges will be a minimum of 4.00" in diameter and will have white faces with black lettering, with a pressure range of 30.00"-0-600#.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

The pump pressure and vacuum gauges will be installed adjacent to each other at the pump operator's control panel.

Test port connections will be provided at the pump operator's panel. One (1) will be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They will have 0.25 in. standard pipe thread connections and non-corrosive polished stainless steel or brass plugs. They will be marked with a label.

This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

PRESSURE GAUGES

The individual "line" pressure gauges for the discharges will be Class 1 interlube filled.

They will be a minimum of 2.00" in diameter and have white faces with black lettering.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

Gauges will have a pressure range of 30"-0-400#.

The individual pressure gauge will be installed as close to the outlet control as practical.

This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

WATER LEVEL GAUGE

A Fire Research TankVision Pro model WLA300-A00 water tank indicator gauge will be installed on the pump operators panel. The gauge kit will include an electronic indicator module, a pressure sensor, and a 10' sensor cable. The gauge will show the volume of water in the tank on nine (9) easy to see super bright RGB LEDs. A wide view lens over the LEDs will provide for a viewing angle of 180 degrees. The gauge case will be waterproof, manufactured of Polycarbonate/Nylon material, and have a distinctive blue label.

The program features will be accessed from the front of the indicator module. The program will support self-diagnostics capabilities, self-calibration, six (6) programmable colored light patterns to display tank volume, adjustable brightness control levels and a data link to connect remote indicators. Low water warnings will include flashing LEDs at 1/4 tank and down chasing LEDs when the tank is almost empty.

The gauge will receive an input signal from an electronic pressure sensor. The sensor will be mounted from the outside of the water tank near the bottom. No probe will be placed on the interior of the tank. Wiring will be weather resistant and have automotive type plug-in connectors.

REMOTE LIGHT DRIVER

A Fire Research TankVision model WLA290-A00 remote light driver will be installed. The driver will provide four (4) separate outputs to control additional water level lights around the apparatus. The lights will show 1/4, 1/2, 3/4, and full tank. When power is applied the driver will run a test and cycle each remote light on and off. When the tank is less than 1/4 full the 1/4 tank light will blink.

WATER LEVEL GAUGE, ADDITIONAL

An additional water level gauge will be provided. An Ernst sight tube water level indicator with a floating red ball will be mounted on the gauge panel with an unrestricted view for the operator.

WATER LEVEL GAUGE

There will be two (2) additional water level indicator(s), Whelen®, Model PSTANK2, LED module with chrome trim, installed one (1) on the cab behind the left cab door and one (1) on the cab behind the right cab door.

This light module(s) will include four (4) colored levels, and function similar to the water level indicator located at the operators panel:

- First green module indicates a full water level
- Second blue module indicates a water level above 3/4 full
- Third amber module indicates a water level above 1/2 full
- Last red module indicates a water level above 1/4 full and empty
 - Above 1/4 this light will be steady burning
 - At empty this light will be flashing

The flash rate will be determined by the main water level tank sensor.

This module will be activated when the pump is in gear.

FOAM LEVEL GAUGE

An electronic foam level gauge will be provided on the operator's panel that registers foam level by means of five (5) colored LED lights. The lights will be durable, ultra-bright five (5) LED design viewable through 180 degrees. The foam level indicators will be as follows:

- 100 percent = Green
- 75 percent = Yellow
- 50 percent = Yellow
- 25 percent = Yellow
- Refill = Red

The light will flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights will flash sequentially when the foam tank is empty.

The level measurement will be based on the sensing of head pressure of the fluid in the tank.

The display will be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design will

provide complete protection from foam and environmental elements. An industrial pressure transducer will be mounted to the outside of the tank. The display will be able to be calibrated in the field and will measure head pressure to accurately show the tank level.

LIGHT SHIELD

There will be a polished, 16 gauge stainless steel light shield installed over the pump operator's panel.

- There will be 12 volt DC white LED lights installed under the stainless steel light shield to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.
- One (1) pump panel light will come on when the pump is in ok to pump mode.

The switch panel will be lit when the parking brake is set. This is to afford the operator illumination when first approaching the control panel.

AIR HORN SYSTEM

Two (2) Hadley®, eTone, chrome air horns will be recessed in the front bumper. The air horn system will be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve will be installed to prevent the loss of air in the brake system.

Air Horn Location

The air horns will be located on the right side of the bumper, outside of the frame rail.

Air Horn Control

The air horn(s) will be activated by the following:

- Left side lanyard. The lanyard to be a link chain inside vinyl tubing.
- Steering wheel horn ring with electric/air horn selector switch

ELECTRONIC SIREN

A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone will be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.

Electronic siren head will be recessed in the driver side center switch panel.

The electronic siren will be controlled on the siren head only. No horn button or foot switches will be provided.

SPEAKER

There will be one (1) Whelen®, Model SA315P, black nylon composite, 100-watt, speaker with through bumper mounting brackets and polished stainless steel grille provided. The speaker will be connected to the siren amplifier.

The speaker(s) will be recessed in the center of the front bumper.

AUXILIARY MECHANICAL SIREN

There will be a Federal Signal Model Q2B mechanical siren furnished and installed in the front of the apparatus.

The Q2B will be chrome finish.

The siren will have a 2-gauge cable connected to a power solenoid that is connected by a 2-gauge cable ran battery direct to the primary chassis batteries and will be labeled Q2B+ at the battery. The power solenoid will only be enabled when the emergency master switch is on.

The siren will have a 2-gauge ground wire connected to the chassis battery stud. The cable will be labeled Q2B- at the battery.

The mechanical siren will be recessed in the front bumper on the left side. The siren will be properly supported using the bumper framework.

MECHANICAL SIREN CONTROL

The mechanical siren will be activated by the following:

- Left side foot switch.

A momentary chrome push button switch will be included in the right side dash panel to activate the siren brake.

FRONT ZONE UPPER WARNING LIGHTS

There will be two (2) 21.50" Whelen Freedom IV LED lightbars mounted on the cab roof, one (1) on each side, above the driver's and passenger's door, facing forward.

The driver's side lightbar will include the following:

- One (1) red flashing LED module in the outside rear corner position.
- One (1) white alley LED module in the outside end position.
- One (1) red flashing LED module in the outside front corner position.
- One (1) white flashing LED module in the outside front position.
- One (1) red flashing LED module in the inside front position.
- One (1) white flashing LED module in the inside front corner position.

The passenger's side lightbar will include the following:

- One (1) white flashing LED module in the inside front corner position.
- One (1) red flashing LED module in the inside front position.
- One (1) white flashing LED module in the outside front position.
- One (1) red flashing LED module in the outside front corner position.
- One (1) white alley LED module in the outside end position.
- One (1) red flashing LED module in the outside rear corner position.

There will be clear lenses and colored filters included on the lightbar.

The following switches may be installed in the cab on the switch panel to control the lightbar:

- a switch to control the flashing LED modules.
- a switch to control the driver's side alley LED module.
- a switch to control the passenger's side alley LED module.

The four (4) white flashing LED modules will be disabled when the parking brake is applied.

The two (2) red flashing LED modules in the front positions and the alley LED modules in the end positions may be load managed when the parking brake is applied.

FRONT ZONE LOWER LIGHTS

There will be four (4) Whelen®, Model M6**, 4.31" high x 6.75" wide x 1.37" deep lights installed on the cab face above the headlights, in a common bezel matching the one for the headlamps per the following.

- One (1) Model M6** light installed in the left side outside position. The left side outside warning light to include red LEDs.
- One (1) Model M6** light installed in the left side inside position. The left side inside warning light to include red LEDs.
- One (1) Model M6** light installed in the right side inside position. The right side front inside light to be red and set to steady burn pattern #174.
- One (1) Model M6** light installed in the right side outside position. The right side outside warning light to include red LEDs.
- The lens color(s) to be clear.
- The housing to be polished and the trim shall be chrome.

There will be a switch in the cab on the switch panel to control the lights.

The inside lights may be load managed or disabled if white, when the parking brake is set.

Amber inside lights will be disabled when the park brake is released.

HEADLIGHT FLASHER

The high beam headlights will flash alternately between the left and right side.

There will be a switch installed in the cab on the switch panel to control the high beam flash. This switch will be live when the battery switch and the emergency master switches are on.

The flashing will automatically cancel when the hi-beam headlight switch is activated or when the parking brake is set.

SIDE ZONE LOWER LIGHTING

There will be six (6) Whelen®, Model M6**, 4.31" high x 6.75" long x 1.37" deep flashing LED warning lights with chrome trim installed per the following:

- Two (2) lights located, one (1) each side on the front custom cab corner. The driver's side, side front light to include red warning LEDs and the passenger's side, side front light to include red warning LEDs.
- Two (2) lights located, one (1) each side of cab rearward of crew cab doors. The driver's side, side middle light to include red warning LEDs and the passenger's side, side middle light to include red warning LEDs.
- Two (2) lights located, one (1) each side, centered above rear wheels. The driver's side, side rear light to include red warning LEDs and the passenger's side, side rear light to include red warning LEDs.
- The warning light lens color(s) to be clear.

There will be a switch in the cab on the switch panel to control the lights.

REAR ZONE LOWER LIGHTING

There will be two (2) Whelen®, Model M6*C, LED flashing warning lights located at the rear of the apparatus.

- The driver's side rear light to be red
- The passenger's side rear light to be red

Both lights will include a lens that is clear.

There will be a switch located in the cab on the switch panel to control the lights.

REAR UPPER ZONE WARNING LIGHTS

There will be two (2) Whelen, Model MCFLED2* LED warning beacons provided at the rear of the truck, one (1) each side.

