Request for Proposal 2023-05 75’ Quint Fire Truck

FREDERICK-FIRESTONE FIRE PROTECTION DISTRICT

CUSTOM AERIAL LADDER FIRE APPARATUS

DOUG PRUNK – ASSISTANT FIRE CHIEF
JEREMY A. YOUNG – FIRE CHIEF

For Custom 75' Quint Fire Truck for Frederick-Firestone Fire Protection District a Colorado Special District

The Frederick-Firestone Fire Protection District (District) is soliciting written proposals and quotes for a Custom 75' Quint Fire Truck to be provided for the District. This is a Guaranteed Maximum Price (GMP) public works project. The District is conducting a Qualifications Based Selection process to retain a manufacturer/vendor for the aforementioned services. The Aerial Apparatus will enable the District to significantly improve fire suppression, rescue, and emergency services. The services provided by the selected vendor will include preparation of final bidding and specification documents, preparation, and submittal of a final quote for all services to be provided by the vendor, any necessary consultation meetings, site visits, pre-construction and construction meetings for the apparatus.

Sealed proposals responsive to this Request for Proposals ("RFP") must be submitted by providing the information requested in this RFP by **1700hrs on Monday, September 11th, 2023.**

Frederick-Firestone Fire Protection District RFP 2023-05
Attn: Doug Prunk – Assistant Fire Chief
8426 Kosmerl Place
Frederick, Colorado 80504
303-833-2742 Office

During the quote preparation process, all communication, correspondence, questions, or requests for clarification shall be directed to Assistant Fire Chief Doug Prunk by email (dprunk@fffd.us). General questions may be communicated by phone; however, specific requests for clarifications must be e-mailed. Failure to comply with this requirement may result in disqualification.

Submitting vendors shall mail or hand-deliver one (1) hard copy and one (1) digital copy in Microsoft Word or Adobe PDF format of the proposal to the above stated address. Mailed proposals must be received by the District by the above stated submittal deadline.

A proposal may be withdrawn at any time before the deadline for submitting proposals by notifying the District by writing of the intent to withdrawal. The notice must be signed by the representative of the vendor who submitted the quote. The vendor may thereafter submit a new or modified quote if it is received at the District no later than the deadline. Modification offered in any other manner, oral or written, will not be considered. Quotes cannot be changed after the submission deadline unless the District requests clarification.

If a vendor discovers any ambiguity, conflict, discrepancy, omission, or other error in the RFP, the vendor must immediately provide the District with written notice of the problem and request that the RFP be clarified or modified. Without disclosing the source of the request, the District may modify the RFP before the proposal submission deadline by issuing an addendum to all potential bidders to whom the RFP was sent.

If, before the proposal submission deadline, a vendor knows of or should have known of an error in the RFP but fails to notify the District of the error, the vendor shall submit a proposal at its own risk, and if, awarded the project, shall not be entitled to additional compensation or time by reason of the error or its later correction.

All materials submitted in response to this RFP will become the property of the District. All proposals submitted to the District shall constitute public records within the meaning of the Colorado Public (Open) Records Act (CORA) and may be subject to inspection and disclosure to the public in accordance with CORA. A vendor that desires any aspect of its proposal to remain confidential must specifically identify the confidential portion of the proposal and the grounds for claiming confidentiality. Further, the confidential portion must be easily segregated from the rest of the proposal.

This RFP is a solicitation for quotes and proposals and not an offer to contract. The District reserves the right to accept or reject any or all proposals. The District further reserves the right to issue clarifications and other directives concerning this RFP, to require clarification or further information with respect to any proposal, and to determine the final terms of any contract for services. All costs incurred by a vendor for proposal preparation, interviews and contract negotiations are the sole responsibility of the proposing vendor. All prices and services submitted in the quote shall be binding and valid for 90 days after the closing date.

SECTION A - BACKGROUND INFORMATION

The District currently provides fire suppression, community risk reduction, emergency medical care and transport, and administrative services from four (4) fire stations and one (1) administrative building. The District serves a 36-square mile area in the Town of Frederick, the Town of Firestone and unincorporated areas of Southwest Weld County. The District provides all-hazard response to over 34,000 residents of the Carbon Valley Area.

The Frederick-Firestone Fire Protection District is accepting bids for a Custom 75’ Aerial Ladder/Quint on a 2 wheeled drive chassis. The cab shall have seating for four (4). The apparatus shall carry a minimum of 800 feet of five (5) inch supply line and three (3) pre-connected attack lines located forward of the pump panel. The main fire pump shall be capable of delivering a minimum of 1,500gpm fire flow with a poly water tank with a minimum of 500 gallons. The motor will have at minimum a 500-horsepower motor. The apparatus shall have a driver side pump panel with a mid-ship mounted pump. The aerial device shall be a rear-mounted turntable with a minimum of 75’ reach. The total apparatus length shall not exceed 48’.

Bids will be evaluated based on the requirements established by the Frederick-Firestone Fire Protection District, which may include criteria to determine acceptability, such as inspection, testing, quality, workmanship, delivery, and suitability for a particular purpose. The Frederick-Firestone Fire Protection District has the right to reject, any and all, bids or to waive any irregularity in any bid. Acceptance of any bid is conditioned upon the parties executing a mutually acceptable Fire Apparatus Purchase Agreement, which will include, among other

provisions, a delay damage provision. Bidders are solely responsible for all costs and expenses incurred during the bid process.

SECTION B – SCHEDULE FOR PROJECT SERVICES

- July 10 RFP is released
- July 10-Aug 31 Vendor questions submitted.
- Sept 11 Bids are submitted by 1400hrs
- Sept 11-25 Bid Compliance Evaluation
- Oct 10 Successful vendor selected & notified

SECTION C - PROPOSAL SUBMITTAL REQUIREMENTS

The proposals shall adhere to the following contents:

Item	Requirement	Comply (Y or N)	Exception (Y or N)
A.	**INTENT OF SPECIFICATIONS** 1) It is the intent of these specifications to cover the furnishing and delivery to the Frederick-Firestone Fire Protection District of a complete apparatus equipped as hereinafter specified. With a view to obtaining the best results and the most acceptable apparatus for service in the fire departments, these specifications cover only general requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment, and appliances with which the successful bidder must conform. Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all features. The apparatus shall conform to the requirements of the current (at the time of bid) National Fire Protection Association **Pamphlet 1901 for Motorized Fire Apparatus Pumper** unless otherwise specified in these specifications. 2) Each bid shall be accompanied by a set of "Contractor's Proposal" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform. **3) In order to make comparison of the specification to the "Contractor's Proposal "more efficient, the proposal must be in the same order as the specifications. (NO EXCEPTIONS)**		
B.	**GENERAL CONSTRUCTION** 1) The apparatus shall be designed, and the equipment		

	mounted with due consideration to distribution of load between the front and rear axles so that all specified equipment, including filled water tank, a full complement of personnel and fire hose will be carried without injury to the apparatus. Weight balance and distribution shall be in accordance with the recommendations of the International Association of Fire Chief's (IAFC) and National Fire Association (or American Insurance Association). **2)** The materials and components called for in the construction and finish of the apparatus described herein such as the body, plumbing, sub-frame, electrical, cab/chassis etc. will be strictly adhered to. After thorough research, the Frederick-Firestone Fire Protection District has determined that these materials are best suited for our application. All manufacturers have access to these raw materials, and it would therefore be the manufacturer's choice not to offer these materials and components. **3) In addition, the fire department must obtain a vehicle that will provide an extended in-service life. Therefore, all vendors are required to bid their premium, most heavy-duty model should they offer more than one series or construction grade of apparatus. (NO EXCEPTIONS)**		
C.	**EXCEPTIONS TO SPECIFICATIONS** 1) The following chassis, pump, aerial and body specifications shall be strictly adhered to. Exceptions will be allowed if they are equal to or superior to that specified and provided, they are listed and fully explained. A full description shall be provided on a separate piece of paper and include the page number and paragraph title of which you are taking exception. The opinion of which is equal to or superior will be the decision of the fire district. If "no" exception is taken to a paragraph, then it will be strictly adhered to.		
D.	**DELIVERY REQUIREMENTS** 1) The apparatus shall be completely equipped as per these specifications upon arrival and on completion of the required tests shall be ready for immediate service in the fire department of the purchaser. Any and all alterations required at the scene of delivery to comply with these specifications must be done at the contractor's expense. To ensure proper break-in of all components while still under warranty, apparatus is to be delivered under its own power. rail or truck freight is not accepted. 2) A qualified delivery engineer representing the		

