

CITY COUNCIL AGENDA ITEM COVER MEMO

Agenda Item Number: _____

Meeting Type: Regular

Meeting Date: Aug 13, 2015

Action Requested By: Fire and Rescue

Agenda Type: Resolution

Subject Matter:

Approval of Agreement

Exact Wording for the Agenda:

Agreement between the City of Huntsville and Pierce Manufacturing Inc for the construction of one Enforcer 107' Ascendant Aerial Fire Apparatus.

Note: If amendment, Please state title and number of the original!

Item to be considered for: Action

Unanimous Consent Required: No

Briefly state why the action is required; why it is recommended; what council action will provide, allow and accomplish and; any other information that might be helpful.

Critical fleet replacement

Associated Cost: _____ Budgeted Item: Yes

MAYOR RECOMMENDS OR CONCURS: Yes

Department Head: 

Date: 8-4-15

ROUTING SLIP CONTRACTS AND AGREEMENTS

Originating Department: Fire and Rescue

Council Meeting Date: 8/4/2015

Department Contact:

Phone #

Contract or Agreement: Agreement

Document Name: Pierce Manufacturing Inc

City Obligation Amount:

Total Project Budget:

Uncommitted Account Balance:

Account Number:

Procurement Agreements

<u>Title 41</u>	<u>Competitive</u>
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Grant-Funded Agreements

<u>Not Applicable</u>	Grant Name: <input type="text"/>
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Department	Signature	Date
1) Originating	<i>AW McFarland</i>	8-4-15
2) Legal	<i>Mary Gates</i>	8-12-15
3) Finance	<i>[Signature]</i>	8/12
4) Originating	<i>AW McFarland</i>	8-4-15
5) Copy Distribution		
a. Mayor's office (1 copies)		
b. Clerk-Treasurer (Original & 2 copies)		

RESOLUTION NO. 15- _____

BE IT RESOLVED by the City Council of the City of Huntsville, Alabama, that the Mayor is hereby authorized to enter into an Agreement, by and between the City of Huntsville, a municipal corporation in the State of Alabama, and Pierce Manufacturing Inc., which said Agreement is attached hereto and identified as "Agreement between the City of Huntsville and Pierce Manufacturing Inc. for the construction of (1) one Enforcer 107' Ascendant Aerial Fire Apparatus" consisting of one-hundred twenty-seven(127) pages or five (5) pages plus one-hundred twenty-two pages consisting of Exhibits A-B and the date of August 13, 2015, appearing on the margin of the first page, together with the signature of the President or President Pro Tem of the City Council, and executed copy of said document being permanently kept on file in the Office of the City Clerk-Treasurer of the City of Huntsville, Alabama.

ADOPTED this the 13th day of August, 2015.

President of the City Council of
the City of Huntsville, Alabama

APPROVED this the 13th day of August, 2015.

Mayor of the City of Huntsville,
Alabama

"AGREEMENT BETWEEN THE CITY OF HUNTSVILLE AND PIERCE MANUFACTURING INC. FOR THE
CONSTRUCTION OF (1) ONE ENFORCER 107' ASCENDANT AERIAL FIRE APPARATUS"

This Purchase Agreement (together with all attachments referenced herein, the "Agreement"), made and entered into by and between Pierce Manufacturing Inc., a Wisconsin corporation ("Pierce"), and the City of Huntsville, Alabama, a Municipal Corporation in the State of Alabama, ("Customer") is effective as of the date specified in Section 3 hereof.

1. Definitions:

- A. "**Purchase Detail Form**" means the pricing proposal form submitted by Pierce outlining the consideration for the purchase of the Apparatus to include the terms of the pre-payment discount and the required performance bond which is attached hereto as "Exhibit A".
- B. "**Specifications**" means the required specifications, technical specifications, training, testing requirements, and warranty for the Apparatus prepared in response to the Customer's request which are attached hereto as "Exhibit B" and incorporated herein by reference. These specifications are accepted by Pierce and the Customer as the requirements for the construction of the apparatus. It shall be solely Pierce's responsibility to identify and correct any deficiencies or flaws in design.
- C. "**Delivery**" means the date Pierce is prepared to make physical possession of the Product available to the Customer.
- D. "**Acceptance**" The Customer shall have fifteen (15) calendar days of Delivery to inspect the Apparatus for substantial conformance with the material Specifications; unless Pierce receives a Notice of Defect within fifteen (15) calendar days of Delivery, the Apparatus will be deemed to be in conformance with the Specifications and accepted by the Customer.

2. Purpose. This Agreement sets forth the terms and conditions of Pierce's sale of the Apparatus to the Customer.

3. Term of Agreement. This Agreement will become effective on the date it is duly executed by the last of the parties to execute it ("Effective Date") and, unless earlier terminated pursuant to the terms of this Agreement, it will terminate upon the Customer's Acceptance and payment in full of the Purchase Price.

4. Purchase and Payment. The Customer agrees to purchase the Apparatus specified in Exhibits A and B for the total purchase price of Eight Hundred Fifty-seven Thousand One Hundred Forty-eight and 77/100 Dollars (\$857,148.77) ("Purchase Price"). Prices are in U.S. funds. Fifty percent of the total Purchase Price shall be due and payable within fourteen (14) days of the execution of this Agreement by both parties. The remaining fifty percent shall be due and payable within fourteen (14) days of acceptance of the Apparatus by the Customer.

5. Future Changes. Various state or federal regulatory agencies (e.g. NFPA, DOT, EPA) may require changes to the Specifications and/or the Apparatus and in any such event any resulting cost increases incurred to comply therewith will be added to the Purchase Price to be paid by the Customer. In addition, any future drive train upgrades (engine, transmission, axles, etc.), or any other specification changes have not been calculated into our annual increases and will be provided at additional cost. To the extent practicable, Pierce will document and itemize any such price increases for the Customer.

6. Agreement Changes. The Customer may request that Pierce incorporate a change to the Apparatus or the Specifications for the Apparatus by delivering a change order to Pierce; provided, however, that any such change order must be in writing and include a description of the proposed change sufficient to permit Pierce to evaluate the feasibility of such change ("Change Order"). Within [seven (7) business days] of receipt of a Change Order, Pierce will inform the Customer in writing of the feasibility of the Change Order, the earliest possible implementation date for the Change Order, of any increase or decrease in the Purchase Price resulting from such Change Order, and of any effect on production scheduling or Delivery resulting from such Change Order. Pierce shall not be liable to the Customer for any delay in performance or Delivery arising from any such Change Order. A Change Order is only effective when counter-signed by Pierce's authorized representative.

7. Cancellation/Termination. In the event this Agreement is cancelled or terminated by the Customer before completion, unless such termination is for cause as defined in section 9 herein, Pierce may charge a cancellation fee. The following charge schedule based on costs incurred may be applied: (a) 10% of the Purchase Price after order is accepted and entered by Pierce; (b) 20% of the Purchase Price after completion of approval drawings, and; (c) 30% of the Purchase Price upon any material requisition. The cancellation fee will increase accordingly as costs are incurred as the order progresses through engineering and into manufacturing. Pierce endeavors to mitigate any such costs through the sale of such Apparatus to another purchaser; however Customer shall remain liable for the difference between the Purchase Price and, if applicable, the sale price obtained by Pierce upon sale of the Apparatus to another purchaser, plus any costs incurred by Pierce to conduct any such sale.

President of the City Council
of the City of Huntsville, Alabama
Date: August 13, 2015

8. Performance by Pierce.

A. *Performance Schedule.* Performance by Pierce shall conform to the following schedule:

- 1) Construction of the apparatus shall begin within 28 weeks of the Effective Date.
- 2) Fire Body Pre-Paint inspection will be conducted at the manufacturer's facility within 37 weeks of the Effective Date.
- 3) Final Inspection upon Completion will be conducted at the manufacturer's facility within 44 weeks of the Effective Date. The apparatus shall be completed and ready for delivery before the final inspection is conducted.
- 4) The completed apparatus shall be delivered to the Customer for acceptance testing within 48 weeks of the Effective Date.
- 5) The completed apparatus shall successfully pass final inspection within 30 days of delivery to the Customer.

B. *Inspection Visits.* Pierce will provide three (3) factory inspection trips for three (3) Huntsville Fire and Rescue Department representatives, to Pierce's facility. Transportation, meals, lodging, and other requisite expenses will be the bidder's responsibility. Transportation will be via commercial airlines between Huntsville International Airport (HSV) and the Austin Straubel International Airport (GRB). The factory visits will occur at the following stages of production of the apparatus:

- 1) Fire Body Pre-Paint inspection will be conducted at the manufacturer's facility within 37 weeks of the contract being awarded.
- 2) Final Inspection upon Completion will be conducted at the manufacturer's facility within 44 weeks of the contract being awarded. The apparatus shall be completed and ready for delivery before the final inspection is conducted. Pierce will notify the Customer when the prototype apparatus is completed and ready for final inspection. Final inspection shall be defined as the Customer inspecting all aspects of the apparatus for compliance with specifications and quality of workmanship. Any items found to be deficient shall be corrected at that time. If the deficiencies are such that they cannot be corrected within 96 hours allotted for the inspection, another final inspection shall be required. Pierce shall notify the buyer when the deficiencies have been corrected so that an additional inspection trip may be scheduled. The cost of this and any other subsequent final inspection trips shall be paid by Pierce.

During the final inspection, Huntsville Fire and Rescue representatives may request functional test be performed in their presence by employees of Pierce. These tests may include but not limited to pump tests, electrical tests, generator tests, aerial device operational tests, and road tests.

The customer shall have the right to inspect the apparatus, within manufacturer's normal business hours, at any other point during construction. Expenses incurred during inspection visits other than those specified in this section will be the responsibility of the purchaser.

During inspection visits, the Customer shall have the right to perform actual performance tests to evaluate completed portions of the unit. Testing will be accomplished with the assistance and resources of Pierce.

- 3) The stage for the third inspection visit is to be determined.

C. *Approval Drawings.* Detailed blue prints (Approval Drawings) will be approved by the Customer prior to any metal being sheared or cut for the apparatus. The Customer, manufacturer's representative and the apparatus manufacturer will each have a copy of this blue print. Upon Customer's approval, this print will become a part of the total contract. The blue print will show, but not be limited to, the following items: the chassis being utilized, lights, sirens, all compartment locations and dimensions, special suction, discharges, etc. Blue print will be a visual interpretation of the unit as it is to be supplied. Approval drawing must be made available prior to pre-construction conference

D. *Deliver, Delivery Engineer.* The apparatus shall be delivered FOB destination on its own power in new condition along with the original invoice and manufacturer's statement of origin. The warranty will go into effect when the truck is placed in service. The truck must be serviced and ready for use when delivered. The City of Huntsville will receive all service, warranty, and technical bulletins for the model purchased. Pierce shall give the customer five (5) days' notice of Delivery.

A qualified and responsible representative of the contractor will deliver the apparatus to the Fire Department, and remain in the community purchasing the equipment for a sufficient time (normally three days), to instruct the fire department personnel in the operation, care, and maintenance of the equipment delivered, and to mount small equipment items that were ordered with the apparatus.

- E. *Acceptance Testing and Training.* Upon delivery, fifteen days must be allowed for the acceptance inspection to be conducted by authorized representatives of HFR in the presence of the delivery engineer. In the event the apparatus fails to meet the test requirements on first trial, a second trial may be made within thirty (30) days of the date of the first trial. Housing of the apparatus will not constitute acceptance until testing is successfully completed. Upon successful acceptance, the payment will be made and training will begin.

The instruction provided to the Customer shall be structured in a well-organized classroom and hands on approach. The instructional objectives shall consist of the specification, operation, and maintenance of all components on the apparatus. At a minimum the covered objectives shall include instruction on the engine, transmission, regeneration, generator/inverter, battery charging system, fire pump, anti-lock brakes, electronic stability control, automatic traction control, transmission/engine retarder, ladder/stabilizer controls, and ladder operation. The training shall be concluded with a formal question and answer session. Manufacturer shall provide electronic copies of all training materials including but not limited to all handouts and power point presentations to the purchaser for future training aids on the apparatus.

9. Termination for Cause. If Pierce is unable to provide an Apparatus that meets the specifications set forth in Exhibit B, or if the Apparatus is damaged beyond repair during construction or delivery, then the Customer may terminate this Agreement for Cause. In the event of a Termination for Cause, Pierce shall be liable to the Customer in the amount of any payments made by the Customer plus any procurement costs incurred by the Customer.

10. Damages. If the apparatus does not successfully complete acceptance testing as determined by the Customer's authorized representative on or before the date set forth in Section Eight herein, the actual damages for the delay will be impossible to determine and in lieu of, Pierce shall pay to the Customer as fixed, agreed and liquidated damages the sum of One Hundred Dollars (\$100.00) per day for each calendar day of delay until the work is satisfactorily completed. Whatever sums may be due the Customer as liquidated damages for delay may be deducted from payments due Pierce or may be collected from Pierce or Pierce's surety.

11. Notice. Any required or permitted notices hereunder must be given in writing at the address of each party set forth below, or to such other address as either party may substitute by written notice to the other in the manner contemplated herein, by one of the following methods: hand delivery; registered, express, or certified mail, return receipt requested, postage prepaid; or nationally-recognized private express courier:

Pierce Manufacturing, Inc.
Director of Order Management
2600 American Drive
Appleton WI 54912
Fax (920) 832-3080

Customer
City of Huntsville, Alabama

12. Standard Warranty. Any applicable Pierce warranties are attached hereto in Exhibit B and made a part hereof. Any additional warranties must be expressly approved in writing by Pierce's authorized representative.

a. Disclaimer. OTHER THAN AS EXPRESSLY SET FORTH IN THIS AGREEMENT, NEITHER PIERCE, ITS PARENT COMPANY, AFFILIATES, SUBSIDIARIES, LICENSORS OR SUPPLIERS, THEIR RESPECTIVE OFFICERS, DIRECTORS, EMPLOYEES, SHAREHOLDERS, AGENTS OR REPRESENTATIVES, MAKE ANY EXPRESS OR IMPLIED WARRANTIES WITH RESPECT TO THE APPARATUS PROVIDED HEREUNDER OR OTHERWISE REGARDING THIS AGREEMENT, WHETHER ORAL OR WRITTEN, EXPRESS, IMPLIED OR STATUTORY. WITHOUT LIMITING THE FOREGOING, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, THE IMPLIED WARRANTY AGAINST INFRINGEMENT, AND THE IMPLIED WARRANTY OR CONDITION OF FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED AND DISCLAIMED. STATEMENTS MADE BY SALES REPRESENTATIVES OR IN PROMOTIONAL MATERIALS DO NOT CONSTITUTE WARRANTIES.