The color of the lights will be:

- The rear upper light(s) on the driver's side to be red.
- The rear upper light(s) on the passenger's side to be amber.

All lenses will be clear.

There will be a switch located in the cab on the switch panel to control the beacons.

TRAFFIC DIRECTING LIGHT

There will be one (1) Whelen®, Model TAL65, 36.00" long x 2.87" high x 2.25" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen, Model TACTL5, control head will be included with this installation.

The controller will be energized when the battery switch is on.

The auxiliary flash not activated.

This traffic directing light will be mounted on top of the body below the turntable with a treadplate box at the rear of the apparatus.

The traffic directing light control head will be located in the driver side overhead switch panel in the right panel position.

ELECTRICAL SYSTEM GENERAL DESIGN FOR ALTERNATING CURRENT

The following guidelines will apply to the 120/240 VAC system installation:

General

Any fixed line voltage power source producing alternating current (ac) line voltage will produce electric power at 60 cycles plus or minus 3 cycles.

Except where superseded by the requirements of the current edition of applicable NFPA standards, all components, equipment and installation procedures will conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus will be listed and installed in accordance with the manufacturer's instructions. All products will be used only in the manner for which they have been listed.

Grounding

Grounding will be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems will not be used. Only stranded or braided copper conductors will be used for grounding and bonding.

An equipment grounding means will be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) will be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor will be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure will be bonded to the vehicle frame by a copper conductor. This conductor will have a minimum ampere rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements will be permitted to be used.

All power source system mechanical and electrical components will be sized to support the continuous duty nameplate rating of the power source.

Operation

Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, will be permanently attached to the apparatus at any point where such operations can take place.

Provisions will be made for quickly and easily placing the power source into operation. The control will be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train will be equipped with a means to prevent the unintentional movement of the control device from its set position.

A power source specification label will be permanently attached to the apparatus near the operator's control station. The label will provide the operator with the following information:

- Rated voltage(s) and type (ac or dc)
- Phase
- Rated frequency
- Rated amperage
- Continuous rated watts
- Power source engine speed

Direct drive (PTO) and portable generator installations will comply with Article 445 (Generators) of the NEC.

Overcurrent protection

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device will not exceed 144.00" (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly will be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degree Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device will be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

Wiring Methods

Fixed wiring systems will be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)
- or
- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit will not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring will be run as follows.

- Separated by a minimum of 12.00" (305 mm), or properly shielded, from exhaust piping
- Separated from fuel lines by a minimum of 6.00" (152 mm) distance

Electrical cord or conduit will be supported within 6.00" (152 mm) of any junction box and at a minimum of every 24.00" (610 mm) of continuous run. Supports will be made of nonmetallic materials or corrosion protected metal. All supports will be of a design that does not cut or abrade the conduit or cable and will be mechanically fastened to the vehicle.

Wiring Identification

All line voltage conductors located in the main panel board will be individually and permanently identified. The identification will reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends will be labeled showing function and wire size.

Wet Locations

All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, will be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location will be not less than 24.00" (610 mm) from the ground. Receptacles on off-road vehicles will be a minimum of 30.00" (762 mm) from the ground.

The face of any wet location receptacle will be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle will be installed in a face up position.

Dry Locations

All receptacles located in a dry location will be of the grounding type. Receptacles will be not less than 30.00" (762 mm) above the interior floor height.

All receptacles will be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they will be so marked.

Listing

All receptacles and electrical inlet devices will be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages will be rated for the appropriate service.

Electrical System Testing

The wiring and associated equipment will be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment will be subjected to a dielectric voltage withstand test of 900-volts for one (1) minute. The test will be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test will be conducted after all body work has been completed.

Electrical polarity verification will be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

Operational Test per Current Edition NFPA Standard

The apparatus manufacturer will perform the following operation test and ensure that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order. The test will be witnessed and the results certified by an independent third-party certification organization.

The prime mover will be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source will be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in the current edition of applicable NFPA standards.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current edition of applicable NFPA standards will be applied to the low voltage electrical system during the operational test.

GENERATOR

There will be one (1) Harrison 3.6 kW hydraulic generator provided.

This generator will be 31.00" long x 15.00" wide x 14.13" high and weigh 168 lbs.

This generator will have a 3,600 watt continuous duty rating @ 120 volts AC.

The generator will be driven by a transmission power take off unit, through a hydraulic pump and motor.

The generator will include an electrical control inside the cab. The hydraulic engagement supply will be operational at any time (no interlocks).

The generator hydraulic circuit will include a soft start valve to protect the generator components during PTO engagement.

There will be an AC volt meter furnished next to the circuit breaker panel to monitor the generator.

GENERATOR LOCATION

The generator will be mounted in the in the area over the pump in the center. The flooring in this area will be either reinforced or constructed in such a manner that it will handle the additional weight of the generator.

GENERATOR START

There will be a switch provided on the cab instrument panel to engage the generator.

CIRCUIT BREAKER PANEL

The circuit breaker panel will be located high on the back wall of compartment LS4.

POWER OUTLET STRIP

There will be one (1) receptacle strip(s) with six (6) 20 amp 120 volt AC straight blade receptacles provided to be determined.

The strip(s) selected will be powered from the shoreline inlet through a receptacle located adjacent to the strip(s).

There will be a label installed near the strip(s) that state the following:

- Line Voltage
- Current Rating (amps)
- Phase
- Frequency

THREE (3)-SECTION 75 FOOT AERIAL LADDER

CONSTRUCTION STANDARDS

The ladder will be constructed to meet the requirements as described in the current edition of applicable NFPA standards. Some portions of this specification exceed minimum NFPA recommendations and will be considered a minimum requirement to be met.

LADDER CONSTRUCTION

To insure a high strength to weight ratio and an inherent corrosion resistance, the aerial ladder will be completely constructed of high strength aluminum.

The aerial ladder will consist of three (3) welded extruded aluminum telescopic ladder sections, which will extend to a minimum height of 75' above the ground at full extension and elevation. The measurement of height will be consistent with the current NFPA standard.

The operating range of the ladder will be -8 degrees to +76 degrees.

The ladder will be designed to provide continuous egress for firefighters and civilians from an elevated position to the ground. The egress section will be designed to maintain the rated load of the aerial device. It will be bolted on for easy replacement.

The rated horizontal reach will be 67' 9".

The measurement of horizontal reach will be consistent with the current NFPA standard.

The measurement will be from the outermost rung at full extension to the centerline of turntable rotation.

The ladder will have the capability to support a minimum of 750 pounds at the tip and 100 pound equipment allowance in the unsupported configuration, based upon 360-degree rotation, up to full extension and from -8 degrees to +76 degrees.

All side rails, rungs, handrails, uprights and K-braces will be made of structural 6061T6 alloy aluminum extrusions.

All material will be tested and certified by the material supplier.

All ladder sections will be semi-automatically welded by shielded arc welding methods using 5356 aluminum alloy welding wire.

Structural rivets or bolts will not be utilized in the ladder weldment sections.

Due to the unpredictable nature of fire ground operations, a minimum safety factor of 2.5 to 1 is desired without .25" of ice build-up.

A safety factor of 2.0 to 1 is desired for environmental loading (wind plus .25" of ice build-up).

This structural safety factor will apply to all structural aerial components including turntable and torque box stabilizer components.

Definition of the structural safety factor will be as outlined in the current NFPA standard:

- DL = Dead load stress. Stress produced by the weight of the aerial device and all permanently attached components.
- RL = Rated capacity stress. Stress produced by the rated capacity load of the ladder.
- WL = Water load stress. Stress produced by nozzle reaction force and the weight of water in the water delivery system.
- FY = Material yield strength. The stress at which material exhibits permanent deformation.
- $2.5 \times DL + 2.5 \times RL + 2.5 \times WL$ equal to/less than FY
- $2.0 \times DL + 2.0 \times RL + 2.0 \times WL + 2.0 \times \text{Ice Loading}$ equal to/less than FY

The minimum NFPA specification is exceeded by providing a safety factor above 2 to 1 while flowing water, and a safety factor of 2 to 1 with ice build-up.

The stability factor or tip over safety margin will be a minimum of 1.5 to 1 as defined by the current NFPA standard.

An independent engineering firm will verify the aerial safety factor.

Design verification will include computer modeling and analysis, and extensive strain gauge testing witnessed by an independent registered professional engineer.

Verification will include written certification from the independent engineering firm made available by the manufacturer upon request from the purchaser.

All welding of aerial components, including the aerial ladder sections, turntable, pedestal and outriggers will be performed by welders who are certified to American Welding Society Standards DI.1, DI.2 and DI.3 as outlined in the current NFPA 1901 standard.

The weldment assemblies of each production unit will be tested visually and mechanically by an ASNT certified level II non-destructive test technician to comply with the current NFPA standard.

Testing procedures will conform to the American Welding Society Standard B 1.1 0 Guide for non-destructive testing. Test methods may include dye penetrant, ultrasound and magnetic particle where applicable.

Each ladder section will consist of two (2) extruded aluminum side rails and a combination of aluminum rungs, tubular diagonals, verticals and two (2) full-length handrails.

The rungs on all sections will be K-braced for maximum lateral stability.

This K-bracing will extend to the center of each rung to minimize ladder side deflection.

The ladder rungs will be designed to eliminate the need to replace rubber-rung covers.

The rungs will be spaced on 14" centers and have an integral skid-resistant surface as outlined in the current NFPA standard.

An oval shaped rung will be utilized to provide a larger step surface at low angles and more comfortable grip at elevated positions.