	contractor shall deliver the apparatus and remain in the Fire Department a sufficient length of time to instruct the Department personnel in the proper use, operation, care, and maintenance of the equipment involved. 3) The following items, in quantity shown, will be included in the bid price submitted for the fire apparatus and will be furnished to the fire department upon delivery in digital format: a. Operator's Manual (2) b. Equipment Maintenance Manual (2) c. Letter of certification for the third-party pump test (2) d. Complete "As Wired" electrical diagram for apparatus (2) e. Aerial documentation (2)		
E.	**NOTE** 1) It is understood that in many aspects these specifications are detailed in their design to set forth minimum quality features for each prospective bidder. It is understood that exceptions will be taken by some bidders. 2) In order to fully evaluate each bid. Each bidder shall submit a drawing of the exact apparatus being proposed with the bid. Left, Right, Top and Rear views shall be shown with all apparatus body details and compartment dimensions. **Bids submitted with drawings of similar units or with no proposal drawings shall be considered unresponsive and will be cause for the rejection of the bid.** 3) Drawings will include basic dimensions of the apparatus to include at a minimum: a. Overall length b. Cab length c. Box length d. Cab height e. Body height f. Highest point on the apparatus g. Turn radius h. Outrigger spread i. Ground to cab floor height		
F.	**QUALITY AND WORKMANSHIP** 1) The design of the apparatus must embody the latest approved automotive engineering practices. The workmanship must be of the highest quality in its respective field. Special consideration will be given to the following points: Accessibility of the various units which require periodic maintenance operations; ease of operations **(**including both pumping and driving); and symmetrical proportions. Construction must be rugged		

	and ample safety factors must be provided to carry loads as specified and to meet both on and off road "Performance Tests and Requirements".		
G.	**WARRANTIES AND GUARANTEES** 1) The bidder will warrant the apparatus to be free from mechanical defects in workmanship for a period of one (1) year. The entire year will be covered for parts and labor costs associated with repairs. When possible, warranty work will be done where the apparatus is housed. The following minimum warranties shall apply, if your warranty is different, please fill in the blank. If the blanks are not filled in, we will assume you meet the warranty criteria. Chassis Bumper to Bumper: 3 Year _____ Bumper to Bumper: 1 Year _____ Engine: 5 years, 100,000 miles _____ Transmission: 5 years _____ Axles: 2 Years _____ Chassis Frame: Lifetime _____ Pump: 5 years _____ Water Tank: Lifetime (Non Prorated) Aerial: Structural 20 years _____ Aerial: Workmanship 2 years _____ Aerial: Hydraulic System Workmanship 2 years _____ Aerial: Hydraulic Structural 5 years _____ Aerial: Cylinder Seals 2 ½ years _____ Aerial: Waterway Assembly 10 years _____ Apparatus Body: Structural 10 years _____ Apparatus Cab: Structural 10 years _____ Apparatus Body: Corrosion Perforation 10 years _____ Paint: 10 years or 100,000 miles _____		
H.	**USA MANUFACTURER** 1) The entire apparatus shall be assembled within the borders of the Continental United states to insure more readily available parts (without added costs and delays caused by tariffs and customs) and service, as well as protection the purchaser should legal action ever be required. Fire apparatus components and assembly shall be U.S. Made. The Frederick-Firestone Fire Protection District reserves the right to accept the lowest and/or best performance bids to meet the mission of the fire district. Frederick-Firestone Fire Protection District also reserves the right to waive any informality.		
I.	**INSPECTION TRIPS** 1) There shall be a chassis Pre-Construction at the		

	purchaser's location, a chassis final inspection at the chassis plant for three (3) department members including air travel, food, and lodging. A total project Pre-Construction and a Pre-delivery factory inspection trip for three (3) F.D. members provided including air travel, food, and lodging at the manufacturer's facility. (If facility is located more than 200 miles away)		
J.	**PATENTS** 1) The apparatus manufacturer will pay all royalties and license fees and will hold and save the fire department, its officers, agents, servants, and employees harmless from liability of any nature and kind, including costs, and expenses for or on account of any patented or non-patented invention, process, article, or appliance manufactured or used on the performance of the contract including its use by the fire department. In this respect, the successful bidder will defend all suits or claims for infringement of any patent or license right.		
K.	**ASSIGNMENTS** 1) The manufacturer will not assign, transfer, convey, or otherwise dispose of the contract or his right to execute it or his right, title, or interest to it or any part thereof, or assign any of the money's due or become due under the contract, without the prior written consent of the fire district.		
L.	**NO CONTACT POLICY** 1) After the date and time established for receipt of proposal, any contact initiated by any proposer with any Frederick-Firestone Fire Protection District representative other than Assistant Chief of Operations Doug Prunk, concerning this Request for Proposal is prohibited to eliminate all communication errors and conflicts of interest during the proposal process. Any such unauthorized contact may cause the disqualification of the bidder from this procurement transaction. **Doug Prunk – Assistant Chief of Operations dprunk@fffd.us or 303-833-2742 M–Th, 0700 – 1700 hours**		
M.	**MODEL** 1) The chassis shall be a manufacturer's designated model to meet the specifications within these specifications. The cab and chassis shall include design considerations for multiple emergency vehicle applications, rapid transit, and maneuverability. The chassis shall be manufactured for heavy duty service with the strength		

	and capacity to support a fully laden apparatus, one hundred (100) percent of the time.		
N.	**MODEL YEAR** 1) The chassis shall have a vehicle identification number that reflects a 2024 model year.		
O.	**COUNTRY OF SERVICE** 1) The chassis shall be put in service in the country of United States of America (USA). The chassis will meet applicable U.S.A. federal motor vehicle safety standards per CFR Title 49 Chapter V Part 571 as clarified in the incomplete vehicle book per CFR Title 49 Chapter V Part 568 Section 4 which accompanies each chassis.		
P.	**COMPLIANCE WITH LAWS** 1) Proposals must comply with all Federal, State, County and local laws governing or covering this type of service and fulfillment of all ADA (Americans with Disabilities Act) requirements. All materials submitted in response to this bid will become the property of the Fire District. 2) All proposals submitted to the Fire District shall constitute public records within the meaning of the Colorado Public (Open) Records Act and may be subject to inspection and disclosure to the public in accordance with the Act. A bidder that desires any aspect of its proposal to remain confidential must specifically identify the confidential portion of the proposal and the grounds for claiming confidentiality. Further, the confidential portion must be easily segregated from the rest of the proposal. 3) This bid request is not an offer to contract. The Fire District reserves the right to accept or reject any or all proposals. The Fire District further reserves the right to issue clarifications and other directives concerning this bid; to require clarification or further information with respect to any proposal, and to determine the final terms of any contract for services. All costs incurred by a bidder for proposal preparation, interviews and contract negotiations are the sole responsibility of the proposing bidder. All prices submitted in the quote shall be binding and valid for at least 60 days after the closing date. 4) At any time before the Apparatus Purchase Agreement is signed by the successful bidder and the Fire District, the Fire District may in its sole discretion terminate or postpone the bid process or the Project and may withdraw any conditional award.		

Q.			