13. Insurance. Pierce maintains the following limits of insurance with a carrier(s) rated A- or better by A.M. Best:

Commercial General Liability Insurance:

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

Umbrella/Excess Liability Insurance:

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

(x) Pierce shall provide the Customer with a copy of a current Certificate of Insurance with the coverages listed above; (y) the City of Huntsville, its officers, employees and elected officials shall be included as additional insureds for Commercial General Liability (subject to the terms and conditions of the applicable Pierce insurance policy); and (z) all policies to provide a 30 day notice of cancellation to the named insured

14. Force Majeure. Pierce shall not be responsible nor deemed to be in default on account of delays in performance due to causes which are beyond Pierce's control which make Pierce's performance impracticable, including but not limited to civil wars, insurrections, strikes, riots, fires, storms, floods, other acts of nature, explosions, earthquakes, accidents, any act of government, delays in transportation, inability to obtain necessary labor supplies or manufacturing facilities, allocation regulations or orders affecting materials, equipment, facilities or completed products, failure to obtain any required license or certificates, acts of God or the public enemy or terrorism, failure of transportation, epidemics, quarantine restrictions, failure of vendors (due to causes similar to those within the scope of this clause) to perform their contracts or labor troubles causing cessation, slowdown, or interruption of work.

15. Default. The occurrence of one or more of the following shall constitute a default under this Agreement: (a) the Customer fails to pay when due any amounts under this Agreement or to perform any of its obligations under this Agreement; (b) Pierce fails to perform any of its obligations under this Agreement; (c) either party becomes insolvent or become subject to a bankruptcy or insolvency proceedings; (d) any representation made by either party to induce the other to enter into this Agreement is false in any material respect; (e) the Customer dissolves, merges, consolidates or transfers a substantial portion of its property to another entity; or (f) the Customer is in default or has breached any other contract or agreement with Pierce.

16. Manufacturer's Statement of Origin. It is agreed that the manufacturer's statement of origin ("MSO") for the Apparatus covered by this Agreement shall remain in the possession of Pierce until the entire Purchase Price has been paid. If more than one Apparatus is covered by this Agreement, then the MSO for each individual Apparatus shall remain in the possession of Pierce until the Purchase Price for that Apparatus has been paid in full. In case of any default in payment, Pierce may take full possession of the Apparatus, and any payments that have been made shall be applied as payment for the use of the Apparatus up to the date of taking possession.

17. Independent Contractors. The relationship of the parties established under this Agreement is that of independent contractors and neither party is a partner, employee, agent, or joint venturer of or with the other.

18. Assignment. Neither party may assign its rights and obligations under this Agreement unless it has obtained the prior written approval of the other party.

19. Governing Law; Jurisdiction. Without regard to any conflict of laws provisions, this Agreement is to be governed by and under the laws of the state of Alabama. Venue to enforce any provision of this Agreement shall be in either the Circuit Court of Madison County, Alabama or the United States District Court for the Northern District of Alabama, Northeastern Division.

20. Facsimile Signatures. The delivery of signatures to this Agreement by facsimile transmission shall be binding as original signatures.

21. Entire Agreement. This Agreement shall be the exclusive agreement between the parties for the Apparatus. Additional or different terms proposed by the Customer shall not be applicable, unless accepted in writing by Pierce's authorized representative. No change in, modification of, or revision of this Agreement shall be valid unless in writing and duly executed by both parties.

22. Conflict. In the event of a conflict between the Customer Specifications and the Pierce Proposal, the Pierce Proposal shall control. In the event there is a conflict between the Pierce Proposal and this Agreement, the Agreement shall control.

23. Signatures. This Agreement is not effective unless and until it is approved, signed and dated by each party's authorized representative.

Accepted and agreed to:

PIERCE MANUFACTURING, INC.

CUSTOMER: City of Huntsville, Alabama_____

Name: _____

Name: _____

Title: _____

Title: Mayor_____

Date: _____

Date: August 13, 2015_____

**EXHIBIT A
PURCHASE DETAIL FORM**

Pierce Manufacturing, Inc.
Director of Order Management
2600 American Drive
Appleton WI 54912
Fax (920) 832-3080

Date: _____

Customer Name: Huntsville Fire/Rescue

Quantity	Chassis Type	Body Type	Price per Unit
1	Enforcer	107' Ascendant	\$857148.77*
			\$
			\$
			\$
			\$

[Insert any trade-in or applicable discounts here.]

50% pre-pay discount of \$21,975.93 included in above figure

Warranty Period: _____

Training Requirements: 3 days

Other Matters: A Performance Bond must be submitted to the City of Huntsville in the amount of 100% of the pre-payment within fourteen (14) days of the execution of this agreement by both parties and upon receipt of the pre-payment in accordance with Section 4 of the agreement.

This contract is available for inter-local and other municipal corporations to utilize with the option of adding or deleting any Pierce available options, including chassis models. Any addition or deletion may affect the unit price.

Payment Terms: 50% with signed contract, balance at delivery

[NOTE: If deferred payment arrangements are required, the Customer must make such financial arrangements through a financial institution acceptable to Pierce.] All taxes, excises and levies that Pierce may be required to pay or collect by reason of any present or future law or by any governmental authority based upon the sale, purchase, delivery, storage, processing, use, consumption, or transportation of the Apparatus sold by Pierce to the Customer shall be for the account of the Customer and shall be added to the Purchase Price. All delivery prices or prices with freight allowance are based upon prevailing freight rates and, in the event of any increase or decrease in such rates, the prices on all unshipped Apparatus will be increased or decreased accordingly. Delinquent payments shall be subject to a carrying charge of 1.5 percent per month or such lesser amount permitted by law. Pierce will not be required to accept payment other than as set forth in this Agreement. However, to avoid a late charge assessment in the event of a dispute caused by a substantial nonconformance with material Specifications (other than freight), the Customer may withhold up to five percent (5%) of the Purchase Price until such time that Pierce substantially remedies the nonconformance with material Specifications, but no longer than sixty (60) days after Delivery. If the disputed amount is the freight charge, the Customer may withhold only the amount of the freight charge until the dispute is settled, but no longer than sixty (60) days after Delivery. Pierce shall have and retain a purchase money security interest in all goods and products now or hereafter sold to the Customer by Pierce or any of its affiliated companies to secure payment of the Purchase Price for all such goods and products. In the event of nonpayment by the Customer of any debt, obligation or liability now or hereafter incurred or owing by the Customer to Pierce, Pierce shall have and may exercise all rights and remedies of a secured party under Article 9 of the Uniform Commercial Code (UCC) as adopted by the state of Wisconsin.

THIS PURCHASE DETAIL FORM IS EXPRESSLY SUBJECT TO THE PURCHASE AGREEMENT TERMS AND CONDITIONS DATED AS OF _____, 20____ BETWEEN PIERCE MANUFACTURING INC. AND THE CITY OF HUNTSVILLE, ALABAMA WHICH TERMS AND CONDITIONS ARE HEREBY INCORPORATED IN, AND MADE PART OF, THIS PURCHASE DETAIL FORM AS THOUGH EACH PROVISION WERE SEPARATELY SET FORTH HEREIN, EXCEPT TO THE EXTENT OTHERWISE STATED OR SUPPLEMENTED BY PIERCE MANUFACTURING INC. HEREIN.

**HUNTSVILLE FIRE AND RESCUE
PIERCE ENFORCER 107' ASCENDANT AERIAL APPARATUS
SPECIFICATIONS - EXHIBIT B**

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, pumphouse (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 2009 STANDARDS

This unit will comply with the NFPA standards effective January 1, 2009, 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.

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".

VEHICLE INSPECTION PROGRAM CERTIFICATION

To assure the vehicle is built to current NFPA standards, the apparatus, in its entirety, will be third-party, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition of NFPA 1901. The certification will include: 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 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*.

BID BOND

A bid bond as security for the bid in the form of a 10% bid bond will be provided with the proposal. 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.

Performance (Based on Order Entry Prior to Close of Business on August 31, 2015)

- 1.) Construction of the apparatus shall begin within 28 weeks of the contract being awarded
- 2.) Fire Body Pre-Paint inspection will be conducted at the manufacturer's facility within 37 weeks of the contract being awarded.
- 3.) Final Inspection upon Completion will be conducted at the manufacturer's facility within 44 weeks of the contract being awarded. The apparatus shall be completed and ready for delivery before the final inspection is conducted.

Delivery Date

The completed apparatus shall be delivered to the purchaser for acceptance testing within 48 weeks of the contract being awarded.

Non-Performance

In the event that the manufacturer has not fulfilled the contract by the contracted delivery date, a penalty of One Hundred Dollars \$100.00 per day shall be assessed against the manufacturer for each day past the contracted delivery date until which time the apparatus passes acceptance testing as determined by the departments authorized representative. Any time delay considered by the manufacturer to be due to the purchasers' failure to provide timely responses, equipment, or other purchaser caused delay must be reported to the purchaser in writing within five (5) business days of the delay.

Delivery Date

The completed apparatus shall be delivered to the purchaser for acceptance testing within 48 weeks of the contract being awarded.

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.

ELECTRICAL WIRING DIAGRAMS

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

WIRING SCHEMATICS

Complete “as-built” chassis wiring schematics for this apparatus will be supplied and furnished to the customer within 12 months after delivery. All relays, solenoids and circuit breakers shall be permanently labeled.

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 234.00..

GVW RATING

The gross vehicle weight rating will be 56,300.

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 be heat-treated steel measuring 10.25" x 3.50" x .375".

Each rail will have a section modulus of 16.00 cubic inches, yield strength of 120,000 psi, and a resisting bending moment (rbm) of 1,921,069 inch-pounds.

FRAME REINFORCEMENT

A full-length mainframe "C" liner will be provided.

The liner will be an internal "C" design, heat-treated steel measuring 9.38" x 3.13" x 0.25". Each reinforcement member will have a section modulus of 3.90 cubic inches, yield strength of 120,000 psi and resisting bending moment (rbm) of 938,762 in-lb.

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 shall 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 third party certified turning angle of 45 degrees. Front discharge, front suction, or aluminum wheels will not infringe on this cramp angle.

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 G296 MSA tread, rated for 22,800 lb maximum axle load and 68 mph maximum speed.

The tires will be mounted on Accuride® 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 33,500 lb.

TOP SPEED OF VEHICLE

A rear axle ratio will be furnished to allow the vehicle to reach a top speed of 60 mph.

REAR SUSPENSION

The rear suspension will be Standens, semi-elliptical, 3.00" wide x 53.00" long, 12-leaf pack with a ground rating of 33,500 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. To reduce bending stress due to acceleration and braking, the front eye will be a berlin eye that will place the front spring pin in the horizontal plane within the main leaf.

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.

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.

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.

AUTOMATIC TIRE CHAINS

One (1) pair of Insta-Chain automatic tire chains will be provided at the rear. The system will be electric-over-air operated with a locking switch on the cab instrument panel to prevent accidental activation of the system. The system may be engaged at speeds up to 25 mph and operated at speeds up to 35 mph.

CHROME LUG NUT COVERS

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

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 below the left side rear compartment.

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 particular wheel begins to lockup, a signal will be sent to the control unit. This control unit then will 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. A "mud/snow" 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.

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:

- Bendix® brake treadle valve with vinyl covered foot surface
- 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)

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

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 a WABCO System Saver 1200 IWT, with internal wet tank, 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 Milton 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 on the driver side pump panel. 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 Milton female coupling will also be provided with the loose equipment.

AIR OUTLET

One (1) air outlet will be installed with a Milton style M female coupling and shut off valve, located on the driver side pump panel. This system will tie into the "wet" tank of the brake system and include an 85-psi pressure protection valve in the outlet line to prevent the brake system from losing all air.

A mating Milton style M male fitting will be provided with the loose equipment.

AIR HOSE

There shall be one (1) fifty (50)ft length(s) of air hose will be furnished with fittings.

An air chuck will be provided with the air hose. The air chuck will fit the valve stems that are provided on the tires.

All fittings shall be Milton "M" brand

ALL WHEEL LOCK-UP

An additional all wheel lock-up system will be installed which applies air to the front brakes only. The standard spring brake control valve system will be used for the rear.

ENGINE

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

Make:	Cummins
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Model:	ISL9
Power:	450 hp at 2100 rpm
Torque:	1250 lb-ft at 1400 rpm
Governed Speed:	2200 rpm
Emissions Level:	EPA 2015
Fuel:	Diesel
Cylinders:	Six (6)
Displacement:	543 cubic inches (8.9L)
Starter:	Delco 39MT™
Fuel Filters:	Spin-on style primary filter with water separator and water-in-fuel sensor. Secondary spin-on style filter.
Coolant Filter:	Spin-on style with shut off valves on the supply and return line

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.

Based upon availability from Cummins at the time of booking, either an EPA 2015 or an EPA 2016 compliant engine will be provided.

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.

A stainless steel metal screen will be installed at the inlet of the air intake system that will meet NFPA 1901 requirements.

The air cleaner and stainless steel screen will be easily accessible by tilting the cab.

EXHAUST SYSTEM

The exhaust system will be stainless steel from the turbo to the inlet of the selective catalytic reduction (SCR) device, and will be 4.00" in diameter. The exhaust system will include a diesel particulate filter (DPF) and an SCR device to meet current EPA standards. An insulation wrap will be provided on all exhaust pipes between the turbo and DPF to minimize the transfer of heat to the cab. The exhaust will terminate horizontally ahead of the passenger side rear wheels. A tailpipe diffuser will be 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.

RADIATOR

The radiator and the complete cooling system will meet or exceed 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.

Supply and return tanks will be made of heavy duty glass-reinforced nylon that will be crimped onto the core assembly using header tabs and a compression gasket to complete the radiator core assembly. There will be a full steel frame around the inserts to enhance cooling system durability and reliability.

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® silicone hoses will be used for all engine/heater coolant lines installed by the chassis manufacturer.

The chassis manufacturer will also use Gates brand hose on other heater, defroster and auxiliary coolant circuits. There will be some areas in which an appropriate Gates product is not available. In those instances a comparable silicone hose from another manufacturer will be used.

Hose clamps will be stainless steel constant torque type to prevent coolant leakage. They will react to temperature changes in the cooling system and expand or contract accordingly while maintaining 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 left hand side 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 driver's 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 located on the driver's side of the body and be covered with a hinged, spring loaded, polished stainless steel door that is marked "Diesel Exhaust Fluid Only".

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.

TRANSMISSION

An Allison 5th generation, Model EVS 3000P, 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 9 o'clock and 3 o'clock).

A transmission temperature gauge with red light and audible alarm will be installed on the cab dash.

TRANSMISSION SHIFTER

A five (5)-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	3.49 to 1.00
2nd	1.86 to 1.00
3rd	1.41 to 1.00
4th	1.00 to 1.00
5th	0.75 to 1.00
R	5.03 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® 1710 universal joints.