The minimum design load will be 500 pounds distributed over a 3.50" wide area as outlined in the current NFPA standard.

Each aerial ladder section will have heat sensor labels that are preset to 300 degrees F with expiration year. The heat labels will meet the current NFPA standard.

The aerial ladder will exceed the current NFPA standard governing the minimum ladder section width and handrail height.

Section	Width	Height
Base Section	34.38"	26.13"
Second Section	27.38"	22.63"
Fly Section	21.38"	19.50"

TURNTABLE

The upper turntable assembly will connect the aerial ladder to the turntable bearing.

The steel structure will have a mounting position for the aerial elevation cylinders, ladder connecting pins and upper turntable operator's position.

A 39.41" diameter turntable bearing with a 3.50" drive gear face will be bolted to the top of the bearing mounting plate with 3/4" diameter Grade 8 plated bolts.

Gear teeth will be stub tooth form.

The rated overturning moment of the turntable bearing will be a minimum of 441,400 ft lbs.

The operator's turntable platform will be constructed of a with non-skid aluminum oxide surface.

The platform will extend 23" from the turntable control station base, with a width of approximately 18".

The rear of the platform will extend approximately 26" back from the turntable and will be approximately 38" wide at the rear.

The turntable will be modified at the passenger side to allow for easier access to the hose bed for hose loading. The portion of the turntable outboard of the rotational motor will be omitted, and the handrails will be modified as required.

The platform will be fastened by grade 8 bolts.

The turntable handrails will be a minimum 42" high and will not increase the overall travel height of the vehicle. The handrails will be constructed from 1.62" diameter extruded 6061-T6 aluminum with a slip resistant knurled surface. The handrails will be anodized to resist corrosion.

A foot switch will be located at the turntable control console to allow hydraulic flow to the aerial device. The foot switch will be protected by a cover to prevent accidental activation. Activation of the foot switch is necessary for aerial operation.

ELEVATION SYSTEM

Dual 5" diameter elevating cylinders will be mounted on the underside of the base section of the ladder.

Two (2) 2.00" diameter stainless steel pins will fasten the cylinder to the turntable and also fasten to the ladder.

The pins will have 125000 psi minimum yield strength and will be secured with .50" GR 8 bolt with lock nuts.

The bolts are to ensure that the pins do not walk out of the mounting brackets on the turntable and base section.

The elevating cylinders will be mounted utilizing maintenance free spherical bearings on both ends of the cylinders.

The aerial base pivot bearings will be maintenance free type bearings (no external lubrication required).

The cylinders will function only to elevate the ladder and not as a structural member to stabilize the ladder side movement.

The elevating cylinders will be provided with pilot operated check valves on the barrel and rod side of the piston to prevent movement of the ladder in case of a loss of hydraulic pressure.

Operation envelope will be -8 to 76 degrees.

The elevation system will be designed following the current NFPA standard.

The elevation hydraulic cylinders will incorporate cushions on the upper limit of travel.

The hydraulic system will have a hydraulic circuit to reduce the elevation raising speed of the aerial.

When the aerial reaches approximately 65 degrees, the circuit will be activated and the elevation speed will be reduced.

The reduce speed will minimize the whipping action of the aerial at maximum elevation.

This circuit will only be for the raise function of the aerial.

The hydraulic elevation cylinders will also serve as a locking device to hold the aerial in the stored position for road travel.

The lowering circuit for the hydraulic cylinders will have a relief valve to prevent damage to the aerial base section or boom support when the aerial is being stored.

EXTENSION/RETRACTION SYSTEM

Both power extension and retraction will be furnished and meet the requirements of the current NFPA standard.

Extension will be by way of two (2) extending cylinders mounted on the side of the base section of the ladder.

The cylinders will be supplied with dual pilot operated check valves on each stabilizer cylinder to hold the cylinder in position should a charged line be severed at any point in the hydraulic system.

No hoses will be permitted between a holding valves and cylinder.

CYLINDER SIZE

Bore	2.50"
Stroke	112.00"

The cylinders will operate through a block and tackle wire rope arrangement to extend and retract the ladder.

Maximum extension of the ladder is to be automatically limited by the stroke of the cylinders.

The normal operating wire rope safety factor will be 5: 1 and the stall safety factor will be 2:1 based on the breaking strength of the wire ropes.

The minimum ratio of the diameter of wire rope used to the diameter of the sheave used will be 1 to 12.

Wire ropes will be constructed of seven (7) strands over an inner wire core for increased flexibility. The wire rope will be galvanized to reduce corrosion.

All cylinder and sheave pivot pins will be made of 125,000 psi yield stainless steel material.

The cylinder and sheaved bearing are designed as not to require external lubrication (maintenance free).

LADDER CABLE SIZE

1st Section (4, 2 extend and 2 retract)	1/2" 7 x 19 galvanized cable
2nd Section (4, 2 extend and 2 retract)	5/16" 7 x 19 galvanized cable

The ladder assembly will consist of three (3) separate weldments that will extend and retract within each other.

Nylatron PAG + OIL slide pads will be utilized between each section to minimize friction.

Four (4) T type interlocking load transfer stations will enclose the slide pads.

The transfer stations will be located at the upper portion of the base and second ladder sections.

Additional guide pad are located along the aerial section to guide the ladder during retraction and extension.

ROTATION SYSTEM

The aerial will be supplied with a powered rotation system as outlined in the current NFPA standard.

The hydraulic rotation motor will provide continuous rotation under all rated conditions and be supplied with a brake to prevent unintentional rotation.

The swing drive brake will meet the side pull test as stated in the current NFPA standard.

A high torque hydraulic motor driven through a spring applied hydraulically released multiple disk brakes into a planetary gearbox will accomplish rotation.

The gearbox will have a minimum continuous torque rating of 60,000 in. lbs. and a minimum intermittent rating of 130,000 in. lbs.

The turntable bearing, ring gear teeth, pinion gear, planetary gearbox and output shaft will be certified by the manufacturer of the components for the application.

ROTATION INTERLOCK

A permanently installed prevention mechanism will be provided as part of the rotation system to prevent the rotation of the aerial device to the side in which the stabilizers have not been fully deployed (short-jacked).

The mechanism will allow full and unrestricted use of the aerial in the 180 degree area on the side(s) where the stabilizers have been fully deployed.

The system will also have a manual override to comply with the current NFPA standard.

AERIAL PEDESTAL

The pedestal assembly will be a welded assembly made of structural steel channel with 1.5" thick top plate and .75" bottom plates, and .375" thick integral bulkheads. The vertical member will be a .375" wall cylinder with a 28" outside diameter and will connect the rotation bearing mounting plate to the lower substructure.

The pedestal assembly will be bolted to the chassis frame with .88" diameter Grade 8 bolts, and will be utilized to mount the outrigger jacks and reservoir for the aerial hydraulic system.

LOAD CAPACITIES

The following load capacities will be established, with the stabilizers at full horizontal extension and placed in the down position, to level the truck and to relieve the weight from the tires and axles. Capacities will be based upon full extension and 360 degree rotation.

A load chart will be visible at the operator's station. The load chart will show the recommended safe load at any condition of the aerial device's elevation and extension. The ratings in an unsupported, fully extended configuration will maintain a 2.5 to 1 safety factor. A safety factor of 2.0 to 1 will be maintained with a 35 mph wind.

The aerial device will have a rated capacity of 750 lbs. consistent with the current NFPA standard.

The rated capacity will include 750 lbs. in personnel allowance and 100 lbs. for equipment mounted at the tip of the ladder.

The aerial device will be rated in multiple configurations as outlined in the current NFPA standard.

The loads in each configuration are in addition to 100 lbs of equipment mounted at the tip.

Condition #1- Tip load only, no water flowing		
Elevation	Capacity in personnel (Maximum)	Pounds (Maximum)
-8 to 29 degrees	3 on Fly	750 lbs
30 to 39 degrees	3 on Fly, 1 on Mid, 1 on Base	750 lbs, 250 lbs, 250 lbs
40 to 49 degrees	3 on Fly, 2 on Mid, 2 on Base	750 lbs, 500 lbs, 500 lbs
50 to 59 degrees	4 on Fly, 2 on Mid, 3 on Base	1000 lbs, 500 lbs, 750 lbs
60 to 76 degrees	4 on Fly, 3 on Mid, 3 on Base	1000 lbs, 750 lbs, 750 lbs
Condition #2 Ladder Tip loads while flowing 1000 GPM		
Elevation	Capacity in Personnel (Maximum)	Pounds (Maximum)
-8 to 29 degrees	2 on Fly	500 lbs
30 to 39 degrees	2 on Fly, 1 on Base	500 lbs, 250 lbs
40 to 49 degrees	2 on Fly, 1 on Mid, 1 on Base	500 lbs, 250 lbs, 250 lbs
50 to 59 degrees	3 on Fly, 2 on Mid, 2 on Base	750 lbs, 500 lbs, 500 lbs
60 to 76 degrees	4 on Fly, 2 on Mid, 3 on Base	1000 lbs, 500 lbs, 750 lbs

Reduced loads at the fly can be redistributed to the mid or base sections as needed.

The tip capacity will be reduced to zero when flowing water with the nozzle above the waterway centerline.

BOOM SUPPORT

A heavy-duty boom support will be provided for support of the ladder in the travel position.

On the base section of the ladder, a stainless steel scuffplate will be provided where the ladder comes into contact with the boom support.

The boom support will be located just to the rear of the chassis cab.

AERIAL BOOM SUPPORT LIGHT

There will be one (1) Amdor®, Model AY-LB-12HW012, 190 lumen, 12" long, white LED strip light mounted on the boom support cradle. This light will be activated when the aerial master switch is activated.