SECTION D – BID PACKET

The following parameters and guidelines will be followed during the preparation of the bid packet:

Item	Requirement	Comply (Y or N)	Exception (Y or N)
A.	**TIMELY PROPOSALS** 1) Bids must be returned to the Frederick-Firestone Fire Protection District Administrative Offices no later than **1400hrs on Monday, September 11th, 2023**. There will be no formal bid opening. a. The Bid Proposals as requested b. Preliminary drawing(s) c. Exceptions to Specifications d. Option Bid items e. Contractor's Specifications f. Pricing and estimated build times It is the bidder's responsibility to see their proposals arrive on time. Late proposals, facsimiles, e-mails, or telephone bids shall not be considered.		
B.	**BODY COMPARTMENT SPACE** 1) The bidder shall give total square feet of the usable compartment space in the body of the apparatus.		
C.	**BUILD TIME** 1) The bidder shall give an estimate timeline to build and deliver the apparatus with drop-dead date provided.		
D.	**EXCEPTION TO SPECIFICATIONS** 1) Exceptions shall be allowed if they are equal to or superior to that specified (as judged by the customer), and provided they are listed and fully explained on a separate page entitled "EXCEPTIONS TO SPECIFICATIONS". Exception lists shall refer to the specification page number.		
E.	**CONTRACTOR'S SPECIFICATIONS** 1) Each bid shall be accompanied by a set of "Contractor's Specifications" consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform. These specifications shall indicate size, type, model and make of all component parts and equipment.		
F.	**PRICING AND FINANCING**		

	1) All pricing and financing related to the bid, included base price, exceptions, options and financing available shall be placed in a separate sealed package.		
G.	**SERVICE** 1) The builder must have an acceptable service center with 50 miles drive time from the Fire District boundaries. If the bidder does not have an acceptable service center within 50 miles and will approve and reimburse the Fire District's maintenance partner to do all warranty/repair work, this will be accepted.		
H.	**WARRANTY** 1) The apparatus shall be warranted to be free from defects in materials or workmanship under normal use and service. The builder shall supply, as a part of their bid package, a copy of the warranty or warranties that they propose to provide, and in no case shall it be less than one (1) year on the entire apparatus. 2) All other warranties, as outlined in these specifications, shall be provided in writing as a part of the bid package. Failure to provide the warranties as outlined throughout these specifications shall be cause for rejection of the bid package.		
I.	**CROSSMEMBERS WARRANTY** 1) A lifetime parts and labor warranty shall be provided on all chassis frame cross-members.		
J.	**WARRANTY 3-YEAR CUSTOM CHASSIS** 1) The custom chassis shall be warranted to be free from defects in materials or workmanship under normal use and service. The builder shall supply, on company letterhead as part of their bid package, a copy of the detailed warranty or warranties that they propose to provide and in no case shall the custom chassis warranty be less than **three (3) years.** It shall include as the minimum the A/C, defroster and heater systems, spring suspension components, independent suspension components, steering gears on the independent suspension, gauge instrumentation, seats, instrument consoles, and a $10,000 collateral damage warranty on the transmission cooler. The electrical system, cab structural, engine, transmission, frame and cross-members are to be covered under separate warranties throughout these specifications.		
K.	**BODY STRUCTURAL INTEGRITY WARRANTY** 1) The body shall be free of structural or design failure or		

	workmanship for a period of ten (10) years or 100,000 miles starting thirty (30) days after the original invoice date.		
L.	**CAB PAINT WARRANTY** 1) The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.		
M.	**PAINT LIMITED WARRANTY** 1) The apparatus body and pump house shall be free of blistering, peeling and any other adhesion defect caused by defective manufacturing methods or paint material selection for exterior surfaces for a period of five (5) years starting thirty (30) days after the original invoice date.		
N.	**CORROSION LIMITED WARRANTY** 1) The body exterior paint shall be warranted against corrosion perforation for a period of ten (10) years starting thirty (30) days after the original invoice date.		
O.	**STANDARD ONE (1) YEAR WARRANTY** 1) The apparatus shall be free of defects in material and workmanship for a period of one (1) year starting thirty (30) days after the original invoice date.		
P.	**CAB STRUCTURAL WARRANTY** 1) The cab structure shall be warranted for a period of ten (10) years or one hundred thousand (100,000) miles, whichever may occur first. Warranty conditions may apply and shall be listed in the detailed warranty document that shall be provided upon request.		
Q.	**ENGINE WARRANTY** 1) The engine shall be warranted for a period of five (5) years or 100,000 miles, whichever occurs first.		
R.	**TRANSMISSION WARRANTY** 1) The series transmission shall be warranted for a period of five (5) years with unlimited mileage. Parts and labor shall be included in the warranty.		
S.	**FRONT SUSPENSION WARRANTY** 1) The front axle shall be warranted for two (2) years with unlimited miles under the general service application.		
T.	**REAR AXLE WARRANTY**		

	1) The rear axle shall be warranted for two (2) years with unlimited miles under the general service application.		
U.	**PUMP WARRANTY** 1) The fire pump shall be warranted for a period of five (5) years from the date of delivery.		
V.	**AERIAL STRUCTURE WARRANTY** 1) The aerial structural device shall be warrantied for a period of twenty (20) years from the date of delivery of any manufacturer defects.		
W.	**TANK WARRANTY** 1) The water and foam tanks shall have a lifetime warranty.		
X.	**INDEPENDENT THIRD-PARTY PUMP CERTIFICATION** 1) The fire pump shall be tested and certified by the Underwriter's Labs, a nationally recognized independent third-party testing company. Tests shall be conducted so that the pump performs as listed: a. 100% of rated capacity at 150 pounds net pressure b. 70% of rated capacity at 200 pounds net pressure c. 50% of rated capacity at 250 pounds net pressure d. 100% of rated capacity at 165 pounds net pressure 2) The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 600psi. The pump shall be fully tested at the pump manufacturer's factory to the performance spots as outlined by the latest **NFPA pamphlet number 1901**. The pump shall be free from objectionable pulsation and vibration.		
Y.	**PRE-CONSTRUCTION MEETING** 1) There shall be a pre-construction meeting held at the factory. The apparatus manufacturer shall provide at a minimum the following items: a. Complete specifications b. Detailed amps draw report c. All warranties d. A listing of clarifications or questions from the manufacturer that require attention. e. Full size "C" drawings f. Paint sample plates for color matching of existing apparatus		
Z.	**FINAL PRE-DELIVERY INSPECTION**		

	1) There shall be an inspection of the apparatus in the final stage of production. If any discrepancies are found during the final inspection, they will be addressed immediately and then the apparatus will be ready for delivery.		

SECTION E – CONTRACT DETAILS

Item	Requirement	Comply (Y or N)	Exception (Y or N)
A.	**AWARD OF CONTRACT** 1) All bids submitted shall be good for a minimum of sixty (60) days from the bid proposal deadline. After the evaluation and award process is complete, all bidders shall be notified of the results.		
B.	**AMENDMENT/ORAL STATEMENTS** 1) No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract will be made in writing by the Fire District purchasing agent.		
C.	**DEFAULT** 1) The Fire District reserves the right to terminate the contract immediately in the event the bidder/builder fails to meet delivery or completion schedules, or otherwise performs in accordance with the accepted proposal.		
D.	**PERFORMANCE BOND** 1) The successful bidder shall, within 15 days of executing the contract, supply the Frederick-Firestone Fire Protection District with a 100 percent performance bond. The performance bond shall be furnished by the manufacturer of the proposed apparatus. The performance bond (surety bond) shall cover the standard one (1) year warranty period only and shall not cover extended warranties offered by the seller or other component manufacturer.		
E.	**COMMERCIAL GENERAL LIABILITY INSURANCE** 1) The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of commercial general liability insurance:		

	a. Products/completed operations aggregate $1,000,000 b. Personal and advertising injury $1,000,000 c. Each occurrence $1,000,000 2) Coverage shall be written on a commercial general liability form. The policy shall be written on an occurrence form and shall include contractual liability coverage for bodily injury and property damage subject to the terms and conditions of the policy. The policy shall include the owner as an additional insured, when required by written contract.		
F.	**COMMERCIAL AUTOMOBILE INSURANCE** 1) The successful bidder shall, during the performance of the contract keep in force at least the following minimum limits of commercial automobile insurance: Combined Single Limit $1,000,000 2) Coverage shall be written on a Commercial Automobile Form.		
G.	**UMBRELLA/EXCESS LIABILITY INSURANCE** 1) The successful bidder shall, during the performance of the contract and for three (3) years following acceptance of the product, keep in force at least the following minimum limits of umbrella liability insurance: 1. Aggregate $10,000,000 2. Each Occurrence $10,000,000 2) The umbrella policy shall be written on an occurrence basis and at a minimum provide excess to the bidder's general liability, automobile liability and the employer's liability policies. The business owner shall be included as an additional insured on the general liability policy as their interest may appear. The required limits can be provided by one or more policies, provided all other insurance requirements are met. Coverage shall be provided by a carrier rated A- or better by A.M. Bests. The bidder agrees to furnish the owner with a current certificate of insurance with the coverage listed above along with its bid. The certificate shall show the purchaser as certificate holder. The certificate of insurance shall provide the		