The shafts will be dynamically balanced before installation.

A splined slip joint will be provided in each driveshaft, 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 4-spoke design.

BUMPER

A one (1) piece, ten (10) 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 22.00" from front face of cab.

Documentation will be provided, upon request to show that the options selected have been engineered for fit-up and approval for this modular bumper extension.

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.

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 175' 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 COVER

A bright aluminum treadplate cover will be provided over the center hose tray.

The cover will be "notched" allowing the hose to be pre connected to hose connection.

The cover will be attached with a stainless steel hinge.

A D-ring latch will secure the cover in the closed position and a pneumatic stay arm will hold the cover in the open position.

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.

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 0.090" front skin (for a total thickness of 0.22"), 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 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.

INTERIOR CAB INSULATION

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

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 hood 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 hood will be insulated for protection from heat and sound. The noise insulation keeps the dBA level within the limits stated in the current NFPA 1901 standards.

The engine tunnel will be no higher than 17.00" off the crew cab floor.

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 bright aluminum treadplate 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.

Lift controls will be located on the right side pump panel or front area of the body in a convenient location.

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.

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.

DOOR JAMB SCUFFPLATES

All cab door jambs will be furnished with a polished stainless steel scuffplate, mounted on the striker side of the jamb.

TRIM BAND ON CAB FACE

A 10.00" band of 22 gauge patterned stainless steel trim will be installed across the front of the cab, from door hinge to door hinge. The trim band will be centered on the headlights and applied with two-sided tape. A 0.625" self-adhesive trim strip will be applied around the perimeter of the trim band.

SIDE OF CAB MOLDING

Chrome molding will be provided on both sides of cab.

MIRRORS

Ramco, Model 6001FFHR-750HR, polished aluminum 9.25" wide x 13.50" high mirrors, with full flat glass section, will be mounted on each side of the front cab corner. A convex section will be bolted to the top of each mirror.

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.

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 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 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 front cab door for ease of entry.

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 half a second.

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. A slip-resistant handrail will be provided adjacent to each cab door opening to assist during cab ingress and egress.

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

STEP LIGHTS

There shall be six (6) white LED step lights installed for cab and crew cab access steps.

- One (1) light for the driver's access steps.
- Two (2) lights for the driver's side crew cab access steps.
- Two (2) lights for the passenger's side crew cab access steps.
- One (1) light for the passenger's side access step.

In order to ensure exceptional illumination, each light shall 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 shall 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.

CAB INTERIOR

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

The officer side dash will be a flat faced design to provide easy maintenance and will be constructed out of painted aluminum.

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

The engine tunnel will be padded and covered, on the top and sides, with gray woven with black Imperial 1200 vinyl coated polyester.

The headliner will be installed in both forward and rear cab sections. Headliner material will be Imperial 1200 vinyl coated polyester. A sound barrier will be part of its composition. Material will be installed on an aluminum sheet and securely fastened to interior cab ceiling.

The forward portion of the 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 gray woven with black.

CAB INTERIOR PAINT

A rich looking interior will be provided by painting all the metal surfaces inside the cab fire smoke gray, vinyl texture 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.

CAB DEFROSTER

To provide maximum defrost and heating performance, a 43,500 BTU heater-defroster unit with 350 CFM of air flow will be provided inside the cab. The defroster unit will be strategically located under the center forward portion of the vacuum formed instrument panel. For easy access, a removable vacuum formed cover will be installed over the defroster unit. The defroster will include an integral aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the 1-piece windshield. The defroster ventilation will be built into the design of the cab dash instrument panel and will be easily removable for maintenance. 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 CAB HEATER

Two (2) 44,180 BTU auxiliary heaters with 276 CFM (each unit) of air flow will be provided inside the crew cab, one (1) in each outboard rear-facing seat riser. The heaters will include high performance dual scroll blowers, one (1) for each unit. Outlets for the heaters will be located below each rear facing seat riser and below the fronts of the driver and passenger seats, for efficient airflow. An extruded aluminum plenum will be incorporated in the cab structure that will transfer heat to the forward cab seating positions.

The heater/defroster and crew cab heaters will be controlled by a single integral electronic control panel. The heater control panel will allow the driver to control heat flow to the front and rear simultaneously. The control panel will include variable adjustment for temperature and fan control, and be conveniently located on the dash in clear view of the driver. The control panel will include highly visible, progressive LED indicators for both fan speed and temperature.

AIR CONDITIONING

A high performance, customized air conditioning system will be furnished inside the cab and crew cab.

The air conditioning system will be capable of cooling the average cab temperature from 100 degrees Fahrenheit to 75 degrees Fahrenheit within 30 minutes at 50 percent relative humidity. 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.

A radiator mounted condenser with a 59,644 BTU output that meets and exceed the performance specification will be installed. Mounting the condenser below the cab or body would reduce the performance of the system and will not be acceptable.

One (1) evaporator unit will be installed in the center roof with two (2) cores, one (1) for the cab and one (1) for the crew cab. The evaporator unit will have an adequate BTU rating to meet the performance specifications.

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

- Four (4) will be directed towards the driver's location
- Four (4) will be directed towards the officer's location
- Seven (7) will be directed towards the crew cab area

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

The air conditioner will be controlled by a single electronic control panel. For ease of operation, the control panel will include variable adjustment for temperature and fan control and be conveniently located on the dash in clear view of the driver.

SUN VISORS

There will be two (2) Imperial 1200 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 no retention bracket 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) flush latch will be provided on the access door.

CAB SAFETY SYSTEM

The cab will be provided with a safety system designed to protect occupants in the event of a side roll or frontal impact, and will include the following:

- A supplemental restraint system (SRS) sensor will be installed on a structural cab member behind the instrument panel. The SRS sensor will perform real time diagnostics of all critical subsystems and will record sensory inputs immediately before and during a side roll or frontal impact event.
- A slave SRS sensor will be installed in the cab to provide capacity for eight (8) crew cab seating positions.
- A fault-indicating light will be provided on the vehicle's instrument panel allowing the driver to monitor the operational status of the SRS system.
- A driver side front air bag will be mounted in the steering wheel and will be designed to protect the head and upper torso of the occupant, when used in combination with the 3-point seat belt.
- A passenger side knee bolster air bag will be mounted in the modesty panel below the dash panel and will be designed to protect the legs of the occupant, when used in combination with the 3-point seat belt.
- Air curtains will be provided in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.
- Suspension seats will be provided with devices to retract them to the lowest travel position during a side roll or frontal impact event.
- Seat belts will be provided with pre-tensioners to remove slack from the seat belt during a side roll or frontal impact event.

FRONTAL IMPACT PROTECTION

The SRS system will provide protection during a frontal or oblique impact event. The system will activate when the vehicle decelerates at a predetermined G force known to cause injury to the occupants. The cab and chassis will have been subjected, via third party test facility, to a crash impact during frontal and oblique impact testing. Testing included all major chassis and cab components such as mounting straps for fuel and air tanks, suspension mounts, front suspension components, rear suspensions components, frame rail cross members, engine and transmission and their mounts, pump house and mounts, frame extensions and body mounts. The testing provided configuration specific information used to optimize the timing for firing the safety restraint system. The sensor will activate the pyrotechnic devices when the correct crash algorithm, wave form, is detected.

The SRS system will deploy the following components in the event of a frontal or oblique impact event:

- Driver side front air bag
- Passenger side knee bolster air bag

- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

SIDE ROLL PROTECTION

The SRS system will provide protection during a fast or slow 90 degree roll to the side, in which the vehicle comes to rest on its side. The system will analyze the vehicle's angle and rate of roll to determine the optimal activation of the advanced occupant restraints.

The SRS system will deploy the following components in the event of a side roll:

- Air curtains mounted in the outboard bolster of outboard seat backs
- Suspension seats will be retracted to the lowest travel position
- Seat belts will be pre-tensioned to firmly hold the occupant in place

SEATING CAPACITY

The seating capacity in the cab will be six (6).

DRIVER SEAT

A seat will be provided in the cab for the driver. The seat design will be a cam action type, with air suspension. For increased convenience, the seat will include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control will be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have an adjustable reclining back. The seat back will be a high back style with side bolster pads for maximum support. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

OFFICER SEAT

A seat will be provided in the cab for the passenger. The seat will be a fixed type, with no suspension. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back will be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

RADIO COMPARTMENT

A radio compartment will be provided under the officer's seat.

The inside compartment dimensions will be 16.00" wide x 7.50" high x 15.00" deep, with the back of the compartment angled up to match the cab structure.

A drop-down door with a chrome plated lift and turn latch will be provided for access.

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

REAR FACING DRIVER SIDE OUTBOARD SEAT

There will be one (1) rear facing seat provided at the driver side outboard position in the crew cab. For optimal comfort, the seat will be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back will be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

REAR FACING PASSENGER SIDE OUTBOARD SEAT

There will be one (1) rear facing seat provided at the passenger side outboard position in the crew cab. For optimal comfort, the seat will be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat back will be an SCBA back style with 5 degree fixed recline angle. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will include the following features incorporated into the side roll protection system:

- Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
- A seat safety system will be included. When activated, this system will pretension the seat belt.

FORWARD FACING CENTER SEATS

There will be two (2) forward facing seats provided at the center position in the crew cab. For optimal comfort, the seats will be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control).

The seat backs will be an SCBA style with 90 degree back. The SCBA cavity will be adjustable from front to rear in 1.00" increments to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

The seat will include the following features incorporated into the side roll protection system:

- A seat safety system will be included. When activated, this system will pretension the seat belt.

SEAT UPHOLSTERY

All seat upholstery will be gray woven with black Imperial 1200 material.

AIR BOTTLE HOLDERS

All SCBA type seats in the cab will have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket will include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp will constrain the SCBA bottle in the seat and will exceed the NFPA standard of 9G. Bracket designs with manual restraints (belts, straps, buckles) that could be inadvertently left unlocked and allow the SCBA to move freely within the cab during an accident, will not be acceptable.

There will be a quantity of five (5) SCBA brackets.

Provided with the SCBA seats, will be backrest inserts which cover the SCBA cavity. The insert cover will be padded and covered with the same material as the seat. A total of five (5) inserts will be provided on all seats except driver's. The seat back insert is designed to support the firefighters back, with or without the SCBA bottle in place. The insert is held in place with two (2) elastic cords.

SEAT BELTS

All seating positions will be furnished with a three (3)-point, shoulder type red seat belt. Each seat belt will include height adjustment. This adjustment will optimize the belts effectiveness and comfort for the seated firefighter. To provide quick, easy use for occupants wearing bunker gear, the seat belt will have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue will be stored at waist position for quick application by the seat occupant. The seat belt receptacle will be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position.

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

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

SEAT BELT MONITORING SYSTEM

A seat belt monitoring system (SBMS) will be provided. The SBMS will be capable of monitoring up to ten (10) seat positions indicating the status of each seat position with a green or red LED indicator as follows:

- Seat Occupied & Buckled = Green
- Seat Occupied & Unbuckled = Red
- No Occupant & Buckled = Red
- No Occupant & Unbuckled = Not Illuminated

Audible Alarm

The SBMS will include an audible alarm that will be activated when a red illumination condition exists and the parking brake is released, or a red illumination condition exists and the transmission is not in park.

HELMET STORAGE, PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, section 14.1.8.4.1 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.

In order to ensure exceptional illumination, each white LED dome light will provide a minimum of 10.1 foot-candles (fc) covering an entire 20.00" x 20.00" square seating position when mounted 40.00" above the seat.

PORTABLE HAND LIGHTS, PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, section 9.8.3 requires two portable hand lights mounted in brackets fastened to the apparatus.

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 will be a molded ABS panel and 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 engin
- 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 optional air conditioning control panel: A control panel with membrane switches will be provided to control heater/defroster temperature and heater, defroster, and air conditioning fan speeds. A green LED status bar will indicate the relative temperature and fan speed settings.

Turn signal arm: A self-canceling turn signal with high beam headlight and windshield wiper/washer controls will be provided. The 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.

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 a single Emergency Master switch which controls all emergency warning lights including lightbars, cab warning lights, body warning lights and high beam flash..

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 engine and 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
- Engine diagnostic switch (blink codes flashed on check engine telltale indicator)
- 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

There will be a Whelen, Model 5SR00FRR, flashing red LED indicator light located in the driving compartment. The light will be illuminated automatically per the current NFPA requirements and labeled "Do Not Move Apparatus If Light Is On".

The same circuit that activates the Do Not Move Apparatus indicator will activate a steady tone 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)
- Hatch Door Open
- 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 built-in switch panels will be located in the lower console or overhead console of the cab.

The switches will be rocker-type and include an integral indicator light. For quick, visual indication the switch will be illuminated whenever the switch is active. A 2-ply, scratch resistant laser engraved Gravoply label indicating the use of each switch will be placed below the switches. The label will allow light to pass through the letters for improved visibility in low light conditions. Switches and light source are integral to the switch panel assembly.

WIPER CONTROL

Wiper control will consist of a two (2)-speed windshield wiper control with intermittent feature and windshield washer controls.

HOURMETER - 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 two (2) pair of wires, including a positive and a negative, installed on the apparatus.

The above 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 protected to 15 amps at 12 volts DC
- Power and ground will terminate officer side dash area
- Termination will be with 15 amp, power point plug with rubber cover
- Wires will be sized to 125 percent of the protection

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

SPARE CIRCUIT

There will be two (2) pair of wires, including a positive and a negative, installed on the apparatus.

The above 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 protected to 15 amps at 12 volts DC.

Power and ground will terminate determined at pre-construction.

Termination will be with heat shrinkable butt splicing.

Wires will be sized to 125% of the protection.

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

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 185 degrees Fahrenheit
- An Optical Gel will be placed between the LCD and protective 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 equipped)
- Foam Level (if equipped)
- 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 indicate
 - 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)

Button functions and button labels may change with each screen.

VEHICLE DATA RECORDER

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

The information stored on the VDR can be downloaded through a USB port mounted in a convenient location determined by cab model. A CD provided with the apparatus will include the programming to download the information from the VDR. A USB cable can be used to connect the VDR to a laptop to retrieve required information.

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 (7-12 Seating Capacity)
- Seat Belt Buckled Status - Yes/No by Position (7-12 Seating Capacity)
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

RADIO ANTENNA MOUNT

There will be two (2) standard 1.125", 18 thread antenna-mounting base(s) installed one (1) on the left side and one (1) 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 passenger side of the apparatus, pointing rearward, displayed automatically with the passenger side turn signal

The camera images will be displayed on the driver's color Mux display. Audio from the microphone on the rear camera will be not provided.