BOOM SUPPORT COMPARTMENT DIRECTLY BEHIND THE CAB

A compartment will be provided on each side of the apparatus directly behind the cab.

Compartment will be made of aluminum treadplate. The interior dimensions of each compartment will be approximately 8.00" wide x 13.00" deep. The height of the compartment will be to the bottom of the crosslays.

A single pan aluminum treadplate door will be provided for each compartment. Each door will be hinged along the forward edge.

There will be a pair of D-handle latches provided on each door. Latches will be spaced as evenly as possible, yet both latches will remain accessible from the ground.

AERIAL BOOM PANEL

There will be one boom panel provided on each side of the aerial ladder base section. The boom panel will be painted lower job color.

The boom panels will be designed so no mounting bolts are in the face of the panel. This will keep the lettering surface free of holes.

EXTENSION INDICATOR

Extension markings and corresponding numerical indicators will be provided along each inside and outside top rail of the base section of the aerial every 10'. They will indicate various positions of extension up to full. Markings and indicators will be clearly visible to the console operator. To aid in visibility during hours of darkness, the markings and numerical indicators will be red reflective material.

FOLDING STEPS

One (1) set of folding steps will be provided at the tip of the ladder. An additional set of folding steps will be provided at the base of the fly section. The steps will be bright finished with a black tread

coating on the stepping surface. Each step will have an integrated LED to illuminate the stepping surface.

STOKES AND MISCELLANEOUS STORAGE BOX

There will be an aluminum storage box painted job color and provided at the base section of the aerial ladder on the right side of the aerial device while viewed from the turntable. The box will be located in place of the aerial boom panel. The box will have a hinged cover with pair of rubber draw latches to secure the equipment. The cover will have the same finish as the box. The cover will be tied in to the open door indicator circuitry when in the open position. A divider will be provided to separate the stokes basket from the other equipment. The box will have no louvers.

There will be a white LED strip light installed on the inside edge of the box in the miscellaneous storage area.

The size of the stokes basket will be 88.00" long x 26.00" wide x 9.00" high. The outside dimensions of the box will be 90.00" long x 26.50" high x 15.50" wide.

The maximum capacity of this box will be 75 lb.

STABILITY TEST

An aerial stability test will be run on the apparatus using the maximum weight allowance for tip options.

LIGHTS FOR TURNTABLE WALKWAY

There will be white LED lights provided at the aerial turntable. The lights will be located to illuminate the entire walking surface of the turntable including the area around the turntable console. These lights will be activated by the aerial master switch.

TURNTABLE CONSOLE LIGHTING

There will be one (1) TecNiq, Model T10, white LED light strip mounted in the turntable console cover to illuminate the controls located on both the upper and lower portion of the turntable control station. These lights will be activated by the aerial master switch.

CONTROL STATION

A control station will be located at the rear of the apparatus in an easily accessible area.

Controls and indicator lights are clearly identified and conveniently located for ease of operation and viewing.

- Right stabilizer fully extended indicator light
- Right stabilizer planted indicator light
- Left stabilizer fully extended indicator light
- Left stabilizer planted indicator light
- Hydraulic emergency power switch
- Override switch for stabilizers not fully extended

- Manual overrides for aerial and stabilizers
- Main hydraulic pressure test port
- High idle switch

A water tight compartment will be provided in the left rear stabilizer body opening and contains the aerial circuit breakers, interlock components and control circuit distribution terminals.

TURNABLE CONTROL STATION

An aerial ladder operators position will be supplied as outlined in the current edition of NFPA 1901.

The operator's position will be located on the left side of the aerial turntable.

The apparatus will be supplied with labels to warn of electrocution hazard. The control console will provide a service access door on the front and side of the console to access hydraulic and electrical connections.

The control console will be angled to face the operator with an etched panel for long service life. The console will be labeled and supplied with lights for night operation.

AERIAL LADDER CONTROL LEVERS

The control levers will be arranged as outlined in the current edition of NFPA 1901.

They will be capable of being operated independently or simultaneously.

The starting or stopping of any one control will not affect the movement speed of the other controls when they are being used simultaneously.

The first lever from the left will be the extension control (forward for extend and back for retract).

The second lever will be for rotation (forward for clockwise and back for counter clockwise).

The third handle will control elevation (forward for down and back for up).

The aerial will employ direct hydraulic controls for precise control and dependable service with minimal electrical functions.

A foot-operated deadman switch will be provided to prevent unintentional movement as outlined in the current edition of NFPA 1901.

Operator's control console will be provided with a hinged aluminum cover. Controls and indicator lights are clearly identified and conveniently located for ease of operation and viewing. Operator's turntable control panel will include:

- Elevation, Extension and Rotation controls
- Fast idle switch
- Panel light mounted in cover

- Rung alignment indicator light
- Tip/Tracking lights
- System pressure gauge
- Indicator/Alarm test switch
- EPU switch
- Load rating tag/decal
- "STABILIZER NOT FULLY EXTENDED" indicator light

STABILIZATION

The vehicle will come equipped with an underslung out and down stabilization system. The system will consist of two (2) hydraulically operated out and down style stabilizers mounted under the frame for a low center of gravity.

The stabilizers will have a maximum spread of 16' from the centerline of the footpads when fully extended. The internal tubes will be 8.00" x 10.00" with 1/2" thick top and bottom plates and 3/8" thick sides of 100,000 psi minimum yield strength steel and will be extended out by hydraulic cylinders. The cylinders will have pilot-operated check valves with thermal relief. This will insure that the beams will be in the stowed during travel. The external tubes will be 9-3/4" x 11-3/4" with 3/8" wall thickness. The internal jack tubes will slide on permanently attached wear pads.

The extension cylinders will be totally enclosed within the extension beams. The horizontal extension cylinders will be of the trombone type to eliminate wear and potential failure of hydraulic hoses.

The stabilizers will have a tip over safety margin of 1 1/2 times its rated load in any position the aerial device can be placed as outlined in the current edition of NFPA 1901. The aerial will be able to sustain a 1 1/3 to 1 rated load on a 5 degree slope downward in the position most likely to cause overturning. The maximum ground slope the apparatus can be set up on is 10 percent. On the 10 percent slope, the apparatus can be leveled within a 5 percent operating range with the apparatus cab facing uphill.

The cylinders will be supplied with dual pilot operated check valves on each stabilizer cylinder to hold the cylinder in the stowed or working position should a charged line be severed at any point in the hydraulic system. Stabilizers will contain safety lock valves and will require no mechanical pins to assure there will be no "leak down" of stabilizer legs.

Each stabilizer leg will have attached to the end of the leg a pan that will be of the split-pan design and will be a maximum 13.00" wide to allow the extension of the stabilizer between parked cars. This pan will serve as a protective guard and a mounting surface for warning lights. The top, forward, and rear edges will be flanged back for added strength.

The stabilizer cylinders will be sized to maximize ground penetration. The lift cylinders will be mounted on the end of the stabilizer tube and will have the following dimensions:

4.00" bore

3.00" rod

21.00" stroke

The stabilizer extension cylinders will have the following dimensions

2.25" bore

1.38" rod

54.00" stroke

Each stabilizer that can be extended from the body will be supplied with a red warning light as outlined in the current edition of NFPA 1901. The stabilizers will be connected to a warning light in the cab to warn the operator if the stabilizers are deployed.

The ground contact area for each stabilizer will be a 12.00" diameter circular stainless steel disc without the auxiliary pads and 24.00" x 24.00" with lightweight composite material pads deployed. The ground pressure will not exceed 75 psi when the apparatus is fully loaded and the aerial device is carrying its rated capacity in every position. This will be accomplished with the stabilizer pads deployed, as outlined in the current edition of NFPA 1901. There will be one (1) pad located on each side of the apparatus, behind the stabilizers.

STABILIZER CONTROLS

One (1) electric solenoid valve will control the stabilizers. The control switches will be located at the rear of the apparatus, so the operator may observe the stabilizers during deployment. An audible alarm with a minimum 87 dba will also sound while the stabilizers are in motion as required by the current edition of NFPA 1901. Stabilizer deployment will be completed in less than 90 seconds.

There will be an interlock that prevents the operation of the ladder until the stabilizers are down and properly set. The interlock system will be designed to prevent aerial movement until the stabilizers are set. Additionally, the system will not permit stabilizer movement when the aerial is out of the cradle. This requirement is outlined in the current edition of NFPA 1901. One (1) switch on each stabilizer leg, will sense when each respective leg is in firm contact with the ground. This condition will be indicated when one green indicator light for each stabilizer is on. The interlock system will have a manual override with access through a door at the turntable access stepwell of the truck.

To simplify leveling the apparatus, two color-coded level indicators will be supplied at the rear of the apparatus. One indicator will be for front to rear level and one for side-to-side level.

STABILIZER PAN MATERIAL

The aerial stabilizer pans will be polished stainless steel.

STABILIZER CONTROL BOX DOORS

Vertically hinged smooth aluminum doors will be provided over each stabilizer control box. The doors will be hinged along the inboard edge and be provided with a Southco C2 chrome raised trigger lever latch.

POWER TAKEOFF / HYDRAULIC PUMP

The apparatus will be equipped with a power takeoff driven by the chassis transmission and actuated by an electric shift, located inside the cab. The power takeoff which drives the hydraulic pump will meet all the requirements for the aerial unit operations. The hydraulic system will operate at a nominal 26 gallons per minute flows at pressure up to 2800 pounds per square inch. An amber indicator light will be installed on the cab instrument panel to notify the operator that the power takeoff is engaged.