	following cancellation clause: should any of the above-described policies be cancelled before the expiration date thereof, the issuing insurer will endeavor to mail thirty (30) days written notice to the certificate holder named to the left. Failure to do so shall impose no obligation or liability of any kind upon the insurer, its agents, or representatives.		
H.	**OPERATION AND SERVICE DOCUMENTATION** 1) The contractor shall supply, at time of delivery, at least two sets of complete operation and service documentation covering the completed apparatus as delivered and accepted. The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof. The contractor shall deliver with the apparatus all manufacturer's operations and service documents supplied with components and equipment that are installed or supplied by the contractor.		
I.	**NFPA REQUIRED MANUALS** 1) The construction, operation, and service documentation shall be provided electronically as outlined above. These manuals shall be written in a "step by step" format for ease of reference. There shall be two (2) copies provided with the apparatus as standard. The NFPA required manuals will be in an electronic (PDF) format.		
J.	**DELIVERY** 1) To ensure proper break-in of all components while still under warranty, the apparatus shall be delivered under its own power (rail or truck freight shall not be acceptable). Delivery of the apparatus shall be paid for by the manufacturer.		
K.	**PERFORMANCE TESTS AND REQUIREMENTS** 1) A road test shall be conducted with the apparatus fully loaded and a continuous run of ten (10) miles or more shall be made under all typical driving conditions, during which time the apparatus shall show no loss of power or overheating.		
L.	**TITLE** 1) The awarded supplier shall provide Title work for the new vehicle within ten (10) days after the receipt of payment and delivery from the Frederick-Firestone Fire Protection District.		
M.	**CONSTRUCTION DOCUMENTATION**		

	The builder shall supply, at the time of delivery, at least one copy of the following documents: 1. The manufacturer's record of apparatus construction details, include the following information: a. Owner's name and address b. Apparatus manufacturer, model, and serial number c. Chassis make, model and serial number. d. GVWR of front and rear axles e. Front tire size and total rated capacity in pounds. f. Rear tire sizes and total rated capacity in pounds. g. Chassis weight distribution in pounds with water and manufacturer mounted equipment (front and rear). h. Engine make, model, serial number, rated horsepower and related speed, and governed speed. i. Type of fuel and fuel tank capacity. j. Electrical system voltage and alternator output in amps. k. Battery make, model and capacity in cold cranking amps (CCA). l. Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio. m. Pump make, model, and rated capacity in gallons per minute and serial number. n. Pump transmission make, model, serial number, and gear ratio. o. Aerial ladder make, model, serial number and rating in pounds. p. Auxiliary pump make, model, rated capacity in gallons per minute and serial number. q. Water tank certified capacity in gallons. r. Paint manufacturer and paint number(s). s. Company name and signature of responsible company representative. 2. Certification of slip resistance of all stepping, rungs, standing, and walking surfaces. 3. Pump manufacturer's certification of suction capability, apparatus manufacturer's approval for stationary pumping applications, engine manufacturer's certified brake horsepower curve showing the maximum governed speed, pump manufacturer's certification of the hydrostatic test, and the certification of inspection and test for the fire pump.		

	4. Weight documents from a certified scale showing actual loading on the front suspension, rear axle(s), and overall fire apparatus (with the water tank full but without personnel, equipment, and hose). 5. Written load analysis and results of the electrical system performance tests. 6. Certification of water tank capacity. 7. Written load analysis and results of the aerial ladder device.		
N.	**<u>OPERATION and SERVICE DOCUMENTATION</u>** The builder shall supply, at the time of delivery, at least two sets of complete operation and service documentation covering the completed apparatus as delivered and accepted. The documentation shall address at least the inspection, service, and operation of the fire apparatus and all major components thereof. The builder shall also provide documentation of the following items for the entire apparatus and each major operating system or major component of the apparatus: 1. Manufacturer's name and address 2. Country of manufacture 3. Source of service and technical information 4. Parts and replacement information 5. Descriptions, specifications, and ratings of the chassis, pump, and aerial device. 6. Wiring diagrams for low voltage and line voltage systems to include the following information: representations of circuit logic for all electrical components and wiring, circuit identification, connector pin identification, zone location of electrical components, safety interlocks, alternator-battery power distribution circuits, and input/output assignment sheets or equivalent circuit logic implemented in multi-plexing systems. 7. Lubrication Charts 8. Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems. 9. Precautions related to multiple configurations of aerial devices, if applicable. 10. Instructions regarding the frequency and procedure for recommended maintenance 11. Overall apparatus operating instructions. 12. Safety considerations 13. Inspection procedures 14. Recommended service procedures 15. Troubleshooting guide 16. Apparatus body, chassis, and other components manufacturer's warranties.		

	17. Special data required by this standard. 18. Copies of required manufacturer test data or reports, manufacturer certifications, and independent third-party certifications of test results. 19. A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus. 20. The builder shall deliver with the apparatus, all manufacturer's operations and service documents supplied with components and equipment that are installed or supplied by the builder.		
O.	**FAILURE TO MEET TEST** 1) In the event the apparatus fails to meet the test requirements of these specifications on the first trials, second trials may be made at the option of the bidder within 30 days of the date of the first trials. Such trials shall be final and conclusive, and failure to comply with these requirements shall be cause for rejection. Failure to comply with changes to conform to any clause of the specifications, within 30 days after notice is given to the bidder of such changes, shall also be cause for rejection of the apparatus. Permission to keep or store the apparatus in any building owned or occupied by the purchaser, or its use by the purchaser during the above-specified period with the permission of the bidder, shall not constitute acceptance.		
P.	**CONTINGENCY FUND** 1) A contingency fund of $10,000.00 shall be included in the bid packet as part of the bid price. Use of contingency funds requires prior approval of the Fire District.		
Q.			
R.	**TRAINING** 1) The builder shall supply a minimum of three (3) three (3) hour training sessions for the Frederick-Firestone Fire Protection District on the operation of the apparatus and the equipment provided on the apparatus at the time of delivery at the factory if needed.		
S.	**ADDITIONAL EQUIPMENT** The following additional equipment will be provided with the completed apparatus: 1. Two (2) Intake Valve (Swivel Elbow Inlet), Low Profile, (Akron #7982 Revolution). 2. Two (2) 5" Storz caps with attachment cables 3. One (1) 2.5lb DOT approved fire extinguisher with a BC rating shall be shipped loose in the cab. 4. One (1) emergency roadside triangle safety kit.		