The following components will be included:

- One (1) SV-CW134639CAI Camera
- One (1) CS134404CI Side camera
- One (1) Amplified speaker (if applicable)
- All necessary cables

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 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 re programmable to accommodate changes to the vehicle's operating parameters
- Complete operating and troubleshooting manuals
- USB connection to the main control module for advanced troubleshooting

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 -40C to +70C
- Storage temperature from -40C to +70C
- 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 16 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

Advanced on-board diagnostic messages will be provided to support rapid troubleshooting of the electrical power and control system. The diagnostic messages will be displayed on the information center located at the driver's position.

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

PROGNOSTICS

A software based vehicle tool will be provided to predict remaining life of the vehicles critical fluid and events (no exceptions).

The system will send automatic indications to the Command Zone, color display and/or wireless enabled device to proactively alert of upcoming service intervals.

Prognostics will include:

- Engine oil and filter
- Transmission oil and filter
- Pump oil (if equipped)
- Foam oil (if equipped)
- Aerial oil and filter (if equipped)

ADVANCED DIAGNOSTICS

An advanced, Windows-based, diagnostic software program will be provided for this control system. The software will provide troubleshooting tools to service technicians equipped with a Windows-based computer or wireless enabled device.

The service and maintenance software will be easy to understand and use and have the ability to view system input/output (I/O) information.

TECH 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 provide an external antenna connection 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 data logging 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 logger will provide up to 2 Gigabytes of data storage.

A USB connection will be provided on the Tech Module. It will provide a means to download data logger 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.

POWER AND GROUND STUDS

Spare circuits will be provided in the primary distribution center for two-way radio equipment.

The spare circuits will consist of the following:

- One (1) 12-volt DC, 30 amp battery direct spare
- One (1) 12-volt DC ground and un-fused switched battery stud located in or adjacent to the power distribution center

ENHANCED SOFTWARE

The solid-state control system will include the following software enhancements:

All perimeter lights and scene lights (where applicable) will be deactivated when the parking brake is released.

Cab and crew cab dome lights will remain on for ten (10) seconds for improved visibility after the doors close. The dome lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

Cab and crew cab perimeter lights will remain on for ten (10) seconds for improved visibility after the doors close. The dome lights will dim after ten (10) seconds or immediately if the vehicle is put into gear.

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

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, rope caulk is not acceptable. 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 (1890) 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

There will be four (4) 12 volt Exide®, Model 31S950X3W, batteries that include the following features will be provided:

- 950 CCA, cold cranking amps
- 190 amp reserve capacity
- High cycle
- Group 31
- Rating of 3800 CCA at 0 degrees Fahrenheit
- 760 minutes of reserve capacity
- Threaded stainless steel studs

Each battery case will be a black polypropylene material with a vertically ribbed container for increased vibration resistance. The cover will be manifold vented with a central venting location to allow a 45 degree tilt capacity.

The inside of each battery will consist of a "maintenance free" grid construction with poly wrapped separators and a flooded epoxy bottom anchoring for maximum vibration resistance.

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 stored in well ventilated compartments located under the cab.

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 DSL 75, 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.

There will be a Kussmaul™, Model #091-94-12, remote indicator included.

Battery charger will be located in the cab behind the driver seat

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 C.E Niehoff, Model C531 alternator will be provided. It will have a rated output current of 360 amps, as measured by SAE method J56. It will have a custom three (3)-set point voltage regulator, manufactured by C. E. Niehoff. 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®, 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 Model 8800-12V - DOT/ECE LB LED, low beam module.
- The inside light on each side will contain a Model 8800 -12V - DOT/ECE HB LED, high beam module.

FRONT DIRECTIONALS

The front directional's will be Whelen, Model M6T, amber LED arrow lights. The directional's will be housed in the same chrome common bezel as the front warning light and will be located above the headlights.

INTERMEDIATE LIGHT

There will be two (2) Weldon, Model 9186-8580-29, amber LED turn signal marker lights 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 five (5) amber LED lights provided to indicate the presence and overall width of the vehicle in the following locations:

- Three (3) amber LED identification lights will be installed in the center of the cab above the windshield.
- Two (2) amber LED clearance lights will be installed, one (1) on each outboard side of the cab above the windshield.

FRONT CAB SIDE DIRECTIONAL/MARKER LIGHTS

There will be two (2) Weldon, Model 9186-8580-29, amber LED lights installed front of the cab door, 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) LED identification lights located at the rear installed 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) LED lights installed 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) LED lights installed on the side of the apparatus used 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

The lights will be mounted with an aluminum guard.

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 mounted at rear of truck, one each side. 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

There will be two (2) wrap around tri-cluster LED modules provided on the face of the rear body compartments.

Each tri-cluster will include the following:

- One (1) LED stop/tail light
- One (1) LED directional light
- One (1) LED backup light

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 will be provided to illuminate the license plate. A polished stainless steel light shield will be provided over the light that will direct illumination downward, preventing white light to the rear.

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.

CAB PERIMETER SCENE LIGHTS

There will be four (4) Amdor LumaBar H2O, Model AY-9500-020, 20.00" white LED strip lights provided, one (1) for each cab door.

These lights will be activated automatically when the battery switch is on and the exit doors are opened or by the same means as the body perimeter scene lights.

PUMP HOUSE PERIMETER LIGHTS

There will be one (1) Amdor LumaBar H2O, Model AY-9500-020, 20.00" LED weatherproof strip light with bracket provided under the passenger's side pump panel running board.

The light will be controlled by the same means as the body perimeter lights.

BODY PERIMETER SCENE LIGHTS

There will be two (2) Amdor LumaBar H2O™, Model AY-9500-020, 20.00" 12 volt DC LED strip lights provided.

The lights will be mounted in the following locations:

- One (1) light under the driver's side turntable access steps
- One (1) light under the passenger's side turntable access steps

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

STEP LIGHTS

Two (2) white LED step lights will be provided, one (1) on each side of the front body.

In order to ensure exceptional illumination, each light shall 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 actuated with the pump panel light switch.

All other steps on the apparatus will be illuminated per the current edition of NFPA 1901.

SPECIAL SWITCHING FOR SCENE LIGHTS

There will be two (2) 12V white lights located at the rear of body, driver and passenger side mounted high as practical that will be activated when the emergency master switch is on and the vehicle is shifted into reverse. Both conditions will be required for the 12V white lights to turn on.

The lights will be deactivated if the emergency master switch is off, or if the vehicle is shifted out of reverse.

12 VOLT LIGHTING

There will be one (1) Whelen, Model PFP2P, 12 volt LED floodlight(s) with Model, PBAPEDD, pedestal mounting bracket(s) provided in a location to be determined.

The painted parts of this light assembly to be white.

The light(s) selected above will be controlled by the following:

a switch at the pump operator's panel.

no additional switch location.

no additional switch location.

no additional switch location.

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

12 VOLT LIGHTING

There will be one (1) Whelen® Pioneer™ Series, Model PFP1*, 12 volt LED floodlight(s) installed in semi-recessed housing(s) Model PBA103, located one (1) high and rearward of driver's side crew cab door.

The painted parts of this light assembly to be white.

The light(s) selected above will be controlled by the following:

- a switch at the driver's side switch panel
- a switch at the driver's side pump panel
- no additional switch location
- no additional switch location

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

12 VOLT LIGHTING

There will be two (2) Whelen Model PFP1, 12 volt LED floodlight(s) installed in semi-recessed housing(s) Model PBA103 located rear of body, right and left side mounted high as practical.

The painted parts of this light assembly to be white.

The light(s) selected above will be controlled by the following:

a switch at the driver's side switch panel

a switch at the pump operator's panel

no additional switch location

no additional switch location

These light(s) may be load managed when the parking brake is set

12 VOLT LIGHTING

There will be one (1) Whelen Model PFP1, 12 volt LED floodlight(s) installed in semi-recessed housing(s) Model PBA103 located recessed behind passenger side crew cab door, high as possible..

The painted parts of this light assembly to be white.

The light(s) selected above will be controlled by the following:

a switch at the driver's side switch panel

a switch at the pump operator's panel

no additional switch location

no additional switch location

These light(s) may be load managed when the parking brake is set

12 VOLT LIGHTING

There will be one (1) Whelen, Model PFP2P, 12 volt LED floodlight(s) with Model, PBAPEDD, pedestal mounting bracket(s) provided in a location to be determined..

The painted parts of this light assembly to be white.

The light(s) selected above will be controlled by the following:

a switch at the pump operator's panel.

no additional switch location.

no additional switch location.

no additional switch location.

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

12 VOLT LIGHTING

There will be one (1) Whelen® Pioneer™, Model PCP2*, 12 volt LED combination spot/flood light(s) provided on the front visor, centered.

The painted parts of this light assembly to be white.

The light(s) will be controlled by the following:

- a switch at the driver's side switch panel
- a switch at the passenger's side switch panel
- no additional switch location

These light(s) may be load managed when the parking brake is set.

DECK LIGHTS

There will be two (2) Whelen, Model PFBP12C, white 12 volt DC LED floodlights with swivel mount provided at the rear of the hose bed, one (1) each side.

The lights will be activated by a control from a switch at the rear of the truck.

WATER TANK

It will have a capacity of 500 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 NFPA Bulletin 1901 requirements.

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 structural steel.

Sufficient crossmembers are provided to properly support bottom of tank.

Crossmembers are constructed of steel bar channel or rectangular tubing.

Tank "floats" in cradle to avoid torsional stress caused by chassis frame flexing.

Rubber cushions, .50" thick x 3.00" wide, will be 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. WATER TANK DOME AND OVERFLOW

The fill tower will be constructed of .50" polypropylene. It will be furnished with a .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 a hose chute to the side and rear of the hose bed on both the driver and passenger side 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.

Hose capacity will be a minimum of 1000 feet of 5.00" large diameter hose.

AERIAL HOSE BED HOSE RESTRAINT

The hose in the hose bed will be restrained by a black nylon Velcro strap at the top of the hose bed and a 1.00" black nylon web design with a 2.00" box pattern at the rear of two (2) hose bed(s). 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 .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 .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 swing-down steps, one on the driver side and one on the passenger side of the truck.

The access steps will be located rearward of the compartmentation.

All steps will have a height no greater than 14.00" from top surface to top surface.

The swing down step mechanism will be constructed of brushed aluminum with bright aluminum steps with Morton Cass inserts.

The stepwell will be lined with bright aluminum treadplate to act as scuffplates.

A handrail will be provided on each side of the access steps.

Holes will be provided in each side step plate for hand holds.

The bottom step will have a step height not exceeding 24.00" from the ground to the top surface of the step at any time.

The steps will be connected to the "Do Not Move Truck" indicator in the cab.

STEP LIGHTS

There will be three (3) white LED step lights provided for each set of aerial turntable access steps.

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 actuated by the aerial master switch in the cab.

SMOOTH ALUMINUM REAR WALL

The rear wall will be smooth aluminum.

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.

RUNNING BOARD INSERT

Grip Strut inserts will be provided in the running boards.

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

The backbone of the body support system will begin with the aerial torque box which is the strongest component of the apparatus and is designed for sustaining maximum loads.

An aluminum body structure will be mounted to the aerial torque box at three (3) points 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 three (3) point body mounting system will consist of two (2) points in the front and one (1) in the rear. The front mounts will attach to the top of the stabilizer H-box, and the rear mount will attach to the rear of the torque box at the chassis centerline.

The body structure will be mounted with neoprene elastomer isolators. These 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.

The combination of the three (3) point mounting system and elastomer isolators allow the chassis and torque box to flex without driving loads into the body.

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.

Evidence of the actual testing techniques will be made available upon request.

DRIVER SIDE COMPARTMENTATION

The full height roll-up door compartment ahead of the rear wheels will be 39.19" wide x 63.00" high x 26.00" deep inside the lower 25.50" and 12.00" deep inside the upper portion with a clear door opening of 36.44" wide x 56.00" high.

There will be one (1) roll-up door compartment above the wheelwell and stabilizer. The compartment will be 83.88" wide x 25.25" high x 12.00" deep inside with a clear door opening of 81.12" wide x 19.75" high.

All compartments will include a drip pan below the roll of the door.

The full height roll-up door compartment behind the rear wheel will be 45.12" 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 43.38" wide x 50.00" high.

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

PASSENGERS SIDE COMPARTMENTATION

The full height roll-up door compartment ahead of the rear wheels will be 39.19" wide x 63.00" high x 26.00" deep inside the lower 25.50" and 12.00" deep inside the upper portion with a clear door opening of 36.44" wide x 56.00" high.

There will be one (1) roll-up door compartment above the wheelwell and stabilizer. The compartment will be 83.88" wide x 25.25" high x 12.00" deep inside with a clear door opening of 81.12" wide x 12.00" high.

All compartments will include a drip pan below the roll of the door.

The full height roll-up door compartment behind the rear wheel will be 45.12" 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 43.38" 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 27.75" wide x 35.00" high x 26.25" deep with a clear door opening of 25.00" wide x 29.50" high.

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

ROLL-UP DOOR, SIDE COMPARTMENTS

There will be six (6) compartment doors installed on the side compartments. The doors will be double faced aluminum construction, an anodized satin finish and manufactured by A&A Manufacturing (Gortite).

Lath sections will be an interlocking rib design and will be 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 to be provided for each roll-up door. 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

An aluminum rub rail will be provided at the rear of the unit. It will extend the full width of the compartments.

COMPARTMENT LIGHTING

There will be seven (7) 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 compartment(s): all body compartments.

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 eight (8) shelves, with a capacity of 500 lb provided. The shelf construction will consist of .188" thick aluminum with 2.00" sides. Each shelf will be as wide and as deep as the compartment space will allow. Each shelf will be painted spatter gray.

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 will be upper portion of D1 (2), D2, D3, P1 (2), P2, P3.

SLIDE-OUT FLOOR MOUNTED TRAY

There will be four (4) floor mounted slide-out tray(s) with 2.00" sides provided D1, D3, P1, P3. Each tray will be rated for up to 500lb in the extended position. The tray(s) will be constructed of .19" aluminum with non-welded corners. The finish will be painted to match compartment interior.

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.

MATTING, COMPARTMENT TRAYS AND SHELVES

Dri-Deck rubber compartment matting will be provided in 12 compartments on the compartment trays and shelves. The locations are, all body compartment shelves and trays.

The Dri-Deck will be black, and .562" thick with holes in the decking to allow air to flow.

MATTING, COMPARTMENT FLOOR

Dri-Deck rubber compartment matting will be provided in three (3) compartments on the compartment floor. The locations are, D-2, D-3, and rear.

The Dri-Deck will be black and .562" thick with holes in the decking to allow air to flow. The leading edge of the matting will include the beveled edge.

REAR WALL

The entire rear surface of the apparatus and all the doors will be covered with smooth aluminum.

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 1.25" diameter anodized aluminum extrusion, with a ribbed design, to provide a positive gripping surface.

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 NFPA 1901 section 15.8 requirements. The handrails will be installed as noted on the sales drawing.