An interlock will be provided that allows operation of aerial power only after the chassis spring brake has been set and the chassis transmission has either been placed in the neutral position or drive position after the driveline has been disengaged from the rear axle.

HYDRAULIC CYLINDERS

All hydraulic cylinders used on the aerial device will be produced by a manufacturer that specializes in the production of hydraulic cylinders.

Each hydraulic cylinder will have a structural warranty of not less than five (5) years, and a seal warranty of not less than two and one-half (2.5) years.

HYDRAULIC SYSTEM

The hydraulic system will have a five year warranty.

The hydraulic plumbing will consist of hydraulic rated hoses.

The hoses transmitting hydraulic pressure will have abrasion resistant covers.

All hydraulic fittings will be plated to minimize corrosion.

The fitting will use an "O" ring seal where possible to minimize hydraulic leaks.

All pressure carrying hydraulic hoses will have a 4:1 safety rating based on burst pressure.

An interlock will be provided that prevents activation of the hydraulic pump until the transmission is placed in neutral and the parking brake set as outlined in the current NFPA standard.

The hydraulic system will be of the load sense design and incorporate features to minimize heat build up and provide smooth control of the aerial ladder.

The system will meet the performance requirement in the current NFPA standard, which requires adequate cooling less than 2 1/2 hours of operations.

All hydraulic components that are non-sealing whose failure could result in the movement of the aerial will comply with the current NFPA standard and have burst strength of 4:1.

Dynamic sealing components whose failure could cause aerial movement will have a margin of 2 to 1 on maximum operating pressure per the current NFPA standard.

All hydraulic hoses, tubes and connections will have minimum burst strength of 3:1 per the current NFPA standard.

A hydraulic oil pressure gauge will be supplied at the base control location per the current NFPA standard.

A hydraulic oil dipstick gauge with 100-mesh fill strainer will be supplied at the rear of the unit for easy fluid level verification.

A chassis-mounted positive displacement piston pump for consistent pressure and rapid response will supply hydraulic power for all aerial operations.

The positive displacement piston pump will be able to supply 26 gallons per minute at a maximum pressure of 2800 psi.

The system will operate between 500 and 2800 psi with flow controls to protect hydraulic components and incorporate a relief valve set at 2950 psi to prevent over pressurization.

The hydraulic pump will be solely dedicated to aerial operations.

The hydraulic system will consist of a 40-gallon reservoir mounted to the pedestal and plumbed to the hydraulic pump.

The tank will be supplied with a removable top clean-out cover to access the inside of the tank.

There will be plumbing for a supply and return line and a tank drain on the reservoir.

The hydraulic pump suction line will have a shut off valve for pump servicing.

The hydraulic oil reservoir will be labeled per the current NFPA standard.

The hydraulic system will use multi-weight, SAE grade oil. ISO grade will be based on geographical location.

The oil will be pre-filtered before it is installed into the reservoir.

Oil samples taken from the oil diagnostic test ports must meet or exceed the hydraulic rating of 18/15/13 per ISO 4406:1999 before delivery.

The oil filters will be mounted above the hydraulic reservoir oil level to eliminate oil loss during filter change.

The system will incorporate the following filters to provide dependable service:

- Separate magnet (not on strainer)
- Reservoir suction strainer: 125 mesh
- Pressure filter with by-pass indicator: 2/3/5 micron, Beta rating of 2/20/75 or better
- Return filter with by-pass indicator: 2/3/5 micron, Beta rating of 2/20/75 or better
- Desiccant breather filter: Water capacity 13 fluid oz, 2 micron rating

The aerial hydraulic system will be designed in such a manner that a hydraulic pump failure or line rupture will not allow the aerial or outriggers to lose position.

Hydraulic holding valves will be mounted directly on cylinders.

To insure reliable performance of holding valves, no hoses will be permitted between a holding valve and cylinder.

The aerial will incorporate the use of trombone steel tubes inside the stabilizer beams to eliminate hydraulic hose wear and leaks.

Hydraulic power to the ladder will be transferred from the pedestal by a hydraulic swivel.

EMERGENCY PUMP

The hydraulic system will be designed with an auxiliary power unit meeting the guidelines of the current NFPA standard.

The auxiliary power unit will be a 12-volt pump connected to the chassis electrical system.

The pump will provide operation at reduced speeds to store the aerial device and outriggers for road transportation.

Self-centering switches will be provided at the turntable and each stabilizer control station to activate the system.

The system will be designed to provide a minimum of 30 minutes of hydraulic power to operate functions.

HYDRAULIC SWIVEL

The aerial ladder will be equipped with a five (5) port, high pressure hydraulic swivel which will connect the hydraulic lines from the hydraulic pump and reservoir through the rotation point to the aerial control bank. The hydraulic swivel will allow for 360 degree continuous rotation of the aerial.

ELECTRIC SWIVEL

The ladder will be equipped with an electric swivel to allow 360 degrees rotation of the aerial while connecting all electrical circuits through the rotation point. A minimum of 32 collector rings will be provided that are capable of supplying 20 amp continuous service. All collector rings will be enclosed and protected with desiccant plugs against condensation and corrosion. No oil or silicone will be used.

13-BIT ABSOLUTE ENCODER

The aerial ladder will be equipped with a 13-Bit Absolute Encoder.

The 13-Bit Absolute Encoder will provide a unique binary word to reference each position and direction for all 360 degrees of rotation.

If the power is interrupted for any reason, the 13-Bit Absolute Encoder will allow power to be returned to the system without having to re-zero the settings.

The 13-Bit Absolute Encoder will be an integral part of a micro-processor based control system.

ELECTRICAL SYSTEM

The aerial electrical system will be designed and manufactured in such a way that the power and signal protection and control compartments will contain circuit protection devices and power control devices.

The power and signal protection and control components will be protected against corrosion, excessive heat, excessive vibration, physical damage and water spray.

The electrical system will be designed and manufactured in such a way that all of the serviceable components will be readily accessible.

The electrical system will be designed and manufactured so that circuit protection devices will be utilized to protect each circuit.

All circuit protection devices will be sized to prevent wire and component damage when subjected to extreme current overload.

The electrical system will be designed and manufactured so that general protection circuit breakers will be Type-I automatic reset (continuously resetting) or Type-II (manual resetting) and conform to SAE J553 or J258. When required, automotive type fuses conforming to SAE J554, J1284, J1888 or J2077 will be utilized to protect electronic equipment.

The electrical system will be designed and manufactured so that power control relays and solenoids, when utilized, will have a direct current (dc) rating of 125 percent of the maximum current for which the circuit is protected.

The aerial electrical system will be designed and manufactured utilizing toggle switches that are certified for the outside conditions that fire apparatus experience and meet military specifications. No rocker style switches are allowed for outside applications.

The aerial electrical system will be designed and manufactured in such a way that all wiring is protected through conduit or loom.

The aerial electrical system will be designed and manufactured in such a way that all wiring harnesses are properly supported to eliminate harness damage through rubbing.

The aerial electrical system will be designed and manufactured in such a way that all connectors utilized in the system will be of a waterproof design.

The aerial electrical system will be designed and manufactured in such a way that all connectors, except for connections to vendor supplied components, will incorporate solid, plated connecting pins.

The aerial electrical system will be designed and manufactured in such a way that a mechanical rocker proximity switch and light are incorporated into the boom support.

The aerial electrical system will be designed and manufactured so that the aerial master and aerial PTO can be engaged after the water pump has been engaged, without having to bring the RPM back to idle.

All switches will meet MIL-SPEC MIL-S-3950 specifications and will have the following features:

Toggle switches with flush screw terminals.

Environmentally sealed

Positive detent action

The aerial electrical system will be designed with standard cabling to the tip of the aerial consisting of the following:

One 12/8 cable.

One 16/20 cable.

LEFT SIDE STABILIZER PANEL

A fuse and relay panel located behind the left side stabilizer.

NEMA 6x rated weatherproof enclosure.

Relays and fuses for aerial and stabilizer interlocks and control switches.

TURNTABLE

The turntable will be lighted for nighttime operation with 2 work lights activated by the aerial master switch.

TURNTABLE CONSOLE

The following switches and indicator lights will be standard on the turntable console:

High Idle On/Off Switch

Tip/Tracking Lights Switch

Indicator And Alarm Test Switch

Emergency Hydraulic Power Switch

Stabilizers Not Fully Extended Amber Indicator Light

Rung Alignment Green Indicator Light

A turntable console will be lighted for nighttime operation with 1 work light activated by the aerial master switch.

A fuse panel located in the turntable console with the following features:

Splash proof enclosure.

TURNTABLE OVERRIDE CONTROLS

Illumination will be provided for the override controls located within the compartment on the turntable console. The light will activate when the aerial master switch is active and the switch on the light is activated.

MASTER OVERRIDE CONTROLS

An emergency power switch will be located in the driver side turntable step well. The switch will activate the emergency power unit and allow control of the aerial or stabilizers based on the direction the switch is toggled.

A work light will be provided to illuminate the master override controls when the battery switch is active and the master override door is open.

BOOM SUPPORT

A Turck relay proximity sensor will be provided on the boom support to detect if the aerial device is fully stowed within the boom support.

TIP LIGHT

There will be two (2) Whelen® Model MP**, 5,695 lumens 12 volt DC LED lights installed at the tip of the aerial device.

One (1) will be located on the left side with left side tip light to include spot optics.

One (1) will be located on the right side with right side tip light to include spot optics.

- The light(s) to be installed on adjustable bail bracket(s).
- The painted parts of this light assembly to be white

The lights will be controlled with the tracking lights.