SECTION F - CAB

Item	Requirement	Comply (Y or N)	Exception (Y or N)
A.	**CAB STYLE** 1) The cab shall be a custom, four door fully enclosed model, built specifically for the fire service by a company specializing in cab and chassis design for all fire service applications. The cab shall not be a "raised roof" configuration.		
B.	**CAB ENTRY DOOR TYPE** 1) All cab entry doors shall be full length in design to fully enclose the lower cab steps.		
C.	**CAB TEST INFORMATION** 1) The cab shall have successfully achieved survival of the International crash test ECE-R29, Addendum 28, Revision 1 standards, see Attachment page. It shall also meet SAE J2420 COE Frontal Strength Evaluation Dynamic Loading Heavy Trucks and SAE J2422 Cab Roof Strength Quasi-Static Roof Load test requirements. The cab shall be constructed of corrosion resistant materials.		
D.	**CAB PAINT COLOR** 1) The lower paint color shall be White, the upper paint color shall be Red.		
E.	**CAB PAINT EXTERIOR BREAKLINE** 1) The upper and lower paint shall meet at a break line on the cab which shall be located approximately 1.00 inch below the door windows on each side of the cab. The break line shall curve down at the front cab corners to approximately 5.00 inches below the windshields on the front of the cab. 2) Final break line will be approved during pre-construction meetings.		
F.	**CAB PAINT WARRANTY** 1) The cab and chassis shall be covered by a limited manufacturer paint warranty which shall be in effect for ten (10) years from the first owner's date of purchase or in service or the first 100,000 actual miles, whichever occurs first.		
G.	**CAB ENTRY DOORS** 1) The cab shall include four (4) entry doors, two (2) front		

	doors and two (2) crew doors designed for ease of entering and egress when outfitted with an SCBA. 2) The doors shall include a double rolled style automotive rubber seal around the perimeter of each door frame and door edge which ensures a weather tight fit. 3) All door hinges shall be hidden within flush mounted cab doors for a pleasing smooth appearance and perfect fit along each side of the cab. Each door hinge shall be piano style with a pin and shall be constructed of stainless steel.		
H.	**CAB DOOR TRIM REFLECTIVE** 1) A reflective chevron sign shall be installed on the lowest portion of the inner door panel, one (1) on each door. The stripe shall be by 3M and meet the minimum requirements set forth by the NFPA 1901 – Current Edition standard. 2) A stripe of reflective tape shall be installed at the outer interior edge of each door. The stripe shall be red and yellow chevron pattern and made by 3M.		
I.	**CAB ENTRY DOOR TYPE** 1) All cab entry doors shall be full length in design to fully enclose the lower cab steps.		
J.	**WINDSHIELD WIPER SYSTEM** 1) The cab shall include a dual arm wiper system which shall clear the windshield of water, ice and debris. There shall be a minimum of two (2) windshield wipers which shall be affixed to a radial wet arm. The system shall include a single motor which shall initiate the arm in which the windshield wipers are attached, initiating a back-and-forth motion for each wiper. The wiper motor shall be activated by an intermittent wiper control located within easy reach of the driver's position.		
K.	**ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR** 1) The windshield washer fluid level shall be monitored electronically. When the washer fluid level becomes low the yellow "Check Message Center" indicator light on the instrument panel shall illuminate and the message center in the dual air pressure gauge shall display a "Check Washer Fluid Level" message.		
L.	**GRAB HANDLES** 1) The cab shall include one (1) 18.00 inch three-piece extruded, aluminum anti-slip exterior assist handle behind each cab door. The assist handle shall be made of extruded aluminum and shall be 1.25 inches in diameter with a surface to enable non-slip assistance with a gloved		

	hand.		
M.	**AUXILIARY GRAB HANDLE** 1) There shall be two (2) 7.00-inch molded stainless steel grab handles with a bright finish attached to the front fascia of the cab in the center below the windshield on the driver and passenger side. A single handle may be substituted in the center of the front fascia. The handle installation shall include steel reinforcement behind the front cab fascia.		
N.	**INTERIOR GRAB HANDLE "A" PILLAR** 1) There shall be two (2) rubber covered 11.00-inch grab handles installed inside the cab, one on each "A" post at the left and right door openings. The left handle shall be located 7.88 inches above the bottom of the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.		
O.	**INTERIOR GRAB HANDLE FRONT DOOR** 1) Each front door shall include one (1) ergonomically contoured 9.00-inch cast aluminum handle mounted horizontally on the interior door panels. The handles shall feature a textured black powder coat finish to assist personnel entering and exiting the cab.		
P.	**INTERIOR GRAB HANDLE REAR DOOR** 1) A black powder coated cast aluminum assist handle shall be provided on the inside of each rear crew door. A 30.00-inch-long handle shall extend horizontally the width of the window just above the window sill. The handle shall assist personnel in exiting and entering the cab.		
Q.	**REAR VIEW MIRRORS** 1) There shall be two (2) remote-controlled heated mirrors, one on each side of the apparatus. Both of the Rear-View Mirrors shall be controlled through a virtual button on the multiplex display and mounted on the front doors of the cab. They shall be a 2-piece mirror, with the top being the main mirror and the bottom being a smaller convex mirror. The style, and brand, of the mirrors shall be discussed at the pre-construction meeting. 2) The apparatus shall also be equipped with small rearview mirrors on the rear doors, visible from the front facing rear seats of the cab.		
R.	**REARVIEW MIRROR HEAT SWITCH**		

	1) The heat for the rearview mirrors shall be controlled through a virtual button on the multiplex display and control screen.		
S.			
T.	**CAB INSULATION** 1) The cab ceiling and walls shall include thick foam insulation. The insulation shall act as a barrier absorbing noise as well as assisting in sustaining the desired climate within the cab interior.		
U.	**CAB INTERIOR COLOR** 1) The cab interior colors shall be gray.		
V.	**SUN VISORS** 1) The header shall include two (2) sun visors, one each side forward of the driver and officer seating positions above the windshield.		
W.	**CAB UNDERCOAT** 1) There shall be a rubberized undercoating applied to the underside of the cab that provides abrasion protection, sound deadening and corrosion protection.		
X.	**CAB DOOR HARDWARE** 1) The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves.		
Y.	**CAB SIDE DRIP RAIL** 1) There shall be a drip rail along the top radius of each cab side. The drip rails shall help prevent water from the cab roof running down the side of the cab.		
Z.	**BATTERY** 1) The single start electrical system shall include six (6) Harris BCI 31 950 CCA batteries (or equivalent) with a 210 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541. The cables shall have encapsulated ends with heat shrink and sealant.		
AA.	**BATTERY TRAY** 1) The batteries shall be installed within two (2) steel battery trays located on the left side and right side of the chassis, securely bolted to the frame rails. The battery trays shall be coated with the same material as the frame. 2) The battery trays shall include drain holes in the bottom for sufficient drainage of water. A durable, non-conducting, interlocking mat made by Dri-Dek shall be installed in the bottom of the trays to allow for air flow and help prevent moisture build up. The batteries shall be		

	held in place by non-conducting phenolic resin hold down boards.		
BB.	**BATTERY BOX COVER** 1) Each battery box shall include a steel cover which protects the top of the batteries. Each cover shall include flush latches which shall keep the cover secure as well as a black powder coated handle for convenience when opening.		
CC.	**BATTERY CABLE** 1) The starting system shall include cables which shall be protected by 275-degree F. minimum high temperature flame retardant loom, sealed and encapsulated at the ends with heat shrink and sealant.		
DD.	**BATTERY JUMPER STUD** 1) The starting system shall include battery jumper studs. These studs shall be in the forward most portion of the driver's side lower step. The studs shall allow the vehicle to be jump started, charged, or the cab to be raised in an emergency in the event of battery failure.		
EE.	**BATTERY CONDITIONER** 1) A battery conditioner shall be supplied. The battery conditioner shall be mounted in the cab in the LH rear facing outer seating position.		
FF.	**BATTERY CONDITIONER DISPLAY** 1) A battery conditioner display shall be supplied. The battery conditioner display shall be mounted to the dash, so it is viewable through the front windshield on the left-hand side of the cab.		
GG.	**ELECTRICAL INLET** 1) A 20-amp super electrical receptacle shall be supplied. A single item or an addition of multiple items must not exceed the rating of the electric inlet that it's connected to.		
HH.	**ELECTRICAL INLET LOCATION** 1) The electrical inlet shall be installed in the left-hand side lower front step in the mid position.		
II.	**ELECTRICAL INLET CONNECTION** 1) The electrical inlet shall be connected to the battery conditioner and the air pump.		
JJ.	**ELECTRICAL INLET COLOR** 1) The electrical inlet connection shall include a yellow cover.		