AIR BOTTLE STORAGE

A total of three (3) air bottle compartments will be provided and located one on the driver side rear wheel area and two on the passenger side rear wheel area. The air bottle compartment will be 12.00" wide x 7.50" tall x 26.00" deep. A stainless steel door with a chrome plated 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.

A switch will be installed close to the door hinge that shall connect the door to the "Do Not Move Truck" indicator circuit.

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.

ROOF LADDER

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

AERIAL FOLDING LADDER

There will be two (2) 12' aluminum Duo-Safety Series 585-A folding ladder(s) provided.

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.

PIKE POLES

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

8 FT PIKE POLE

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

6 FT PIKE POLE

There will be two (2) 6' pike pole(s) with fiberglass I beam handles provided. The pike pole(s) will be stored in tubular holders located in the ground ladder storage compartment.

STEPS

A folding step will be provided on the front of each fender compartment for access to the hose bed. The step will be bright finished, non-skid with a black coating. The step will incorporate an LED light to illuminate the stepping surface. The step can be used as a hand hold with two openings wide enough for a gloved hand.

Two (2) additional folding steps will be located on the front bulkhead, an equal quantity on each side. The step(s) will be bright finished, non-skid with a black coating. Each step will incorporate an LED light to illuminate the stepping surface. The step(s) can be used as a hand hold with two openings wide enough for a gloved hand.

PUMP

Pump will be a Waterous CSU, 2000 gpm single (1) stage midship mounted centrifugal type.

Pump will be the class "A" type.

Pump will deliver the percentage of rated discharge at pressures indicated below:

- 100% of rated capacity at 150 psi net pump pressure.

-70% of rated capacity at 200 psi net pump pressure.

-50% of rated capacity at 250 psi net pump pressure.

Pump body will be close-grained gray iron, bronze fitted, and horizontally split in two (2) sections for easy removal of the entire impeller shaft assembly (including wear rings).

Pump will be designed for complete servicing from the bottom of the truck, without disturbing the pump setting or apparatus piping.

Pump case halves will be bolted together on a single horizontal face to minimize a chance of leakage and facilitate ease of reassembly. No end flanges will be used.

Discharge manifold of the pump will be cast as an integral part of the pump body assembly and will provide a minimum of three (3) 3.50" openings for flexibility in providing various discharge outlets for maximum efficiency.

The three (3) 3.50" openings will be located as follows: one (1) outlet to the right of the pump, one (1) outlet to the left of the pump, and one (1) outlet directly on top of the discharge manifold.

Impeller shaft will be stainless steel, accurately ground to size. It will be supported at each end by sealed, anti-friction ball bearings for rigid precise support. Impeller will have flame plated hubs assuring maximum pump life and efficiency despite any presence of abrasive matter in the water supply.

Bearings will be protected from water and sediment by suitable stuffing boxes, flinger rings, and oil seals. No special or sleeve type bearings will be used.

Stuffing boxes will be of the conventional two (2) piece, split-gland type, to permit adjustment or replacement of Grafoil packing without disturbing the pump. Water will be fed into stuffing box lantern rings for proper lubrication and cooling when the pump is operating.

Lantern rings will be located at the inner ends of the stuffing boxes, to avoid having to remove them when replacing pump packing.

Wear rings will be bronze and easily replaceable to restore original pump efficiency and eliminate the need to replace the entire pump casing due to wear.

PUMP TRANSMISSION

The pump transmission will be made of a three (3) piece, aluminum, horizontally split casing. Power transfer to pump will be through a high strength Morse HY-VO silent drive chain. By the use of a chain rather than gears, 50% of the sprocket will be accepting or transmitting torque, compared to two (2) or three (3) teeth doing all the work.

Drive shafts will be 2.35" diameter hardened and ground alloy steel and supported by ball bearings. The case will be designed to eliminate the need for water cooling.

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. A manual back-up shift control will also be located on the pump operator's pump panel.

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 that the chassis transmission is in pump gear. This indicator light will be labeled "OK to pump".

Another green indicator light will be installed adjacent to the hand throttle on the pump panel and indicate either the pump is engaged and the road transmission is in pump gear, or the road transmission is in neutral and the pump is not engaged. This indicator light will be labeled "Warning: Do not open throttle unless light is on".

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 cylindrical type and will be a separate unit. The heat exchanger will be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger will be plumbed to the master drain valve.

INTAKE RELIEF VALVE

An Elkhart relief valve will be installed on the suction side of the pump preset at 125 psig.

Relief valve will have a working range of 75 psig to 250 psig.

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.

Control will be located behind an access door at a side pump panel.

RELIEF VALVE

A Waterous adjustable relief valve, specially designed for fire service, will be provided.

Valve will be positive, quick acting, and include an instantaneous on/off control. When in the off position, the relief valve will functionally be removed from the system. When turned back to the on position, the relief valve will again monitor and maintain the previous pressure setting.

Control for adjusting pressure will be elliptical shaped for positive grip.

An easily removable pilot valve strainer will be provided and be accessible from the pump operator's panel.

Two (2) indicator lights will be furnished, showing the position of the relief valve (amber for open and green for closed).

PRIMING PUMP

The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multistage venturi based AirPrime System, conforming to standards outlined in the current edition of NFPA 1901.

All wetted metallic parts of the priming system are to be of brass and stainless steel construction.

One (1) priming control will open the priming valve and start the pump primer.

THERMAL RELIEF VALVE

A Watrous Overheat Protection Manager (OPM) 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 140 Degrees F (60 C) and a red warning light that is triggered when the water in the pump reaches 180 F (82 C).

The warning light will act as an additional protection device if the temperature in the pump keeps rising after the valve opens. The warning light and alarm with a test switch will be mounted on the pump operator panel.

The discharge line will be plumbed to ground.

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) CDs. Each manual will cover pump operation, maintenance, and parts.

PLUMBING

All inlet and outlet plumbing, 3.00" and smaller, will be plumbed with either stainless steel pipe or synthetic rubber hose reinforced with high-tensile polyester braid. Small diameter secondary plumbing such as drain lines will be stainless steel, brass or hose.

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 lines will drain through a master drain valve or will be equipped with individual drain valves. All individual drain lines for discharges will be extended with a hose to drain below the chassis frame.

All water carrying gauge lines will be of flexible polypropylene tubing.

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.

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.

LEFT SIDE INLET

On the left side pump panel will be one (1) - 2.50" auxiliary inlet, terminating in 2.50" National Standard Hose Thread. The auxiliary inlet will be provided with a strainer, chrome swivel and plug.

The location of the valve for the one (1) inlet will be recessed behind the pump panel.

ANODE, INLET

A pair of replaceable sacrificial .75" magnesium anodes will be provided in the water pump to protect the pump from corrosion. One (1) will be placed in the inlet side of the pump and the other in the discharge side of the pump.

INLET CONTROL

Control for the side auxiliary inlet(s) will be located at the inlet valve.

FRONT INLET PROVISION

Provisions for a front inlet will be provided on the passenger side pump suction manifold. Flange will be capped off for possible addition of front inlet at a later date.

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 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 heavy duty 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.

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 2.50" (M) National Standard hose thread adapter.

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.

LARGE DIAMETER DISCHARGE OUTLET

There will be a 4.00" discharge outlet with a 4.00" Akron valve installed on the right side of the apparatus, terminating with a 4.00" (M) National Standard hose thread adapter. This discharge outlet will be actuated with a handwheel control at the pump operator's control panel.

An indicator will be provided to show when the valve is in the closed position.

FRONT DISCHARGE OUTLET

There will be one (1) 1.50" discharge outlet piped to the front of the apparatus and located on the top of the left side of the front bumper.

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 Class 1 automatic drains provided at all low points of the piping.

DISCHARGE CAPS

Chrome plated, rocker lug, caps with vinyl covered cables will be furnished for all discharge outlets.

OUTLET BLEEDERS

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 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 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.

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 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 OUTLET ELBOWS

The 4.00" outlet(s) will be furnished with one (1) 4.00" (F) National Standard hose thread x 5.00" Storz elbow adapter with Storz cap.

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.

AERIAL OUTLET

The aerial waterway will be plumbed from the pump to the water tower line with 5.00" pipe and a 4.00" Akron valve. The handwheel control for the waterway valve will be located at the pump operator's panel.

An indicator will be provided to show the position of the valve.

CROSSLAY HOSE BEDS

Two (2) crosslays with 1.50" outlets will be provided. Each bed to be capable of carrying 200' of 1.75" double jacketed hose 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 0.25" aluminum and will provide adjustment from side to side. The divider will be unpainted with a brushed finish.

Vertical scuffplates constructed of 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.

2.50" CROSSLAY HOSE BED

One (1) crosslay with 2.50" outlets will be provided. This bed to be capable of carrying 200' of 2.50" double jacketed hose and will be plumbed with 2.50" i.d. pipe and gated with a 2.50" quarter turn ball valve.

Outlet 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 control 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.

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 stainless steel scuffplate.

Crosslay bed flooring will consist of removable perforated brushed aluminum.

CROSSLAY/DEADLAY HOSE RESTRAINT

Elastic netting will be provided across the top and ends of three (3) crosslay/deadlay opening(s) to secure the hose during travel. The netting will be permanently attached at the top center of the crosslay/deadlay bed and removable on each end.

FOAM SYSTEM

A foam system will not be required on this apparatus.

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.

The trim rings for the side discharge outlets will be color coded and labeled to correspond with the discharge identification tag.

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 will be 35.00" wide. The platform will lock in the retracted and the extended position.

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.

The passenger's side pump panel will be removable and fastened with swell type fasteners.

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.

There will be a switch accessible through a door on the pump panel included with this installation.

PUMP PANEL GAUGES AND CONTROLS

The following will be provided on the pump panels in the FRC ThrottleXcel monitoring system

- Engine Oil Pressure Gauge: LED bar graph display
- Engine Water Temperature Gauge: LED bar graph display
- Tachometer: over 1/2" high LED digits
- Voltmeter: LED bar graph display
- Time/Date. Dot Matrix display
- Master Pump Drain Control
- Engine Throttle, Fire Research ThrottleXcel and monitoring display.

AIR HORN BUTTON

An air horn control button will be provided at the pump operator's control panel. This button will be red in color and properly labeled and put within easy reach of the operator.

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 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

There will be an electronic water level gauge provided on the operator's panel that registers water 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 water 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 water 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 water and environmental elements. An industrial pressure transducer will be mounted to the outside of the tank. The field calibratable display measures 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.

There will be a light activated above the pump panel light switch when the parking brake is set. This is to afford the operator some illumination when first approaching the control panel.

There will be a green pump engaged indicator light activated on at the operator's panel when the pump is shifted into gear from inside the cab.

AIR HORN SYSTEM

Two (2) Grover Stuttertone air horns, 24.00" long, will be provided and located in the front bumper, recessed one each side of front bumper tray, outside of frame. The horn system will be piped to the air brake system wet tank utilizing .38" tubing. A pressure protection valve will be installed in-line to prevent loss of air in the air brake system.

AIR HORN CONTROL

The air horns will be actuated by a chrome push button located on the officer's side of the engine tunnel and by the horn button in the steering wheel. The driver will have the option to control the air horns or the chassis horns from the horn button by means of a selector switch located on the instrument panel.

ELECTRONIC SIREN

A Whelen, Model 295HFS2, electronic remote 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 inside switch panel.

Siren will be actuated by a foot switch on the officer's side and by the horn button in the steering wheel. The driver will have the option to control the siren or the chassis horns from the horn button by means of a selector switch.

SPEAKER

There will be two (2) speakers provided. Each speaker will be a Whelen®, Model SA315P, black nylon composite, 100-watt, with through bumper mounting brackets and polished stainless steel grille. Each speaker will be connected to the siren amplifier.

There will be one (1) speaker recessed in the passenger's side and one (1) speaker recessed in the driver's side of the front bumper.

MECHANICAL SIREN

There will be a B & M, Model Super Chief SC8B-SF, pedestal mounted mechanical siren will be furnished on the top of the bumper located driver side, top of bumper. A siren brake button will be installed on the switch panel. Siren power will be interlocked with the park brake circuit.

The mechanical siren will be mounted on the bumper deck plate. It will be mounted on the left side. A reinforcement plate will be furnished to support the siren.

The mechanical siren will be actuated by two (2) foot switches, one (1) located on the officer's side and one (1) on the driver's side.

LIGHTBARS (CAB ROOF)

There will be two (2) 24.00" Whelen LED lightbars mounted on the cab roof, one (1) on each side, above the driver's and passenger's door, facing forward.

Each lightbar will include the following:

- One (1) red flashing LED module facing forward.
- Two (2) red flashing corner LED module, one (1) in each front corner.
- One (1) red flashing LED module on the end facing to the side.

All the lenses will be clear.

There shall be a switch located in the cab on the switch panel to control the lightbars.

LIGHTS, FRONT ZONE LOWER

Two (2) Whelen model M6*C LED flashing warning lights will be installed on the cab face above the headlights, in a common bezel with the directional lights.

The driver's side front warning light to be red.

The passenger's side front warning light to be red.

Both lights will include a clear lens.

There will be a switch located in the cab on the switch panel to control the lights.

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*C, LED flashing warning lights with Model 6EFLANGE, chrome flanges located in the following positions:

- Two (2) lights, one (1) each side on the bumper extension
 - The side front lights to be red
- Two (2) lights, one (1) each side of cab rearward of crew cab doors
 - The side middle lights to be red
- Two (2) lights, one (1) each side above rear wheels
 - The side rear lights to be red

All six (6) lights will include a clear lens.

There will be a switch located 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 with Model M6FC, chrome flanges 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 WARNING LIGHTS

There will be two (2) Whelen®, Model M6*C, LED flashing warning light(s) with bezel(s) provided above the taillights.

The color of these light(s) will be red.

These light(s) will be controlled with the rear lower warning switch.

These light(s) will include a lens that is clear.

REAR/SIDE ZONE UPPER WARNING LIGHTS

There will be two (2) Whelen®, Model L31H*FN, LED warning beacons provided at the rear of the truck, located one (1) each side. There will be a switch located in the cab on the switch panel to control the beacons.

The color of the lights will be red LEDs with both domes clear.

TRAFFIC DIRECTING LIGHT

There will be one (1) Whelen model TAM65, 36.00" long x 2.84" high x 2.24" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen model TACTLD1 control head will be included with this installation.

The auxiliary warning mode will be activated with the control head only.

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 shall be located overhead in the center 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 NFPA 1901, 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 amperage 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 information detailed in Figure 19-4.10.

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 NFPA 1901 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 NFPA 1901 standard.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in the current NFPA 1901 standard will be applied to the low voltage electrical system during the operational test.

GENERATOR

The apparatus will be equipped with a complete AC (alternating current) electrical power system. The generator will be a Harrison, Model MSV, 6,000 watt hydraulic driven unit with vertical exhaust.