TRACKING LIGHTS

There will be two (2) Whelen® MP**, 5,695 lumens 12 volt DC LED lights installed on the base section of the aerial device below the hand rails per the following:

- One (1) will be located on the left side with left side tracking light to include spot optics.
- One (1) will be located on the right side with right side tracking light to include spot optics.
- The light(s) to be installed on adjustable bail bracket(s).
- The painted parts of this light assembly to be white.

The tracking lights will be controlled by a switch located at the platform/tip and turntable.

LIGHTING ON AERIAL LADDER

There will be TecNiq, Model D02, LED rung lighting provided on both sides of the aerial ladder base, mid, and fly sections. The lighting will be located adjacent to the ladder rungs along the lower rail of the ladder sections and will run the length of the ladder section.

The color of the sections will be:

- The base section of the ladder to be blue.
- The mid section of the ladder to be white.
- The fly section of the ladder to be red.

The LED rung lighting will be activated when the aerial master switch is activated, a switch at the turntable operator's panel is activated through the aerial master and a switch at the turntable operator's panel is activated through the master battery switch.

The lights may be load managed when the parking brake is applied.

STABILIZER WARNING LIGHTS

There will be two (2) Whelen®, Model M6*, LED flashing warning lights with clear lenses and Whelen, Model M6FC, chrome flanges installed on the stabilizer cover panels, one (1) each side.

- The LED lights will be red.

These warning lights will be activated by the same switch as the side warning lights.

STABILIZER BEAM WARNING LIGHTS

Two (2) 4.00" diameter red LED flashing lights will be mounted on each stabilizer, one (1) facing forward and one (1) facing rearward. The lights will be Grote Supernova 40 series LED lights. The lights will be recessed in the horizontal beam of the stabilizer. These warning lights will be activated with the aerial master switch.

STABILIZER SCENE LIGHTS

There will be one (1) Truck-Lite, Model 40227C 4.00" incandescent, scene light installed under each stabilizer beam to illuminate the surrounding area. A total of two (2) lights will be installed. These lights will be activated by the aerial master switch.

120-VOLT RECEPTACLES AT TIP

There will be two (2) 15 amp, 120-volt, three (3)-prong twist lock Woodhead 65W47, receptacles with weatherproof cover provided at the tip of the aerial device. Each receptacle will have its own circuit.

2-WAY AERIAL COMMUNICATION SYSTEM

There will be a Fire Research, Model ICA910, two-way intercom system provided. The control module with an LED volume display and push-button volume control will be located on the turntable operator console.

A hands free module will be located at the aerial tip or platform and constantly transmit to the other module unless the control module push-to-talk button is pressed.

Each intercom unit will be weatherproof.

RAISED AERIAL PEDESTAL

The aerial pedestal will be raised to accommodate the height of the cab.

LIFTING EYE ASSEMBLY - ROPE RESCUE ATTACHMENT

A lifting eye assembly will be provided that is designed to evenly distribute load at the tip of the aerial. The egress will include attachment points for the lifting eye assembly. The lift eye assembly is retained by two (2) locking pins, one (1) at each end outboard side of the egress. Leveling is maintained by the lifting eye assembly rotating within the egress mounting.

RESCUE LIFTING SYSTEM

A rescue lifting attachment will be provided. The lifting attachment will mount to the aerial egress and will consist of a pair of nylatron pulleys mounted to a stainless steel shaft. The pulleys will be adjustable from side to side and will have a total lifting capacity of 750lb, regardless of whether one (1) or both pulleys are being utilized.

AERIAL TURNTABLE MANSAVER™ BARS

Yellow ManSaver™ bars will be installed at the aerial turntable.

WATER SYSTEM

A waterway system will be provided consisting of the following components and features:

A 5.00" pipe will be connected to the water supply on one end and to a 4.00" internal diameter water swivel at the rotation point of the turntable. The water swivel will permit 360 degree continuous rotation of the aerial device.

The 4.00" waterway swivel is to be routed through the rotation point swivel up to the heel pin swivel. The heel pin swivel will allow the water to flow to the ladder pipe while elevating the aerial ladder from - 5 degrees to 75 degrees. The heel pivot pin is not integral with the waterway swivel at any point. The design of the waterway will allow complete servicing of the waterway swivel without disturbing the heel pivot pin.

The integral telescopic water system will consist of a 4.50" diameter tube in the base section, a 4.00" diameter tube in the mid-section and a 3.50" diameter tube in the fly section. The telescopic waterway will be constructed of anodized aluminum pipe.

The rotational torque will have adequate power to rotate the ladder into a full 1500 gallon per minute water stream directed at 90 degrees to the side while maintaining the 500 pound tip load.

The aerial will be capable of discharging up to 1500 gallons per minute at 100 pounds per square inch parallel to the ladder and 90 degrees to each side of center while maintaining the 500 pound tip load.

The safety factor will be 2.5:1 while flowing up to 1000 gallons per minute at 100 pounds per square inch and 2:1 while flowing between 1000 and 1500 gallons per minute at 100 pounds per square inch.

An adjustable pressure relief valve will be furnished to protect the aerial waterway from a pressure surge.

A 1.50" drain valve will be located at the lowest point of the waterway system.

WATERWAY SEALS

The waterway seals will be of type-B PolyPak design, composed of nitroxile seal and a nitrile wiper, which together offer maximum stability and extrusion resistance on the waterway. The seal will be capable of withstanding pressures up to 2000 psi, temperatures in excess of 250 degrees Fahrenheit and have resistance to all foam generating solutions. The seals will be internally lubricated.

The waterway seals will have automatic centering guides constructed of synthetic thermalpolymer. The guides will provide positive centering of the extendible sections within each other and the base section to insure longer service life and smoother operation.

AERIAL MONITOR

An Akron Model 3480 monitor with stow and deploy will be provided at the tip with a Akron 1500 gpm Model 5178.

The monitor's functions will be controlled electrically from two (2) separate locations. One (1) control will be located at the control console and the other at the ladder tip.

There will be a courtesy light at the tip of the aerial to illuminate the controls.

Vertical travel of this monitor will be -45 degrees to 90 degrees. Horizontal rotation will be 90 degrees to each side of the center line of the aerial device.

AERIAL WATERWAY FLOW METER

A Fire Research Corporation Model DF430, digital flow indicator with a four (4) digit LED display will be provided for the aerial waterway at the turntable control station.

The display will have a flow totalizer, programmable high and low flow warnings, and automatically adjust LED brightness for day/night viewing.

REAR INLET

A 5.00" NST inlet to the aerial waterway will be provided at the rear of the apparatus. The inlet will have 5.00" aluminum plumbing. It will be furnished with a 5.00" chrome plated adapter and a 5.00" chrome plated, long handle cap.

WATERWAY LOCKING SYSTEM

The aerial ladder waterway monitor will be capable of being positioned at either the fly section or at the next lower section of the ladder.

The monitor location will be changeable by the use of a single handle, located at the side of the ladder.

The handle, attached to a cam bracket, will simply be moved forward to lock the monitor at the fly section and back to lock it to the previous section.

There will be no pins to remove and reinstall.

The monitor will be operational at all times, regardless of its position, without connecting or disconnecting electrical lines.

ADAPTER, AERIAL INLET

A 5.00" FNST x 4.00" FNST chrome plated swivel will be provided for the aerial inlet at the rear of the apparatus. It will be furnished with a 4.00" chrome plated plug.

TOOLS

The following tools will be provided for retorquing of all specified bolts as recommended by the manufacturer:

- Torque Wrench
- All Required Extensions, Sockets and Adapters
- 4-to-1 Multiplier

MANUALS

Two (2) operator maintenance manuals and two (2) wiring diagrams pertaining to the aerial device will be provided with the apparatus at time of pick-up.

INITIAL INSTRUCTION

On initial delivery of the fire apparatus, the contractor will supply a qualified representative to demonstrate the apparatus and provide initial instruction to the fire department regarding the operation, care, and maintenance of the apparatus for a period of four (4) consecutive days.

EQUIPMENT MOUNTING

South Coast Fire Equipment will mount fire department specified equipment up to a predetermined cost. The mounting may include fabrication, purchasing of mounting equipment, and labor for installation. Fire Department may provide equipment or South Coast can purchase equipment for installation.

LOOSE EQUIPMENT

The following equipment will be furnished with the completed unit:

- One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit.

NFPA LOOSE EQUIPMENT

NFPA Required Loose Equipment Provided by Fire Department

The following loose equipment as outlined in NFPA 1900, 2024 edition, table 8.1 and CAN/ULC S515:2024 edition, section 5.2 will be provided by the fire department:

- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 107, *American National Standard for High-Visibility Safety Apparel and Accessories*, and have a five-point breakaway feature that includes two (2) at the shoulders, two (2) at the sides, and one (1) at the front.
- Five (5) fluorescent orange traffic cones not less than 28.00" (711 mm) in height, each equipped with a 6.00" (152 mm) retro-reflective white band no more than 4.00" (152 mm) from the top of the cone, and an additional 4.00" (102 mm) retro-reflective white band 2.00" (51 mm) below the 6.00" (152 mm) band.
- Five (5) illuminated warning devices such as highway flares, unless the five (5) fluorescent orange traffic cones have illuminating capabilities.
- Four (4) ladder belts meeting the requirements of NFPA 2500.