KK.	**ALTERNATOR** 1) The charging system shall include a 360amp Niehoff 12-volt alternator, or equivalent. The alternator shall include a self-excited integral regulator.		
LL.	**IGNITION** 1) A master battery system with a keyless start ignition system shall be provided. Each system shall be controlled by a one-quarter turn Cole Hersee switch, or equivalent, both of which shall be mounted to the left of the steering wheel on the dash. A chrome push type starter button shall be provided adjacent to the master battery and ignition switches. 2) Each switch shall illuminate a green LED indicator light on the dash when the respective switch is placed in the "ON" position. 3) The starter button shall only operate when both the master battery and ignition switches are in the "ON" position.		
MM.	**STEERING WHEEL / COLUMN** 1) The steering wheel / column shall tilt and telescope.		
NN.	**MECHANICAL SIREN CONTROL** 1. The auxiliary siren shall be controlled by the following: a. Foot switch on the driver's/left side cab floor. b. Foot switch on the officer's/right side cab floor.		
OO.	**MECHANICAL SIREN CONTROL – BRAKE** 1) There shall be a brake for the mechanical siren within arm's reach of the driver and one within arm's reach of the front passenger.		
PP.	**AIR HORN CONTROL IN THE CAB** 1. The air horn shall be activated by the following: a. A button integrated into the steering wheel with a switch from air horn to drive horn. b. A rope style pull cord on the officer/right side of the cab, within arm's reach of the officer seat. 2) The controls for the air horn shall be activated with the battery switch.		
RR.	**PUMP SHIFT** 1) An air-actuated pump shift shall be provided. It shall be engaged with a two-position sliding collar that is actuated pneumatically (by air pressure) from a three-position air-control switch, located in the cab. A manual override shift control, to serve as a backup, shall be located on the driver/right side pump panel.		

	2. Two (2) indicator lights shall be provided, adjacent to the pump shift inside the cab. One (1) green light shall indicate when the pump shift has been completed and shall be labeled as "Pump Engaged". The second green light shall indicate when the pump has been engaged and the chassis transmission is in pump gear. This indicator light shall be labeled as "OK to Pump". 3. Another green indicator light shall be installed adjacent to the hand throttle on the pump panel and shall indicate which of two conditions is true: a. The pump is engaged, and the road transmission is in pump gear. b. The road transmission is in neutral, and the pump is not engaged. 4. This indicator light shall be labeled "Warning: Do not open throttle unless light is on".		
SS.	**EMS COMPARTMENTS** 1) The cab shall include two (2) EMS compartments located behind the driver and front passenger wall above the driver/right side and officer/left side wheel well. These compartments shall measure 24.00 inches wide x 41.00 inches high x 23.00 inches deep. The compartments shall have a clear door opening of 15.00 inches wide x 40.00 inches high. 2) The compartments shall be installed behind the driver's/right and officer's/left seats and shall be accessible from the outside of the cab through a standard lap door. The door shall be equipped with a keyed lock located on the outside of the apparatus. The interior of each door shall be painted to match the outside of the apparatus cab. 3) There shall be a switch to activate a light inside the compartments and the open compartment warning light in the cab in the event the door is left ajar. 4) The exterior EMS compartments shall include access from inside the cab. The compartments shall be accessible from the inside of the cab with cargo webbing. The opening shall face the rear of the cab. There shall be 2 LED strip lights, one on each side of the compartment. The LED Light strip shall go from the bottom of the cabinet to the top and be located just on the inside opening. 5) The EMS compartments located in the crew area of the cab shall include one (1) aluminum shelf which shall be secured using Unistrut channel on two (2) sides of the interior walls of the compartment. The shelf shall include a 1.00-inch lip around the edges. The shelf shall be finished the same as the interior of the compartment.		

	6) One (1) 120-volt AC, 15-amp, duplex straight blade receptacle with USB port shall be in both EMS cabinets. These shall be powered by the shoreline connection. The locations shall be determined at the pre-build trip. 7) The EMS compartments shall be free of any sharp edges and all exposed corners shall be rounded to prevent damage to medical jump kits. The exterior shall feature a painted finish which shall match the interior color. The EMS compartments interior shall feature a DA sanded finish.		
TT.	**COMPARTMENT BETWEEN THE TWO (2) EMS CABINETS** 1) A compartment shall be placed between the two (2) EMS Cabinets. The compartment will be 24.00" deep and 24.00" tall and shall span the distance between the two (2) EMS Cabinets. The cabinet shall have an open face with full height on the inside of the compartment. The top of the compartment shall have a 2" lip. The opening will have a 1" lip. The cabinet shall be painted the interior color. The Two (2) 120-volt AC, two (2)15-amp, straight blade receptacles with USB ports, shall be located on the top of the cabinet. The compartment interior shall feature a DA sanded finish. The opening shall have cargo webbing to secure all equipment.		
UU.	**REAR STORAGE COMPARTMENT** 1) There shall be a 4th compartment located in the rear of the cab located between the two (2) rear seats. The compartment shall be a minimum of twelve (18) inches in depth and a minimum height of 38 inches. The cabinet needs to be as wide as possible without impeding a seated firefighter's ability to don/doff their SCBA. The opening shall be as large as possible with roll-up doors to contain any and all equipment. 2) The compartment located in the crew area of the cab shall include two (2) aluminum shelves which shall be secured using Unistrut channel on two (2) sides of the interior walls of the compartment. The shelf shall include a 1.00-inch lip around the edges. The shelf shall be finished the same as the interior of the compartment. 3) The Two (2) 120-volt AC, two (2) port 15-amp, straight blade receptacles with USB ports shall be located on the top shelf of the cabinet.		
VV.	**POWER CONNECTION** 1) There shall be four (4) power connections to charge cell phones located in the cab area by the front console. These receptacles shall be standard 12V DC receptacles		

	with USB ports. 2) One (1) 12V DC cigarette lighter type power supply on the Officer's side of the console. All locations will be determined during pre-construction meetings.		
	SUPPLEMENTAL RESTRAINT SYSTEM (SRS) 1) A minimum of two (2) airbags, one for each of the riders in the front of the apparatus. The bidder shall also supply pricing for an occupancy rollover protection system.		
WW.	**MAP BOX** 1) There shall be a four (4) bin map box, open from the top, located on the engine tunnel and shall have a means to be secured, either with cargo netting or a lid.		
XX.	**SEAT BELT WARNING** 1) A Weldon, or equivalent, seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator in the Vista display and control screen(s), an indicator light in the instrument panel, and an audible alarm. 2) The warning system shall activate when any seat is occupied with a minimum of 60 pounds, the corresponding seat belt remains unfastened, and the park brake is released. The warning system shall also be activated when any seat is occupied, the corresponding seat belt was fastened in an incorrect sequence, and the park brake is released. Once activated, the visual indicators and audible alarm shall remain active until all occupied seats have seat belts fastened.		
YY.	**SEAT MATERIAL** 1) The seats shall include a covering of high strength, wear resistant fabric made of durable ballistic polyester. A PVC coating shall be bonded to the back side of the material to help protect the seats from UV rays and from being saturated or contaminated by fluids. Common trade names for this material are Imperial 1200 and Durawear 1800.		
ZZ.	**SEAT COLOR** All seats supplied with the chassis shall be black or grey in color. All seats shall include red seat belts.		
A1.	**DRIVER SEAT, STREET SIDE** 1) The driver's seat shall be Bostrom Firefighter 8-way Electric 500 series ABTS. The seats shall have "Zip-Clean Cushions", Sierra style, fixed base, fore/aft		

	adjustment and be of grey colored material. The four-way seat shall feature 3.00-inch vertical travel air suspension and manual fore and aft adjustment with 5.00 inches of travel. The suspension control shall be located on the seat below the left front corner of the bottom cushion. The seat shall also feature integral springs to isolate shock. 2) The seat position shall include a three-point shoulder harness with lap belt and an automatic retractor attached to the cab. The buckle portion of the seat belt shall be mounted on a semi-rigid stalk extending from the seat base within easy reach of the occupant. 3) The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 37.00 inches measured with the seat suspension height adjusted to the upper limit of its travel. 4) This model of seat shall have successfully completed the static load tests set forth by FMVSS 207, 209, and 210 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The materials used in construction of the seat shall also have successfully completed testing regarding the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which dictates the allowable burning rate of materials in the occupant compartments of motor vehicles.		
B1.	**SEAT BACK, DRIVER SIDE** 1) The driver's seat shall feature a two (2) way adjustable lumbar support and offer an infinite fully reclining adjustable titling seat back. The seat back shall also feature a contoured head rest.		
C1.	**SEAT MOUNTING, DRIVER SIDE** 1) The driver's seat shall be installed in an ergonomic position in relation to the cab dash.		
D1.	**OFFICER SEAT, CURB SIDE** 1) The officer's seat shall be a Officer Bostrom Firefighter 6-Way electric 500 series ABTS. The seats shall have "Zip-Clean Cushions", Tanker style, fixed base, fore/aft adjustment, SecureAll SCBA storage bracket and be of grey colored material Firefighter model seat. The seat shall feature two-way manual adjustment and shall include a tapered and padded seat cushion. The seat shall also feature integral springs to isolate shock. 2) The seat shall feature an all belts to seat (ABTS) style of		

	safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt, automatic retractor and buckle as an integral part of the seat assembly. 3) The minimum vertical dimension from the seat H-point to the ceiling for this belted seating position shall be 35.00 inches. 4) This model of seat shall have successfully completed the static load tests by FMVSS 207, 209, 210 and 302 in effect at the time of manufacture. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.		
E1.	**SEAT BACK, OFFICER** The officer's seat shall feature a SCBA locking system which shall be one bracket model and store most U.S. and International SCBA brands and sizes while in transit or for storage within the seat back. The bracket shall be easily adjustable for all SCBA brands and cylinder diameters. All adjustment points shall utilize similar hardware and adjustments shall be made with one tool. The bracket shall be adjustable to compensate for different cylinder lengths without the use of tools. The adjustment shall be made by raising a lever and moving the top clamp vertically. The bracket system shall be free of straps and clamps that may interfere with auxiliary equipment on SCBA units. The center guide fork shall keep the SCBA tank in place for a safe and comfortable fit in the seat back cavity. The SCBA unit simply needs to be pushed against the pivot arm to engage the patented auto-locking system. Once the lock is engaged, the top clamp shall surround the top of the SCBA tank for a secure fit in all directions. The seat back shall include a removable padded cover which shall be provided over the SCBA cavity.		
F1.	**SEAT MOUNTING, OFFICER** 1) The officer's seat shall be installed in an ergonomic position in relation to the cab dash		
G1.	**REAR CREW, FORWARD FACING SEATS** 1) The crew area shall include two (2) seats in the forward-facing center position. The seats shall have "Zip-Clean Cushions", Tanker style, fixed base, SCBA storage		

	bracket and be of grey or black colored material. Firefighter model seat. The seats shall feature a tapered and padded seat, and cushion. The seat and cushion shall be "Fold and Hold" design and shall be secured in either position. 2) The seat shall feature an all belts to seat (ABTS) style of safety restraint. The ABTS feature shall include a three-point shoulder harness with the lap belt and automatic retractor as an integral part of the seat assembly. The buckle portion of the seat belt shall extend from the seat base towards the driver position within easy reach of the occupant. 3) The minimum vertical dimension from the seat H-point to the ceiling for each belted seating position shall be 35.00 inches. 4) This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. To reflect the larger size outfitted firefighters, the test dummy used shall be a 95th percentile hybrid III male weighing 225 pounds rather than the 50th percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.		
H1.	**INTERCOM SYSTEM** 1) A four (4) position, David Clark intercom system shall be provided. The driver/left, officer/right, shall have intercom and radio interface capabilities (push to talk buttons). The remaining two (2) crew cab positions shall have intercom capability only.		
I1.	**HEADSET HANGER** 1) There shall be four (4) headset hangers provided with the intercom system. They shall be located at the following: a. One (1) for the driver/right side seat. b. One (1) for the officer/left seat. c. Two (2) seats in the rear of the cab. A radio interface cable shall also be provided with the system. The interface will be for a Motorola APX 700/800mhz mobile		

	radio.		
J1.	**ANTENNA MOUNTS** 1) There shall be an antenna-mounting base, installed for the two-way mobile radio. 2) There shall be an antenna-mounting base, installed for the wireless network router (i.e., Cradlepoint).		
K1.	**RADIO** 1) A Motorola APX 700/800mhz shall be placed in the cab within reach of both the passenger front and driver front seats. The Fire District shall supply the radio, the builder shall pre-wire and install the radio.		
L1.	**MAP LIGHT** 1) There shall be one (1) adjustable map light provided. The light shall be located within reach of the officer/left front seat. The light shall include a switch.		
M1.	**TRAFFIC LIGHT CONTROLLER - OPTICOM** 1) There shall be one (1) Opticom infrared emitter. The Opticom emitter will be part of the light bar. This light shall be activated when all of the following conditions are met: a. The ignition switch is on. b. The emergency master switch is on. c. The traffic light controller switch, located in the cab instrument panel, is on. d. The parking brake is released. 2) The light shall be deactivated when the parking brake is set to keep the traffic lights operating in their normal mode when the truck stops.		
N1.	**FLASHLIGHTS** 1) There shall be one (1) Streamlight UltraStinger LED flashlight, located on the front driver side/left side engine tunnel. The flashlight shall be powered by hard wiring into the 12-volt DC battery system and shall charge when the apparatus is connected to the shoreline and when the apparatus is running. 2) There shall be one (1) Streamlight Vulcan LED Atex mounted within reach of the front/right officer's seat. 3) There shall be two (2) Streamlight Vulcan LED ATEX Lantern orange flashlights provided. The flashlights shall be mounted in the rear of the cab. The flashlight shall be recharged by hard wiring into the 12-volt DC battery system and shall charge when the apparatus is connected to the shoreline and when the apparatus is running.		
O1.	**MULTIPLEX DISPLAY**		

	1) The multiplex electrical system shall include a minimum of two (2) displays. The displays shall feature full color LCD display screen. The displays shall offer varying fonts and background colors. The displays shall be fully programmable to the needs of the Fire District and shall offer virtually infinite flexibility for screen configuration options. At a minimum, they shall display the outside temperature and highlight any / all compartments door(s) that are open.		
P1.	**CAB CIRCULATION FANS** 1) The cab shall include two (2) individually switched all metal construction 6.00-inch windshield defogger fans which shall be installed in the front middle cab corners.		
Q1.	**MASTER WARNING SWITCH** 1) The optical warning system shall be controlled by a master switch which shall include all "ON" and all "OFF" capability via a virtual button within the MUX display. All warning lights which are "ON" when the master switch is activated shall also activate. This switch shall be clearly labeled for identification.		
R1.	**DO NOT MOVE APPARATUS MESSAGE DISPLAY AND LIGHTING** 1) There shall be a message display on the Doors screen of the information center. The display shall indicate the reason that the apparatus should not be moved. There shall be an illuminated RED indicator light, affixed to the roof above the engine compartment, inside the cab that will alarm when indicated "Do Not Move".		
S1.	**SUPPLEMENTAL RESTRAINT SYSTEM (SRS)** 1) There shall be an SRS system for all occupants of the apparatus. 2) The bidder shall also supply pricing for an occupancy rollover, airbags and front-end collision protection system.		
T1.	**MOBILE DATA TERMINAL** 1) The Fire District shall be installing after delivery a Mobile Data Terminal which will be located on the dashboard directly in front of the front officer/right side seat. The builder shall supply a 12-volt non-interrupted power source to this location. 2) The power shall remain constant even when the apparatus is started. The mount shall be as low as possible to minimize the obstructed view of the officer/passenger side view mirror. The mount will be attached to a suitable substructure to prevent the Mobile		