The generator will be driven by a transmission power take off unit, through a hydraulic pump and motor.

The hydraulic engagement supply will be operational at any time (no interlocks).

An electric/hydraulic valve will supply hydraulic fluid to the clutch engagement unit provided on the chassis PTO drive.

Generator Instruments and Controls

To properly monitor the generator performance, a voltmeter will be furnished near the breaker box.

GENERATOR LOCATION

The generator will be mounted in the in the area over the pump on the left side. 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 in compartment D3 within the false bulkhead wall.

ELECTRIC CORD REEL

Furnished with the 120/240 volt AC electrical system will be an Akron cord reel. The reel will be provided with a 12 volt electric rewind switch that is guarded to prevent accidental operation and labeled for its intended use. The switch will be protected with a fuse and installed at a height not to exceed 72.00" above the operators standing position.

The reel will be capable holding 200' of 10/4, 600 volt cable.

The exterior finish of the reel(s) will be powder coated silver from the reel manufacturer.

No guide is required on the reel assembly. A ball stop will be provided to prevent the cord from being wound on the reel.

A label will be provided in a readily visible location adjacent to the reel. The label will indicate current rating, current type, phase, voltage and total cable length.

A total of one (1) cord reel will be provided one (1) above the pump area on the right side.

The cord reel should be configured with four (4) conductors.

Reel Warranty

The electric reel will come with a **five (5)-year** warranty provided by the reel manufacturer.

CORD

Provided for electric distribution will be one (1) length installed on the reel of 200 feet of yellow 10/4 electrical cord. No connector, terminate each conductor with butt splice will be installed on the end of the cord.

PORTABLE JUNCTION BOX

There will be a total of one (1) electrical junction box(es), listed for use in wet locations and provided with light to indicate power on. Each box will be designed to keep the exterior electrical components above 2.00" of standing water, protected from corrosion, and capable of being carried with a gloved hand.

There will be a cable strain relief and a 1.00' pigtail with wire mesh grip, NEMA L14-20, 20 amp, 120/240 volt twist lock plug and boot provided for each box. Each box will be yellow powder coated .

Each Circle D, PF51G Series, box will be provided with the following receptacles:

- Four (4) 120 vac, 15 amp single straight blade receptacles

ROLLER GUIDE

A captive roller assembly will be installed in a body sheet to aid in the payout of the cord from a reel mounted in a compartment. There will be one (1) for each reel for a total one (1) roller guide.

on the passenger side of pump house dunnage area, above pump panel..

FOUR (4)-SECTION 107 FOOT AERIAL LADDER

CONSTRUCTION STANDARDS

The ladder will be constructed to meet all of the requirements as described in the current NFPA 1901 standards.

The aerial device will be a true ladder type device; therefore ladders attached to booms will not be considered.

These capabilities will be established in an unsupported configuration.

All structural load supporting elements of the aerial device that are made of a ductile material will have a design stress of not more than 50% of the minimum yield strength of the material based on the combination of the live load and the dead load. This 2:1 structural safety factor meets the current NFPA 1901 standard.

All structural load supporting elements of the aerial device that are made of non-ductile material will have a design stress of not more than 20% of the minimum ultimate strength of the material, based on the combination of the rated capacity and the dead load. This 5:1 safety factor meets the current 1901 NFPA standard.

Wire ropes and attaching systems used to extend and retract the fly sections will have a 5:1 safety factor based on the ultimate strength under all operating conditions. The factor of safety for the wire rope will remain above 2:1 during any extension or retraction stall. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used will be 1:12. 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.

The aerial base pivot bearings will be maintenance free type bearings and require no external lubrication.

The aerial device will be capable of sustaining a static load one and one-half times its rated tip load capacity (live load) in every position in which the aerial device can be placed when the vehicle is on a firm level surface.

The aerial device will be capable of sustaining a static load one and one-third times its rated tip load capacity (live load) in every position the aerial device can be placed when the vehicle is on a slope of five degrees downward in the direction most likely to cause overturning.

With the aerial device out of the cradle and in the fully extended position at zero degrees elevation, a test load will be applied in a horizontal direction normal to the centerline of the ladder. The turntable will not rotate and the ladder will not deflect beyond what the product specification allows.

All welding of aerial components, including the aerial ladder sections, turntable, pedestal, and outriggers, will be in compliance with the American Welding Society standards. All welding personnel will be certified, as qualified under AWS welding codes.

The aerial device will be capable of operating with the maximum rated tip load in either of the two (2) following conditions:

- Conditions of high wind up to 35 mph
- Conditions of icing, up to a coating of .25" over the entire aerial structure

All of the design criteria must be supported by the following test data (no exception):

- Strain gage testing of the complete aerial device
- Analysis of deflection data taken while the aerial device was under test load

The following standards for materials are to be used in the design of the aerial device:

- Materials are to be certified by the mill that manufactured the material
- Materials that are certified or recertified by vendors other than the mill will not be acceptable
- Material testing that is performed after the mill test will be for verification only and not with the intent of changing the classification
- All welded structural components for the ladder will be traceable to their mill lots

LADDER CONSTRUCTION

The ladder will be comprised of four sections.

The ladder will have the capability to support a minimum of 750 pounds at the tip in the unsupported configuration, based upon 360 degree rotation, up to full extension and from -10 degrees to +77 degrees.

The ladder (handrails, baserails, trusses, K-braces and rungs) will be constructed of high strength low alloy steel, minimum 100,000 pounds per square inch yield, with full traceability on all structural members.

Each section will be trussed diagonally, vertically and horizontally using welded steel tubing.

All ladder rungs will be round and welded to each section utilizing "K" bracing for torsional rigidity.

The inside width dimensions of the ladder will be:

- Base Section 41.87"
- Inner-Mid Section 34.88"
- Outer-Mid Section 27.87"
- Fly Section 21.63"

The height of the handrails above the centerline of the rungs will be:

- Base Section 25.69"
- Inner-Mid Section 22.06"
- Outer-Mid Section 19.44"

- Fly Section 16.70"

The ladder will be designed to provide continuous egress for firefighters and civilians from an elevated position to the ground. The end of the fly section will be constructed in a manner that aids personnel in climbing off the ladder.

The egress section will be designed to maintain the rated load of the aerial device. It will be bolted on for easy replacement.

VERTICAL HEIGHT

The ladder will extend to a minimum height of 107' above the ground at full extension and elevation. The measurement of height will be consistent with NFPA standards.

HORIZONTAL REACH

The rated horizontal reach will be a minimum of 100'. The measurement of horizontal reach will be consistent with NFPA standards.

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.

The turntable will be a .375" thick aluminum plate, coated with a non-skid, chemical resistant material in the walking areas. The stepping surfaces will meet the skid-resistance requirements of the current NFPA 1901 standard.

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 turntable will be lit to meet the current edition of NFPA 1901 requirements. Lights will be activated by the aerial master switch.

The turntable handrails will be a minimum 42.00" high and will not increase the overall travel height of the vehicle. The handrails will be constructed from aluminum and have a slip resistant knurled surface.

ELEVATION SYSTEM

Dual 5.50" diameter elevating cylinders will be mounted on the underside of the base section of the ladder. Two (2) 2.25" diameter stainless steel pins will fasten the cylinder to the turntable and fasten to the ladder. The pins will have 125,000 psi minimum yield strength and will be secured with .50" Grade 8 bolts with castle nut and cotter pin. 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 with 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.

The operation envelope will be 10 degrees below horizontal to 77 degrees above horizontal.

The elevation system will be designed following NFPA standards. The elevation hydraulic cylinders will incorporate cushions on the upper limit of travel.

The lift cylinders will be equipped with integral holding valves located in the cylinder to prevent the unit from descending should the charged lines be severed, at any point within the hydraulic system and to maintain the ladder in the bedded position during road travel. The integral holding valves will NOT be located in the transfer tubes.

The elevation system will be controlled by the microprocessor. Linear transducers will measure the extension of the elevation cylinder. The microprocessor will provide the following features:

- Collision avoidance of the elevation system to prevent accidental body damage
- Automatic deceleration when the aerial device is lowered into the cradle
- Automatic deceleration at the end of stroke, in maximum raise and lower positions
- Deceleration of the aerial device at the limits of travel.

EXTENSION/RETRACTION SYSTEM

A hydraulically powered, extension and retraction system will be provided through dual hydraulic cylinders and wire ropes. Each set will be capable of operating the ladder in the event of a failure, of the other. For safety, systems that use only a single extension/retraction system will not be acceptable. The extension cylinder rod will be chrome plated to provide smooth operation of the aerial device and reduce seal wear. The extension/retraction cylinders will be equipped, with integral holding valves, to prevent the unit from retracting should the charged line be severed, at any point within the hydraulic system. The integral holding valves will NOT be located in the transfer tubes.

Wire ropes and attaching systems used to extend and retract the fly sections will have a 5:1 safety factor based on the ultimate strength under all operating conditions. The factor of safety for the wire rope will remain above 2:1 during any extension or retraction stall. The minimum ratio of the diameter of wire rope used to the diameter of the sheave used will be 1:12. Wire ropes will be constructed of seven (7) strands over an inner wire for increased flexibility. The wire rope will be galvanized to reduce corrosion.

The extension/retraction system will be controlled by the microprocessor. Linear transducers will measure the ladder extension. The microprocessor will provide the following features:

- Automatic deceleration at the end of stroke, in maximum extend and retract positions

All sheaves will be greaseless and all sheave pins and pivot pins will be polished stainless steel (no exception).

MANUAL OVERRIDE CONTROLS

Manual override controls will be provided for all aerial and stabilizer functions.

LADDER SLIDE MECHANISM

UHMW polyethylene wear pads will be used between the telescoping ladder sections, to provide greater bearing surface area for load transfer. Adjustable slide pads will be used to control side play between the ladder sections.

ROTATION SYSTEM

The aerial will be supplied with a powered rotation system as outlined in NFPA standards. The hydraulic rotation motor will provide continuous rotation under all rated conditions and be supplied with a brake to prevent unintentional rotation. One (1) hydraulically driven, planetary gear box with drive speed reducers will be used to provide infinite and minute rotation control throughout the entire rotational travel. One (1) spring applied, hydraulically released disc type swing brake will be furnished to provide positive braking of the turntable assembly. Provisions will be made for emergency operation of the rotation system should complete loss of normal hydraulic power occur. The hydraulic system will be equipped with pressure relief valves which will limit the rotational torque to a nondestructive power. The gearbox will have a minimum continuous torque rating of 80,000 in. lbs. and a minimum intermittent rating of 160,000 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.

The rotation system will be controlled by the microprocessor. The microprocessor will provide the following features:

- Collision avoidance to prevent accidental body damage
- Prevent the aerial from being rotated into an unstable condition.

ROTATION INTERLOCK

The microprocessor will be used to prevent the rotation of the aerial device to the side in which the stabilizers have not been fully deployed (short-jacked). The microprocessor 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 NFPA 1901. SYSTEMS THAT PERMIT THE AERIAL TO ROTATE TO THE "SHORT JACK" SIDE, WITHOUT AUTOMATICALLY STOPPING THE ROTATION AND/OR WITHOUT ACTUATION OF THE "MANUAL OVERRIDE", will NOT BE ACCEPTED. SYSTEMS THAT ONLY INCLUDE AN ALARM ARE NOT CONSIDERED AN INTERLOCK AND will NOT BE ACCEPTED.

LADDER CRADLE INTERLOCK SYSTEM

A ladder cradle interlock system will be provided through the microprocessor to prevent the lifting of the aerial device from the nested position until the operator places all the stabilizers in a load supporting configuration. A switch will be installed at the boom support to prevent operation of the stabilizers once the aerial has been elevated from the nested position..

AERIAL TORQUE BOX/PEDESTAL

The pedestal assembly will be a welded assembly made of high strength 0.25" plate. The vertical member will be a .375" reinforced 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 360 degree rotation with ladder extended to operational limits at 0 degrees elevation.

A load chart, visible at the operator's station will be provided. The load chart will show the recommended safe load at any condition of the aerial device's elevation and extension.

35 MPH WIND CONDITIONS/WATERWAY DRY

Degrees of Elevation	-10 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 77
Egress	750	750	750	750	750	750	750	750
Fly	-	-	-	-	250	250	500	750
Upper Mid	-	-	-	-	250	500	1000	1000
Lower Mid	-	-	-	500	500	750	1000	1000
Base	-	-	500	500	500	1000	1000	1000

35 MPH WIND CONDITIONS/WATERWAY CHARGED

Degrees of Elevation	-10 to 9	10 to 19	20 to 29	30 to 39	40 to 49	50 to 59	60 to 69	70 to 77
Egress	500	500	500	500	500	500	500	500
Fly	-	-	-	-	-	250	500	500
Upper Mid	-	-	-	250	500	500	750	1000
Lower Mid	-	-	-	250	500	750	1000	1000
Base	-	-	250	500	750	1000	1000	1000

Reduced loads at the tip can be redistributed in 250 lb. increments to the fly, 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 PANEL

There will be one boom panel provided on each side of the aerial ladder base section. The boom panel will be painted to match the lower body paint 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 ten (10) feet. 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 of a 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, non-skid with a black coating.

AERIAL DEVICE RUNG COVERS

Each rung will be covered with a secure, heavy-duty, fiberglass pultrusion that incorporates an aggressive, no-slip coating.

The rung covers will be glued to each rung, and will be easily replaceable should the rung cover become damaged.

The center portion of each rung cover will be black and the outside 2.00" edge at each side will be safety yellow.

Under no circumstances will the rung covers be fastened to the rungs using screws or rivets.

The rung covers will have a 10-year, limited warranty.

INFORMATION CENTER

There will be an information center provided. The information center will operate in temperatures from -40 to 185 degrees Fahrenheit. The information center will employ a Linux operating system and a 7.00" (diagonal measurement) LCD display. The LCD will have a minimum 1000nits rated, color display. The LCD will be sunlight readable, true digital operation, and will have improved resolution. The LCD display will be encased in an ABS, grey plastic housing with a gray decal. There will be five (5), weather-resistant user interface switches provided. The LCD display can be changed to an available foreign language.

OPERATION

The information center will be designed for easy operation in everyday use. There will be a page button to cycle from one screen to the next screen in a rotating fashion. A video button will allow an NTSC signal into the information center to be displayed on the LCD. If any button is pressed while viewing a video feed, the information center will return to the vehicle information screens. There will be a menu button to provide access to maintenance, setup, and diagnostic screens. All other button labels will be specific to the information being viewed.

GENERAL SCREEN DESIGN

Where possible, background colors will be used to provide vehicle information *At A Glance*. If the information provided on a screen is within acceptable limits, a black background color will be used. If the information provided on a screen is not within acceptable limits, an amber background color will indicate a caution condition and a red background color will indicate a warning condition.