NFPA Loose Equipment That Should be Considered

The following loose equipment as outlined in NFPA 1900, 2024 edition, appendix table A.8.4 (a) and CAN/ULC S515:2024 edition, section 5.2 should be considered:

- 800 ft (240 m) of 2.50" (65 mm) or larger fire hose
- 400 ft (120 m) of 1.50" (38 mm), 1.75" (45 mm), or 2.00" (52 mm) fire hose
- One (1) handline nozzle, 200 gpm min
- Two (2) handline nozzles, 95 gpm min
- One (1) playpipe with shutoff and 1", 1.125", and 1.25" tips
- Four (4) SCBA apparatus
- Four (4) SCBA spare cylinders
- One (1) first aid kit.
- Four (4) salvage covers, each a minimum size of 12 ft x 18 ft (3.6 m x 5.5 m).
- Four (4) combination spanner wrenches.
- Two (2) hydrant wrenches.
- One (1) double female 2.50" adapter with national hose (NH) thread.
- One (1) double male 2.50" adapter with national hose (NH) thread.
- One (1) rubber mallet, suitable for use on suction hose connections.
- One (1) 150 ft (45 m) light-use life safety rope meeting the requirements of NFPA 2500.
- One (1) 150 ft (45 m) general-use life safety rope meeting the requirements of NFPA 2500.
- One (1) automatic external defibrillator (AED).

SOFT SUCTION HOSE

There will be no soft suction hose provided.

DRY CHEMICAL EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

FLATHEAD AXE PROVIDED BY FIRE DEPARTMENT

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

PICKHEAD AXE PROVIDED BY FIRE DEPARTMENT

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

PAINT PROCESS

The exterior custom cab and body painting procedure will consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body will be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces will be removed and sanded to a smooth finish. Exterior seams will be sealed before painting. Exterior surfaces that will not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.

2. Chemical Cleaning and Pretreatment - All surfaces will be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces will be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces will be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion.
3. Surfacer Primer - The Surfacer Primer will be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.
4. Finish Sanding - The Surfacer Primer will be sanded with a fine grit abrasive to achieve an ultra-smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.
5. Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.
6. Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat will be applied. The Basecoat will be applied to a thickness that will achieve the proper color match. The Basecoat will be used in conjunction with a urethane clear coat to provide protection from the environment.
7. Clear Coat - Two (2) coats of Clear Coat will be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors will be Clear Coated to match the body. Paint warranty for the roll-up doors will be provided by the roll-up door manufacturer.

After the cab and body are painted, the color will be verified to make sure that it matches the color standard. Electronic color measuring equipment will be used to compare the color sample to the color standard entered into the computer. Color specifications will be used to determine the color match. A Delta E reading will be used to determine a good color match within each family color.

All removable items such as brackets, compartment doors, door hinges, and trim will be removed and painted separately if required, to ensure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly will be finish painted before assembly.

The paint finish quality levels for critical areas of the apparatus (cab front and sides, body sides and doors, and boom lettering panels) are to meet or exceed Cadillac/General Motors GMW15777 global paint requirements. Orange peel levels are to meet or exceed the #6 A.C.T. standard in critical areas. The manufacture's written paint standards will be available upon request.

Environmental Impact

Contractor will meet or exceed all current state regulations concerning paint operations. Pollution control will include measures to protect the atmosphere, water and soil. Controls will include the following conditions:

- Topcoats and primers will be chrome and lead free.

- Metal treatment chemicals will be chrome free. The wastewater generated in the metal treatment process will be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations will have a 99.99 percent efficiency factor.
- Particulate emissions from painting operations will be collected by a dry filter or water wash process. If the dry filter is used, it will have an efficiency rating of 98 percent. Water wash systems will be 99.97 percent efficient.
- Water from water wash booths will be reused. Solids will be removed on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner.
- Empty metal paint containers will be recycled to recover the metal.
- Solvents used in clean-up operations will be recycled on-site or sent off-site for distillation and returned for reuse.

Additionally, the finished apparatus will not be manufactured with or contain products that have ozone depleting substances. Contractor will, upon demand, present evidence that the manufacturing facility meets the above conditions and that it is in compliance with his state EPA rules and regulations.

TWO-TONE CAB PAINT

The cab will be painted two-tone with the upper section painted #10 white and the lower section painted Red 1024 (FLNA32185). There will be a standard two-tone cab paint break provided.

There will be a special cab shield designed and shown on the lettering and striping print.

BODY PAINT

The body will be painted to match the lower section of the cab.

PAINT CHASSIS FRAME ASSEMBLY

The chassis frame assembly will be finished with a single system black top coat before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

Components that are included with the chassis frame assembly that will be painted (unless otherwise stated in a secondary option) are:

- Frame rails
- Frame liners
- Cross members
- Axles
- Suspensions
- Steering gear
- Battery boxes
- Bumper extension weldment
- Frame extensions
- Body mounting angles

- Rear Body support substructure (front and rear)
- Pump house substructure
- Steel fuel tank
- Castings
- Individual piece parts used in chassis and body assembly

Components treated with epoxy E-coat protection prior to paint:

- Two (2) C-channel frame rails
- Two (2) frame liners

The E-coat process will meet the technical properties shown.

AXLE HUB PAINT

All axle hubs will be painted to match lower job color.

COMPARTMENT INTERIOR PAINT

The interior of all compartments will be painted with a gray spatter finish for ease of cleaning and to make it easier to touch up scratches and nicks.

AERIAL PAINT COLOR

All aerial device ladder sections will have a natural swirl finish.

The aerial device paint procedure will consist of a seven (7) step finishing process as follows:

1. Manual Surface Preparation - All exposed metal surfaces on the aerial device structural components above the rotation point will be thoroughly cleaned and mechanically shot-blasted to remove metal impurities and prepare the aerial for painting.
2. Zinc Rich Primer - Zinc rich primer will be applied to the torque box and stabilizers.
3. Primer/Surfacer Coats - A two (2) component epoxy primer/surfacer will be applied to the mechanically shot-blasted metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface. All seams will be caulked with a two (2) component epoxy caulk before painting.
4. Hand Sanding - The primer/surfacer coat of the outer surfaces of the hand rails and base rails will be lightly sanded to a smooth finish.
5. Primer Coat - A two (2) component epoxy primer coat will be applied over the sanded primer.
6. Topcoat Paint - Urethane base coat will be applied to opacity for correct color matching.
7. Clear Coat - Two (2) coats of an automotive grade two (2) component urethane will be applied.

Surfaces that will not be painted include all chrome plated, polished stainless steel, anodized aluminum and bright aluminum treadplate.

All buy out components, such as monitor, nozzle, gauges, etc. will be supplied as received from the vendor.

Removable items such as brackets will be removed and painted separately to ensure paint coverage behind all mounted items.

The aerial device components will be painted as follows using the aforementioned seven (7) step finishing process:

- Aerial turntable: white 10
- Aerial control console: white 10
- Aerial lift and extension cylinders: white 10
- Aerial torque box, support structure and components below the rotation point: gloss black primer
- Aerial stabilizers: black 101
- Aerial egress: #444 orange day glow. This paint color is not covered under any paint warranty.
- Aerial boom support: gloss black primer

REFLECTIVE STRIPES

Three (3) reflective stripes will be provided across the front of the vehicle and along the sides of the body. The reflective band will consist of a 1.00" white stripe at the top with a 1.00" gap then a 4.00" white stripe with a 1.00" gap and a 1.00" white stripe on the bottom.

The reflective band provided on the cab face will be at the headlight level.

REAR CHEVRON STRIPING

There will be alternating chevron striping located on the rear-facing vertical surface of the apparatus. Covered surfaces will include the rear wall and aluminum doors. Roll up doors, stainless steel access doors, and the center rear wall behind the access steps will not be covered in chevron.

The colors will be red and fluorescent yellow green diamond grade.

Each stripe will be 6.00" in width.

This will meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface will be covered with chevron striping.

REFLECTIVE STRIPE ON STABILIZERS

There will be a 4.00" wide fluorescent yellow green diamond grade reflective stripe provided on the forward and rear facing side of all aerial stabilizers.

CAB DOOR REFLECTIVE STRIPE

A 6.00" x 16.00" black reflective stripe will be provided across the interior of each cab door. The stripe will be located approximately 1.00" up from the bottom, on the door panel.

This stripe will meet the current edition of applicable NFPA standards.

LETTERING

There will be reflective lettering, 2.00" high, with outline and shade provided. There will be 14 letters provided.

LETTERING

Forty-one (41) to sixty (60) reflective lettering, 6.00" high, with outline and shade will be provided.

LETTERING

There will be reflective lettering, 12.00" high, with outline and shade provided. There will be six (6) letters provided.

LETTERING

Sixty-one (61) to eighty (80) reflective lettering, 3.00" high, with outline and shade will be provided.

LETTERING

One (1) to twenty (20) reflective lettering, 8.00" high, with outline and shade will be provided.

PAINTED PLATE(S) FOR LETTERING/NUMERALS

There will be two (2) painted aluminum plate(s) provided for department lettering. They will be mounted on the rear of the truck and will be 7" x 17" in size.

DECAL INSTALLATION

There will be one (1) pair of decals furnished by the fire department and applied by the apparatus manufacturer.

LETTERING/NUMERALS ON CAB GRILLE

Two (2) painted letters/numerals, as determined by the fire department, will be provided on the cab grille.

FIRE APPARATUS PARTS MANUAL

There will be one (1) custom parts manual(s) in USB flash drive format for the complete fire apparatus provided.

The manual(s) will contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in alphabetical order
- Instructions on how to locate parts

Each manual will be specifically written for the chassis and body model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

Service Parts Internet Site

The service parts information included in these manuals are also available on the Pierce website. The website offers additional functions and features not contained in this manual, such as digital

photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

CHASSIS SERVICE MANUALS

There will be one (1) chassis service manuals on USB flash drives containing parts and service information on major components provided with the completed unit.

The manual will contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix

The manual will be specifically written for the chassis model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

CHASSIS OPERATION MANUAL

The chassis operation manual will be provided on one (1) USB flash drive.

ONE (1) YEAR MATERIAL AND WORKMANSHIP

A Pierce basic apparatus limited warranty certificate, WA0008, is included with this proposal.

ENGINE WARRANTY

A Cummins **five (5) year** limited engine warranty will be provided. A limited warranty certificate, WA0181, is included with this proposal.

STEERING GEAR WARRANTY

A Sheppard **three (3) year** limited steering gear warranty will be provided. A copy of the warranty certificate will be submitted with this proposal.

FIFTY (50) YEAR STRUCTURAL INTEGRITY

The Pierce custom chassis frame only (does not include crossmembers) limited warranty certificate, WA0013, is included with this proposal.

FRONT AXLE THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY

The Pierce TAK-4 suspension limited warranty certificate, WA0050, is included with this proposal.

SINGLE REAR AXLE FIVE (5) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor™ Axle 5 year limited warranty will be provided.

ABS BRAKE SYSTEM THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor Wabco™ ABS brake system limited warranty certificate, WA0232, is included with this proposal.

TEN (10) YEAR STRUCTURAL INTEGRITY

The Pierce custom cab limited warranty certificate, WA0012, is included with this proposal.

TEN (10) YEAR PRO-RATED PAINT AND CORROSION

A Pierce cab limited pro-rated paint warranty certificate, WA0055, is included with this proposal.

FIVE (5) YEAR MATERIAL AND WORKMANSHIP

The Pierce Command Zone electronics limited warranty certificate, WA0014, is included with this proposal.

CAMERA SYSTEM WARRANTY

A Pierce fifty four (54) month warranty will be provided for the camera system.

COMPARTMENT LIGHT WARRANTY

The Pierce 12 volt DC LED strip lights limited warranty certificate, WA0203, is included with this proposal.

TRANSMISSION WARRANTY

The transmission will have a **five (5) year/unlimited mileage** warranty covering 100 percent parts and labor. The warranty will be provided by Allison Transmission.

Note: The transmission cooler is not covered under any extended warranty you may be getting on your Allison Transmission. Please review your Allison Transmission warranty for coverage limitations.

TRANSMISSION COOLER WARRANTY

The transmission cooler will carry a five (5) year parts and labor warranty (exclusive to the transmission cooler). In addition, a collateral damage warranty will also be in effect for the first three (3) years of the warranty coverage and will not exceed \$10,000 per occurrence. A copy of the warranty certificate will be included with this proposal.

WATER TANK WARRANTY

A UPF poly water tank limited warranty certificate, WA0195, is included with this proposal.

TEN (10) YEAR STRUCTURAL INTEGRITY

The Pierce apparatus body limited warranty certificate, WA0009, is included with this proposal.

ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY

A Gortite roll-up door limited warranty will be provided. The mechanical components of the roll-up door will be warranted against defects in material and workmanship for the lifetime of the vehicle. A **six (6) year** limited warranty will be provided on painted and satin roll up doors.

The limited warranty certificate, WA0190, is included with this proposal.

PUMP WARRANTY

A Hale pump limited warranty certificate, WA0388, is included with this proposal.

TEN (10) YEAR PUMP PLUMBING WARRANTY

The Pierce apparatus plumbing limited warranty certificate, WA0035, is included with this proposal.

TWENTY (20) YEAR AERIAL DEVICE STRUCTURAL INTEGRITY WARRANTY

The Pierce device limited warranty certificate, WA0052, is included with this proposal.

AERIAL SWIVEL WARRANTY

An Amity five (5) year limited swivel warranty will be provided. A copy of the warranty certificate will be included with this proposal.

HYDRAULIC SYSTEM COMPONENTS WARRANTY

Aerial hydraulic system components will be provided with a five (5) year material and workmanship limited warranty.

HYDRAULIC SEAL WARRANTY

Aerial hydraulic seals will be provided with a three (3) year material and workmanship limited warranty.

A copy of the warranty certificates is included with this proposal.

AERIAL WATERWAY WARRANTY

An Amity ten (10) year limited waterway warranty will be provided. A copy of the warranty certificate is included with this proposal.

FOUR (4) YEAR PRO-RATED PAINT AND CORROSION

A Pierce aerial device limited pro-rated paint warranty certificate, WA0047, is included with this proposal.

TWO (2) YEAR GENERATOR MATERIAL AND WORKMANSHIP WARRANTY

A Harrison Hydra-Gen generator two (2) year limited warranty will be provided.

TEN (10) YEAR PRO-RATED PAINT AND CORROSION

A Pierce body limited pro-rated paint warranty certificate, WA0057, is included with this proposal.

ONE (1) YEAR MATERIAL AND WORKMANSHIP

The Pierce graphics fading and deterioration limited warranty limited warranty certificate, WA0168, is included with this proposal.

VEHICLE STABILITY CERTIFICATION

The fire apparatus manufacturer will provide a certification stating the apparatus complies with NFPA 1900, current edition, section 7.14, Vehicle Stability. The certification is included with this proposal.

ENGINE INSTALLATION CERTIFICATION

The fire apparatus manufacturer will provide a certification, along with a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The certification will be provided at the time of delivery.

POWER STEERING CERTIFICATION

The fire apparatus manufacturer will provide a certification stating the power steering system as installed meets the requirements of the component supplier. The certification is included with this proposal.

CAB INTEGRITY CERTIFICATION

The fire apparatus manufacturer will provide a cab crash test certification with this proposal. The certification will state that a specimen representing the substantial structural configuration of the cab has been tested and certified by an independent third party test facility. Testing events will be documented with photographs, real-time and high-speed video, vehicle accelerometers, cart accelerometers, and a laser speed trap. The fire apparatus manufacturer will provide a state licensed professional engineer to witness and certify all testing events. Testing will meet or exceed the requirements below:

- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.
- European Occupant Protection Standard ECE Regulation No.29.
- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.

Side Impact

The cab will be subjected to dynamic preload where a 14,320-lb moving barrier is slammed into the side of the cab at 5.50 mph, striking with an impact of 13,000 ft-lb of force. This test is part of the SAE J2422 test procedure and more closely represents the forces a cab will see in a rollover incident.

Frontal Impact

The same cab will withstand a frontal impact of 32,600 ft-lb of force using a moving barrier in accordance with SAE J2420.

Additional Frontal Impact

The same cab will withstand a frontal impact of 65,098 ft-lb of force using a moving barrier. (Twice the force required by SAE J2420)

Roof Crush

The cab will be subjected to a roof crush force of 22,500 lb. This value meets the ECE 29 criteria, and is equivalent to the front axle rating up to a maximum of ten (10) metric tons.

Additional Roof Crush

The same cab will be subjected to a roof crush force of 110,000 lbs. (Four and a half times the load criteria of ECE 29)

The same cab will withstand all tests without any measurable intrusion into the survival space of the occupant area.

There will be no exception to any portion of the cab integrity certification. Nonconformance will lead to immediate rejection of bid.

CAB DOOR DURABILITY CERTIFICATION

Robust cab doors help protect occupants. Cab doors will survive a 200,000 cycle door slam test where the slamming force exceeds 20 G's of deceleration. The bidder will certify that the sample doors similar to those provided on the apparatus have been tested and have met these criteria without structural damage, latch malfunction, or significant component wear.

WINDSHIELD WIPER DURABILITY CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. Windshield wipers will survive a 3 million cycle durability test in accordance with section 6.2 of SAE J198 *Windshield Wiper Systems - Trucks, Buses and Multipurpose Vehicles*. The bidder will certify that the wiper system design has been tested and that the wiper system has met these criteria.

ELECTRIC WINDOW DURABILITY CERTIFICATION

Cab window roll-up systems can cause maintenance problems if not designed for long service life. The window regulator design will complete 30,000 complete up-down cycles and still function normally when finished. The bidder will certify that sample doors and windows similar to those provided on the apparatus have been tested and have met these criteria without malfunction or significant component wear.

SEAT BELT ANCHOR STRENGTH

Seat belt attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat belt anchor design will withstand 3000 lb of pull on both the lap and shoulder belt in accordance with FMVSS 571.210 Seat Belt Assembly Anchorages. The bidder will certify that each anchor design was pull tested to the required force and met the appropriate criteria.

SEAT MOUNTING STRENGTH

Seat attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat mounting design will be tested to withstand 20 G's of force in accordance with FMVSS 571.207 Seating Systems. The bidder will certify, at time of delivery, that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

PERFORMANCE CERTIFICATIONS

Cab Air Conditioning

Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system will cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 78 degrees Fahrenheit in 30 minutes. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

Cab Defroster

Visibility during inclement weather is essential to safe apparatus performance. The defroster system will clear the required windshield zones in accordance with SAE J381 Windshield Defrosting Systems

Test Procedure And Performance Requirements - Trucks, Buses, And Multipurpose Vehicles. The bidder will certify that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

Cab Auxiliary Heater

Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. An auxiliary cab heater will warm the cab 77 degrees Fahrenheit from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381. The bidder will certify, at time of delivery, that a substantially similar cab has been tested and has met these criteria.

AMP DRAW REPORT

The bidder will provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus will provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which will include the following:
 - The nameplate rating of the alternator.
 - The alternator rating under the conditions specified per:
 - Current edition of applicable NFPA standards.
 - The minimum continuous load of each component that is specified per:
 - Current edition of applicable NFPA standards.
 - Additional loads that, when added to the minimum continuous load, determine the total connected load.
 - Each individual intermittent load.

All of the above listed items will be provided by the bidder per the current edition of applicable NFPA standards.