Every screen in the information center will include the time (12- or 24-hour mode) and a fault alert triangle symbol. The time will be synchronized between all Command Zone color displays located on the vehicle. Once the fault alert triangle is selected, a text message will identify any items causing the audible alarm to sound. If more than one (1) audible alarm is activated, the text message for each alarm will cycle every second until the problems have been resolved. The background for the Alert Center will change to indicate the severity of the warning message. Amber will indicate a caution condition and red will indicate a warning condition. If a warning and a caution condition occur simultaneously, the red background color will be shown for all Alert Center messages.

A label or symbol will be provided for each button. The label or symbol will indicate the function for each active button for each screen. If the button is not utilized on specific screens, it will remain black.

Symbols will accurately depict the aerial device type the information pertains to such as rear mount ladder, rear mount platform, mid-mount ladder or mid-mount platform.

PAGE SCREENS

The Information center will include the following pages:

The Aerial Main and Load Chart page will indicate the following information:

- Rungs Aligned and Rungs Not Aligned will be indicated with respective green or red colored ladder symbols.
- Ladder Elevation will be indicated via a fire apparatus vehicle with ladder symbol with the degree of elevation indicated between the vehicle and ladder.
- Water Flow (if applicable) will be indicated via a water nozzle symbol and text indicating flow / time.
- If applicable, breathing air levels will be indicated via an air bottle symbol and text indicating the percent (%) of air remaining. A green bar graph shown inside the bottle will indicate oxygen levels above 20%. A red bar graph will indicate oxygen levels at or below 20%. When oxygen levels are at or below 10%, the red bar graph will flash.
- *At A Glance* color features will be utilized on this screen. A fault alert triangle symbol in the lower right portion of the screen will indicate any caution faults with a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

The Aerial Reach and Hydraulic Systems page will indicate the following information:

- If applicable, aerial hydraulic oil temperature will be indicated with symbol and text.
- Aerial Hydraulic Oil Pressure will be indicated with a symbol and text.
- The following calculations will be indicated on a representative vehicle symbol:
 - Aerial Device Extension length
 - Aerial Device Height indicating the height of the aerial device tip from the ground
 - Aerial Device Angle indicating the angle from the vehicle which the device is at.
- *At A Glance* color features will be utilized on this screen. A fault alert triangle symbol in the lower right portion of the screen will indicate any caution faults with a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

The Level Vehicle page will indicate the following information:

- The grade of the vehicle will be indicated via a fire apparatus vehicle symbol with the degree of grade shown in text format. The symbol will tilt dependent on the vehicle grade.
- The slope of the vehicle will be indicated via a fire apparatus vehicle symbol with the degree of slope shown in text format. The symbol will tilt dependent on the vehicle slope.

- Outriggers status will be indicated via a colored symbol for each outrigger present. Each outrigger status will be defined as one of the following:
- Outrigger stowed indicated with a silver pan located close to the vehicle
- Outrigger fully extended indicated with a fully deployed green outrigger
- Outrigger short-jacked indicated by a yellow outrigger partially deployed
- Outrigger not set indicated by a red outrigger that is not set on the ground
- A bedding assist alert will indicate that the aerial device is being aligned by the Command Zone system as the operator lowers the aerial device into the cradle with the joystick.
- *At A Glance* color features will be utilized on this screen. A fault alert triangle symbol in the lower right portion of the screen will indicate any caution faults with a yellow background. Warning type conditions will be indicated via a red background. Conditions operating within acceptable limits will be indicated via a green background.

The aerial operation envelope page will indicate the following:

- A top view of the aerial operating envelope
- A side view of the aerial operating envelope

MENU SCREENS

The following screens will be available through the Menu button:

The View System Information screen will display aerial device hours, aerial PTO hours, ladder aligned for stowing, aerial rotation angle, total water flow (if applicable), and aerial waterway valve status (if applicable).

The Set Display Brightness screen will allow brightness increase and decrease and include a default setting button.

The Configure Video Mode screen will allow setting of video contrast, video color and video tint.

The Set Startup screen allows setting of the screen that will be active at vehicle power-up.

The Set Date and Time screen has a 12- or 24-hour format, and allows setting of the time and date.

The View Active Alarms screen shows a list of all active alarms including the date and time of each alarm occurrence, and shows all alarms that are silenced.

The System Diagnostics screen allows the user to view system status for each module and its respective inputs and outputs. Viewable data will include the module type and ID number; the module version; and module diagnostics information including input or output number, the circuit number connected to that

input or output, the circuit name (item connected to the circuit), status of the input or output, and other module diagnostic information.

Aerial Calibrations screen indicates items that may be calibrated by the user and instructions to follow for proper calibration of the aerial device.

Button functions and button labels may change with each screen.

LOWER CONTROL STATIONS

A lower control station will be located on each side of the rear wall of the apparatus in an easily accessible area. The controls and indication labels will be illuminated for nighttime operation. The following items will be furnished at the lower control station and will be clearly identified and conveniently located for ease of operation and viewing:

- Level assist switch
- Override switch to override interlocks
- Emergency stop
- Emergency power unit switch

AERIAL DEVICE CONTROL STATIONS

There will be one (1) device control station at the aerial turntable. All elevation, extension and rotation controls will operate from both of this location. The controls will permit the operator to regulate the speed of the aerial functions, within the safe limits, as determined by the manufacturer and NFPA standards. The controls will be clearly marked and lighted for nighttime operation.

Each control will be equipped, with a positive lock to hold the control in a neutral position, preventing accidental activation. In addition to the neutral lock, a console cover will be provided at the turntable control station. The controls will be so designed to allow the turntable control station to immediately override the tip controls, if equipped, even if the ladder is being operated by the tip controls.

TURNTABLE CONTROL STATION

The turntable control station will be located on the left side of the turntable so the operator may easily observe the ladder while operating the controls.

The following items will be installed at the turntable control station, clearly identified, lighted for nighttime operation and conveniently located for ease of operation and viewing:

- Electric controls for elevation, rotation, extension/retraction
- Intercom controls
- Tip tracking light switch

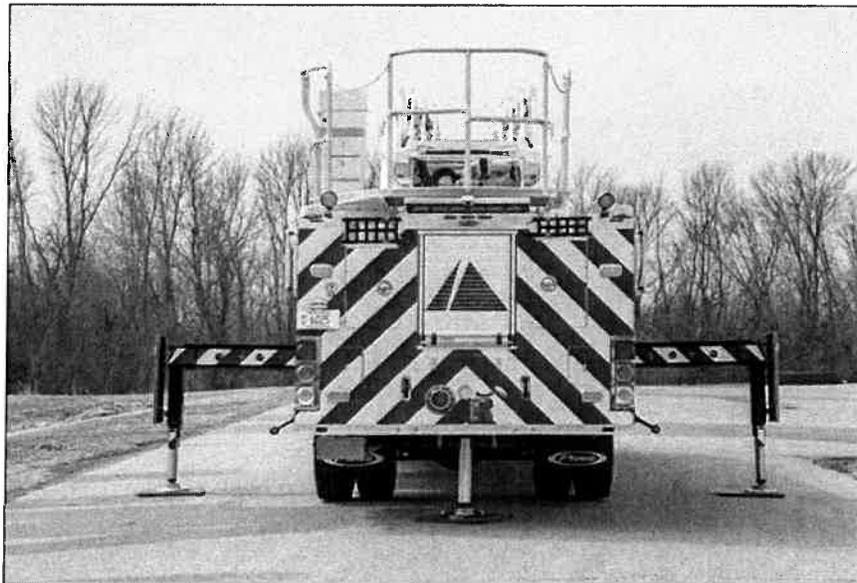
- Emergency stop switch
- Emergency power unit switch
- Operator's load chart
- Two (2) position switch for selecting aerial operational speed

HIGH IDLE

The high idle will be controlled by the microprocessor. The microprocessor will automatically adjust the engine rpm, to compensate for the amount of load placed upon the system. The system will include a safety device that allows activation of the high idle, only when the parking brake is set and the transmission is placed in neutral.

STABILIZERS

The vehicle will come equipped with an out and down stabilization system. The system will consist of two (2) hydraulically operated out and down style stabilizers mounted above the frame and a rear stabilizer jack that is attached directly to the center rear of the torque box.



The stabilizers will have a maximum spread of 18' 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 130,000 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 (no exception).

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 12 percent. On the 12 percent slope, the apparatus can be leveled within a 6 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 16 gauge polished stainless steel shield. The stainless steel shield will be a maximum 13.00" wide to allow the extension of the stabilizer between parked cars. This plate 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

3.50" rod

23.38" stroke

The stabilizer extension cylinders will have the following dimensions

1.75" bore

1.25" rod

64.00" stroke

The rear stabilizer will have the following dimensions:

4.50" bore

4.00" rod

29.00" 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. The stabilizers will be connected to a warning light in the cab to warn the operator if the stabilizers are deployed. A work light will be provided in the stabilizer body opening to illuminate the stabilizer and the ground. The light will automatically come on with the aerial master switch.

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 in front of the stabilizers.

The auxiliary jack pad for the rear stabilizer will be integral to the stabilizer foot pad.

STABILIZER CONTROLS

One (1) electric solenoid valve will control the stabilizers. The control switches will be located one (1) each side at the rear of the apparatus so the operator may observe the stabilizers during deployment.

The stabilizer controls will include the following:

- Leveling assist toggle switch: The outrigger control system will incorporate a computerized self leveling system in addition to the standard outrigger controls. The operator will have the option to manually or automatically level the truck. The computerized system will ensure full outrigger extension, proper jack penetration, and will level the vehicle within 1/2 a degree of level for safe operation of the aerial device.
- One (1) electric toggle switch for the engaging the emergency power unit.
- Two (2) fully extended beams green indicator lights: these lights will be illuminated when each of the respective stabilizer beams are fully extended.
- Three (3) firm on ground green indicator lights: each light will be illuminated when its respective stabilizer shoe is in the load supporting condition.

Each toggle switch will activate the engine fast idle automatically.

Manual override will be supplied for each stabilizer control valve.

A "Stabilizers Not Stowed" indicator will be provided in the driver's compartment. It will illuminate automatically whenever the stabilizers are not fully stowed to prevent damage to the apparatus if moved. The stabilizer system will also be wired to the "Do Not Move Indicator Light", which will flash whenever the apparatus parking brake is not fully engaged and the stabilizers are not fully stowed.

ALUMINUM DOOR, STABILIZER CONTROL BOX

Vertically hinged smooth aluminum doors will be provided over each stabilizer control box. The doors will be hinged inboard.

STABILIZER PLACEMENT

There will be two (2) lasers provided and installed on the body, one (1) next to each stabilizer. The lasers will be activated with the aerial master switch and will provide a green X on the ground to show where the outrigger pads need to be set.

INCLINOMETER

There will be one (1) inclinometer(s) provided in best location for the aerial stabilizer control stations to assist with leveling the truck.

The inclinometer will be Rieker Model 1023SPL3-5/8/20. The inclinometer will have three color zones, 0-5 degrees will be green, 5-8 degrees will be yellow, 8-20 degrees will be red.

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.

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 the aerial power takeoff shift 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 a half (2.5) years.

HYDRAULIC SYSTEM

The hydraulic system will have a five (5)-year warranty.

The hydraulic plumbing will consist of hydraulic rated hoses and steel tubing.

The hoses transmitting hydraulic pressure will have abrasion resistant covers.

All hydraulic fittings and tubing 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 and tubes 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 1901 standard.

The hydraulic system will be of a constant pressure 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 1901 standard, which requires adequate cooling less than 2.5 hours of operations.

All hydraulic components that are non-sealing whose failure could result in the movement of the aerial will comply with current NFPA 1901 standards and have burst strength of 4:1.

Dynamic sealing components whose failure could cause aerial movement will have a margin of 2:1 on maximum operating pressure per the current NFPA 1901 standard.

All hydraulic hoses, tubes and connections will have minimum burst strength of 4:1 per the current NFPA 1901 standard.

A hydraulic oil sight gauge 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 provide 3,150 psi.

The hydraulic pump will be solely dedicated to aerial operations.

The hydraulic system will consist of a 20-gallon reservoir mounted to the pedestal and plumbed to the hydraulic pump.

There will be plumbing for a supply and return line and a tank drain on the reservoir.

The hydraulic oil reservoir will be labeled per the current NFPA 1901 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 18/16/13 per ISO 4406:1999 before delivery.

The low pressure oil filter will be integrated with the hydraulic manifold and designed to prevent oil loss during filter change.

The system will incorporate the following filters to provide dependable service:

- Return filter: Beta 200 at 6 micron
- 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 1901 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 six (6) 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 28 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.

WATER SWIVEL

Water will be transferred to the aerial waterway by means of a 5.00" internal diameter waterway through the swivel, permitting 360 degree continuous rotation.

13-BIT ABSOLUTE ENCODER

The aerial ladder will be equipped with a 13-Bit Absolute Encoder, CAN-based, which provides 8192 counts per shaft turn for position and direction reference.

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 device will utilize a microprocessor-based control system. The system will consist of the following components:

Control System Modules

Each of the control system modules will be configured as follows:

Sealed to a NEMA 4X rating

Operating range from -40 degrees F to 156 degrees F (-40 degrees C to 70 degrees C)

Communicate using J1939 data link

Two (2) diagnostic LED lights

One (1) green light that illuminates when module has power (B+) and ground

One (1) red light that flashes to indicate the module is capable of communicating via the data link

Up to 16 diagnostic LEDs on each module

Ground matrix identification system

The following control system modules will be used:

Control Module

Main controller for the system

USB connection allows for computer diagnostics

Power Module

Built-in fault sensing

Eight (8) digital outputs

Pulse width modulating (PWM) capable

10A continuous per output

Circuit protection based on actual current draw (not affected by heat)

Current Control Module

Built-in fault sensing

Three (3) analog inputs

Eight (8) digital outputs

Pulse width modulating (PWM) capable

3A continuous per output

Closed Loop System

Circuit protection based on actual current draw (not affected by heat)

Input Module

16 software selectable (digital or analog) inputs

Output Module

16 digital outputs

Input/Output Module

Eight (8) software selectable (digital or analog) inputs

Eight (8) digital outputs

SPOTLIGHTS

There will be six (6) Whelen® Micro Pioneer, Model MPB*, 12 volt DC LED bail mount lights furnished.

- One (1) will be mounted on the driver's side of the base section of the ladder
- One (1) will be mounted on the passenger's side of the base section of the ladder

- One (1) will be mounted high on the driver's side tip of aerial
- One (1) will be mounted high on the passenger's side tip of aerial
- One (1) will be mounted low on the driver's side tip of the aerial
- One (1) will be mounted low on the passenger's side tip of the aerial

The painted parts of this light assembly to be white.

Power to the "tracking lights" will be controlled by an on/off switch at the turntable control operator's position.

The lights at the tip will be controlled by turntable only.

LIGHTING ON AERIAL LADDER

There will be TecNiq, Model D02 LED rung lighting provided on both sides of the aerial ladder base, lower and upper 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 red.
- The lower mid section of the ladder to be red.
- The upper mid section of the ladder to be red.
- The fly section of the ladder to be red.

The LED rung lighting will be activated when 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*C, LED flashing warning lights with Whelen, Model M6FC, chrome flanges installed on the stabilizer cover panels, one (1) each side.

The rear stabilizer pan lights will be red LED with a clear lens.

These warning lights will be activated by the same switch as the side warning lights.

STABILIZER BEAM WARNING LIGHTS

There will be two (2) Whelen®, Model TOR00FRR, 2.00" round red LED flashing lights mounted on each stabilizer, one (1) facing forward and one (1) facing rearward.

The lights will be recessed in the horizontal beam of the stabilizer.

These warning lights will be activated with the aerial master switch.

120-VOLT RECEPTACLE AT TIP

A 120-volt, 15 amp, three (3)-prong household duplex receptacle with weatherproof cover will be provided at the tip of the aerial device.

2-WAY AERIAL COMMUNICATION SYSTEM

There will be a Fire Research model ICA900-112 two-way intercom system provided. The control module will be located on the turntable operator console, provided there is room, and have an LED volume display and push-button volume control.

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.

AERIAL PEDESTAL

The aerial pedestal will accommodate the height of the cab.

LIFTING EYE - ROPE RESCUE ATTACHMENT

Two (2) eyes will be welded, one (1) to each ladder beam, at the ladder egress with a spreader bar to mounted between the eyes. This design will distribute a load evenly across the ladder beams because of a single lifting eye on the spreader bar. The bar is retained by two (2) locking pins, one (1) at each end outboard of each eye. Leveling is maintained by the bar rotating in the eyes.

SPECIAL COLOR, BOOM SUPPORT

The boom support will be painted job color.

AERIAL BOOM SUPPORT LIGHT

There will be one (1) Whelen, Model 50C03ZCR, white LED light mounted in the boom support cradle in place of the standard cradle light.

STABILIZER SCENE LIGHTS

There will be one (1) Amdor LumaBar H2O, Model AY-9500-012, 12.00" LED weatherproof strip light installed on each stabilizer to illuminate the surrounding area. These lights will be in place of the standard lights. A total of two (2) lights will be provided.

CHAIN, AERIAL TURNTABLE

A chain 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 5.00" 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 5.00" waterway swivel is to be routed through the rotation point 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 -10 degrees to 77 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 aerial will be capable of discharging up to 1000 gpm at 100 psi parallel to the ladder and 90 degrees to each side of center while maintaining the 500lb tip load.

The aerial will be capable of discharging between 1001 and up to 1500 gallons per minute at 100 psi parallel to the ladder and 40 degrees to each side of center while maintaining the 500lb tip load.

When the aerial device is positioned at -10 to 0 degrees of elevation, the master stream will be capable of flow up to 30 degrees above horizontal.

An adjustable pressure relief valve will be furnished to protect the aerial waterway from a pressure surge.

A 1.50" drain valves will be located at the lowest points 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. This monitor will allow for an additional 30 degrees of travel above horizontal at the aerial tip.

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.

If the aerial has a quick-lock waterway, a limit switch will be provided to disable the extended vertical travel when the monitor is locked to the lower ladder section.

WIRELESS REMOTE AERIAL MONITOR CONTROL

One (1) handheld wireless remote control will be provided near the pump operator's panel in a protected area.

Waterway flow, including total water flowed, will be monitored by the microprocessor. An LCD display will be located at the turntable control station.

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, STORZ INLET

There will be one (1) 5.00" FNST x 5.00" Storz adapter with blind cap provided on the aerial inlet.

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 three (3) days.

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 REQUIRED LOOSE EQUIPMENT, PROVIDED BY FIRE DEPARTMENT

The following loose equipment as outlined in NFPA 1901, 2009 edition, section 9.8.2 and 9.8.3 will be provided by the fire department. All loose equipment will be installed on the apparatus before placed in emergency service, unless the fire department waives NFPA section 4.21.

- 800 ft (240 m) of 2.50" (65 mm) or larger fire hose, in any combination.
- 400 ft (120 m) of 1.50" (38 mm), 1.75" (45 mm), or 2.00" (52 mm) fire hose, in any combination.
- One (1) handline nozzle, 200 gpm (750 L/min) minimum.
- Two (2) handline nozzles, 95 gpm (360 L/min) minimum.
- One (1) playpipe with shutoff and 1.00" (25 mm), 1.125" (29 mm), and 1.25" (32 mm) tips.
- One (1) SCBA complying with NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus for Fire and Emergency Services*, for each assigned seating position, but not fewer than four (4), mounted in brackets fastened to the apparatus or stored in containers supplied by the SCBA manufacturer.
- One (1) spare SCBA cylinder for each SCBA carried, each mounted in a bracket fastened to the apparatus or stored in a specially designed storage space(s).
- One (1) first aid kit.
- Four (4) salvage covers, each a minimum size of 12 ft × 14 ft (3.6 m × 5.5 m).
- Four (4) combination spanner wrenches mounted in brackets fastened to the apparatus.
- Two (2) hydrant wrenches mounted in brackets fastened to the apparatus.
- One (1) double female 2.50" (65 mm) adapter with National Hose threads, mounted in a bracket fastened to the apparatus.
- One (1) double male 2.50" (65 mm) adapter with National Hose threads, mounted in a bracket fastened to the apparatus.
- One (1) rubber mallet, for use on suction hose connections, mounted in a bracket fastened to the apparatus.

- Four (4) ladder belts meeting the requirements of NFPA 1983, *Standard on Fire Service Life Safety Rope and System Components*.
- One (1) 150 ft (45 m) light-use life safety rope meeting the requirements of NFPA 1983, *Standard on Fire Service Life Safety Rope and System Components*.
- One (1) 150 ft (45 m) general-use life safety rope meeting the requirements of NFPA 1983, *Standard on Fire Service Life Safety Rope and System Components*.
- One (1) traffic vest for each seating position, each vest to comply with ANSI/ISEA 207, *Standard for High Visibility Public Safety Vests*, 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.
- One (1) automatic external defibrillator (AED).
- If the supply hose carried does not use sexless couplings, an additional double female adapter and double male adapter, sized to fit the supply hose carried, will be carried mounted in brackets fastened to the apparatus.
- If none of the pump intakes are valved, a hose appliance that is equipped with one or more gated intakes with female swivel connection(s) compatible with the supply hose used on one side and a swivel connection with pump intake threads on the other side will be carried. Any intake connection larger than 3.00" (75 mm) will include a pressure relief device that meets the requirements of 16.6.6.
- If the apparatus does not have a 2.50" National Hose (NH) intake, an adapter from 2.50" NH female to a pump intake will be carried, mounted in a bracket fastened to the apparatus if not already mounted directly to the intake.
- If the supply hose carried has other than 2.50" National Hose (NH) threads, adapters will be carried to allow feeding the supply hose from a 2.50" NH thread male discharge and to allow the hose to connect to a 2.50" NH female intake, mounted in brackets fastened to the apparatus if not already mounted directly to the discharge or intake.

SOFT SUCTION HOSE, PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, section 9.7.2 requires a minimum of 20 ft of suction hose or 15 ft of supply hose.

Hose is not on the apparatus as manufactured. The fire department will provide suction or supply hose.

CO2 EXTINGUISHER

- One (1) extinguisher, 20 pound, CO2
- One (1) bracket will be mounted on the apparatus as designated. The type of extinguisher(s) will be 20 lb CO2. The location(s) will be determined at pre-construction.

DRY CHEMICAL EXTINGUISHER

There will be One (1) extinguisher, 20 pound, dry chemical extinguisher(s) provided.

WATER EXTINGUISHER PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, section 9.8.3 requires one (1) 2.5 gallon or larger water extinguisher mounted in a bracket fastened to the apparatus.

The extinguisher is not on the apparatus as manufactured. The fire department will provide and mount the extinguisher.

AXE, FLATHEAD, PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, Section 9.8.3 requires one (1) flathead axe mounted in a bracket fastened to the apparatus.

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

AXE, PICKHEAD, PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2009 edition, Section 9.8.3 requires one (1) pickhead axe mounted in a bracket fastened to the apparatus.

The axe is not on the apparatus as manufactured. The fire department will provide and mount the axe.

PAINT

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. A final pure water rinse will be applied to all metal surfaces.

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 manufacture.

Specifications are written to define cyclic corrosion testing, physical strengths, durability and minimum appearance requirements must be met in order for an exterior paint finish to be considered acceptable as a Pierce quality finish.

Each batch of basecoat color is checked for a proper match before painting of the cab and the body. After the cab and body are painted, the color is verified again to make sure that it matches the color standard. Electronic color measuring equipment is used to compare the color sample to the color standard entered into the computer. Color specifications are used to determine the color match. A Delta E reading is 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 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 cab will be two-tone, with the upper section painted #10 white along with a shield design on the cab face and lower section of the cab and body painted #90 red.

PAINT - 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.

- 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
- Air tanks
- Fuel tank
- Castings
- Individual piece parts used in chassis and body assembly

After the chassis frame assembly is finish painted, the following non-torqued joints will be sealed with a SG-510A rust-proofing compound:

-All bolted on chassis components that could be vulnerable to rust, i.e. body mounting angles, air tanks, etc.

To summarize, all metal to metal contact components that are prone to rust, will be protected.

COMPARTMENT INTERIOR PAINT

The compartment interior will be painted with a gray spatter finish for ease of cleaning and to make it easier to touch up scratches and nicks.

AERIAL DEVICE PAINT COLOR

The aerial device paint procedure will consist of a six (6) 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. Primer/Surfacer Coats - A two (2) component urethane primer/surfacer will be hand applied to the chemically treated metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface. All seams will be caulked before painting.
3. Hand Sanding - The primer/surfacer coat will be lightly sanded to an ultra smooth finish.
4. Sealer Primer Coat - A two (2) component sealer primer coat will be applied over the sanded primer.
5. Topcoat Paint - Urethane base coat will be applied to opacity for correct color matching.

6. Clearcoat - 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 (turntable and ladder sections) will be painted white 10 using the six (6) step finishing process. The support structure, rotation motor, components below the rotation point and the stabilizers will be cleaned, caulked, primed and painted high gloss black.

The stabilizer beams, pedestal and torque box (including water tank cradle) will be treated with epoxy E-coat prior to painting to help provide resistance to corrosion and chemicals.

The tip of the ladder will be painted a contrasting color for high visibility.

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 6.00" white stripe with a 1.00" gap and a 1.00" white stripe on the bottom.

STRIPE, REFLECTIVE ON CAB FACE

The reflective band provided on the cab face will be located below the stainless steel trim band and above the front bumper.

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 and stainless steel access doors 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 NFPA 1901, 2009 edition, which states that 50% of the rear surface will be covered with chevron striping.

REFLECTIVE STRIPE ON STABILIZERS, IPOS

There will be 4.00" wide alternating fluorescent yellow green diamond grade and red diamond grade reflective chevron stripes provided on the forward and rear facing sides of both aerial stabilizers. The stripes will be angled at a 45 degree angle.

"Z" JOG IN REFLECTIVE STRIPE

There will be one (1) "Z"-shaped jog(s) provided in the reflective stripe design.

OUTLINE, REFLECTIVE STRIPE

A black outline will be applied on the top and the bottom of the reflective band. There will be three (3) set of outline stripes required.

CHEVRON, INVERTED "V" STRIPING ON CAB AND CREW CAB DOORS

There will be alternating chevron striping located on the inside of each cab and crew cab door.

The striping will consist of the following colors:

The first color will be red diamond grade

The second color will be fluorescent yellow green diamond grade

The size of the striping will be 4.00".

LETTERING

The lettering will be 22 karat gold vinyl.

LETTERING

Twenty-one (21) to forty (40) Sign Gold lettering, 3.00" high, with outline and shade will be provided.

LETTERING

One (1) to twenty (20) Sign Gold lettering, 8.00" high, with outline and shade will be provided.

MALTESE CROSS INSTALLATION

There will be one (1) pair of maltese crosses, comprised of genuine gold leaf material, provided and installed in a location to be determined at pre-construction.

FIRE APPARATUS PARTS CD MANUAL

There will be two (2) custom parts manuals for the complete fire apparatus provided in CD format with the completed unit.

The manuals 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

The manuals 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 factory 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 CD MANUALS

There will be two (2) CD format chassis service manuals 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 CD MANUALS

There will be two (2) CD format chassis operation manuals provided.

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 shall be provided. A copy of the warranty certificate shall be submitted with the bid package.

FIFTY (50) YEAR STRUCTURAL INTEGRITY

The Pierce custom chassis frame 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.

REAR AXLE TWO (2) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor axle limited warranty certificate, WA0046, is included with this proposal.

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 submitted with the bid package.

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.

PUMP WARRANTY

A Waterous pump limited warranty certificate, WA0225, 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 submitted with the bid package.

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 will be submitted with the bid package.

AERIAL WATERWAY WARRANTY

An Amity ten (10) year limited waterway warranty will be provided. A copy of the warranty certificate will be submitted with the bid package.

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 limited warranty certificate, WA0051, is included with this proposal.

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 1901, current edition, section 4.13, Vehicle Stability. The certification will be provided at the time of bid.

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 will be provided at the time of bid.

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:

- European Occupant Protection Standard ECE Regulation No.29.
- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.
- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.
- 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.

- Side Impact

The same cab will be subjected to dynamic preload where a 13,275-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 65,200 ft-lb of force using a moving barrier. (Twice the force required by SAE J2420)

The same cab will withstand all tests without any measurable intrusion into the survival space of the occupant area.

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.

CAB DEFROSTER CERTIFICATION

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 HEATER CERTIFICATION

Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. The cab heaters 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.

CAB AIR CONDITIONING PERFORMANCE CERTIFICATION

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.

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:
 - Applicable NFPA 1901 or 1906 (Current Edition).
 - The minimum continuous load of each component that is specified per:
 - Applicable NFPA 1901 or 1906 (Current Edition).
 - 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 applicable NFPA 1901 or 1906 (Current Edition).

EQUIPMENT SUPPLIED BY DEALER

Two (2) Pelican 9410L Handlights (to be supplied by Fire Department mounted by Dealer)

One (1) Supervac 718VR3 PPV Fan

Two (2) Akron Style 7982 Revolution Intake valves with 5" stortz full time swivel inlet and 5" stortz cap with retaining chain

One (1) set of snow chains for the rear tires of the apparatus.