	Data Terminal from bouncing and receiving undue damage. There shall also be a power supply for the Mobile Data Terminal, its cradle point. The Fire District shall supply the cradle point and it will be installed by the manufacturer. For ease of repairs in the future, the power supply for the cradle point shall be labeled.		
U1.	**DATA RECORDING SYSTEM** 1) The chassis shall have a Weldon Vehicle Data Recorder (VDR) system installed or equivalent. The system shall be designed to meet NFPA 1901 and shall be integrated with the Weldon Multiplex electrical system. The following information shall be recorded: a. Vehicle speed b. Acceleration c. Deceleration d. Engine speed e. Engine throttle position f. ABS Event g. Seat Occupied Status h. Seat Belt Status i. Master Optical Warning Device Switch Position j. Time and Date 2) Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.		
V1.	**CAB FENDER** 1) Full width wheel well liners shall be installed on the exterior of the cab to limit road splash and enable easier cleaning. An outer fender made of polished stainless steel.		
W1.	**MUD FLAPS FRONT** 1) The front wheel wells shall have mud flaps installed on them.		
X1.	**CLIMATE CONTROL** 1) The cab shall include a 57,500 BTU @ 425 CFM front overhead heater/defroster. The cab shall also include a combination heater air conditioning unit. This unit shall offer a temperature control valve and two (2) blowers offering three (3) speeds which shall be capable of circulating 550 cubic feet of air per minute. The unit shall be rated for 42,500 BTU/Hr of cooling and 36,000 BTU/Hr of heating. The temperature and blower controls shall be located on the heater/air conditioning unit. The		

	air conditioning system shall perform as follows: 2) In 100-degree F ambient temperature, with 50% relative humidity and at 1200 engine RPM, the crew area will cool down to 72-degree F within 30 minutes. 3) Roof mounted condenser with adequate BTU to meet the performance specification. The evaporator units will have an adequate BTU rating to meet the performance specifications. The condenser shall be painted to match the paint color of the cab. 4) The climate control system shall include a gravity drain for water management. The gravity drain shall remove condensation from the air conditioning system without additional mechanical assistance. The heating and defrosting controls shall be located on the front overhead climate control unit. There shall be additional heating and air conditioning controls located on the engine tunnel mounted climate control unit. 5) The air conditioning compressor shall be a belt driven, engine mounted, open type compressor that shall be capable of producing a minimum of 32,000 BTU at 1500 engine RPMs. The climate control system shall have an automatic temperature control system, whereas the temperature can be set, and the system will determine the need for heating or cooling.		
Y1.	**FRONT UNDERSEAT HEATERS** 1) Two (2) 13,500 BTU heaters shall be provided and installed in the face of the seat riser storage area for the left and right front seats, one (1) each side.		
Z1.	**HVAC COVER PAINT** 1) All HVAC covers shall be painted to match the interior of the cab.		
A2.	**FLUID FILLS** 1) Access for fluid checks and fill points shall be accessed from the outside of the cab without lifting the cab. There shall be visual checks for the engine oil and transmission. There shall be fill points for engine oil as well as windshield wiper fluid.		
B2.	**DOOR KEYS** 1) If the cab has door locks, a total of four (4) door keys for the manual door locks shall be provided.		
	CAB WINDOW CONTROLS		

	1) The cab window controls shall be electrically controlled at each door, with all windows able to be controlled from the driver's position.		
C2.	**FRONT BUMPER** 1) The chassis shall be equipped with a severe duty front bumper constructed from structural steel channel. The bumper material shall measure 12.00 inches high with a minimum 3.0-inch flange and angled front corners. 2) The front bumper shall extend past the furthest point of the aerial ladder when the ladder is bedded and fully retracted. Normally 24 inches.		
D2.	**FRONT BUMPER PAINT** 1) The front bumper shall be painted the same as the lower cab color. The front bumper shall have a reflective chevron decal along the complete face of the bumper to include the angled front corners.		
E2.	**FRONT GRILLE** 1) The front fascia shall include a box style. The grille shall include a minimum free air intake to meet the engine and transmission requirements.		
F2.	**FRONT BUMPER COMPARTMENT** 1) There will be a compartment that shall hold a minimum of 100ft of 1.75" fire hose. A 1.50" front discharge shall be located within the compartment. It shall have a 90-degree swivel male NST connection. It shall have a drain that is automatic and will self-drain when the pressure has been released. The compartment door shall be a fold down style with a single locking "D" handle, turn-type closure.		
G2.	**FRONT BUMPER TOW EYES** 1) There shall be two (2) chrome tow eyes mounted through the front of the bumper and attached to the frame. 2) OR the front bumper tow eyes may be painted to match the chevron or bumper paint if needed.		
H2.	**CAB INTERIOR LIGHTS** 1) There shall be a minimum of four (4) interior cab lights that shall be activated when an exterior cab door is open. 2) There shall be a minimum of four (4) secondary interior cab lights. Each light shall be activated by switch in the light and will have a red lens cover.		
I2.	**MECHANICAL SIREN** 1) The front bumper shall include an electromechanical Federal Q2B™ siren. The siren shall be pedestal mounted on the bumper apron on the furthest outboard section of the bumper on the Driver's side.		

K2.	**CHROME BELL** 1) A 12-inch chrome Fire Truck bell shall be located on the right side of the front bumper. The pull cord shall attach to the bell striker and terminate on the inside of the front of the cab within reach of the front passenger/right seat.		
L2.	**AIR HORNS** 1) The front bumper shall include two (2) Grover air horns recess mounted in the front bumper face on the left side of the bumper in the inboard and outboard positions relative to the left-hand frame rail.		
M2.	**ELECTRONIC SIREN** 1) There shall be one (1) electronic siren head. 2) The siren controller shall be within arms distance of the front seats. The siren controller will be mounted in the front dash panel.		
N2.	**ELECTRONIC SIREN SPEAKER** 1) The bumper shall include one (1), 100-watt (minimum) speaker which shall be recess mounted within the bumper fascia and shall include a polished aluminum grill.		
O2.	**LIGHT BARS** 1) There shall be four (4) light bars mounted on the cab roof. Two on each side of the aerial device. The light bars shall be activated by a switch in the cab within reach of the driver. The front light bars shall be angled to provide the maximum amount of visibility possible. a. Driver Side End Outside: Red, wide flashing LED light b. Driver Side Front Corner Outside: Red, directional flashing LED light c. Driver Side Front 4: Blue flashing LED Light d. Driver Side Front 3: Clear flashing LED Light e. Driver Side Front 2: Red flashing LED Light f. Driver Side Front 1: Red flashing LED Light g. Passenger Side Front 1: Red flashing LED Light h. Passenger Side Front 2: Red flashing LED Light i. Passenger Side Front 3: Clear flashing LED Light j. Passenger Side Front 4: Clear flashing LED Light k. Passenger Side Front Corner Outside: Red, directional flashing LED light l. Passenger Side End Outside: Red, wide flashing LED light.		
P2.	**LIGHTBAR PROVISION** 1) There shall be four (4) junction boxes located on the cab		

	roof with electrical connections for four (4) light bars. There shall be two (2) junction boxes located at the front of the cab roof, one (1) on the left and one (1) on the right, and one (1) located on the roof over each rear door. The light bars shall be provided and installed by the body manufacturer.		
Q2.	**EMERGENCY WARNING LIGHTS – ALL ZONES** 1) All emergency warning lights shall be LED lights.		
R2.	**CLEARANCE LIGHTS** 1) All clearance lights and body marker lights shall be LED lights.		
S2.	**SIDE CAB SCENE LIGHT - ANGLE** 1) The side of the cab shall include two (2) HiViz model FireTech FT-MB-27-FT LED, or equivalent scene lights with chrome bezels, one (1) each side which shall be recess mounted. The lights shall offer LED lighting at a gradient 32-degree angle. The lamps shall draw less than 2 amps and generate a minimum of 1,500 lumens.		
T2.	**SIDE SCENE LIGHT LOCATION** 1) The scene lighting located on the left and right sides of the cab shall be mounted in the upper forward portion of the cab between the front and rear crew doors.		
U2.	**FRONT CAB-BROW/SCENE LIGHTS** 1) The front of the cab shall include two (2) HiViz model FireTech FT-MB-27-FT LED, or equivalent, installed on the brow of the cab. 2) Each lamp head shall be a single 12-volt high intensity LED panel. The LED light panels shall draw 6.0 amps and generate 7,000 lumens total. The lamp head shall be 4.25 inches in height X 6.18 inches in width and shall be adjustable to a 20-degree downward angle within the brow mount brackets. The lamp heads and brackets shall be powder coated white.		
V2.	**FRONT TURN SIGNALS** 1) Front turn signals shall be amber LED.		
W2.	**AIR INLET** 1) An airline connection to supply the apparatus system installed on the driver's/right side of the cab between the cab doors, it will be flush mounted with a protective cover.		
X2.	**LED HEADLIGHTS** 1) Both sets of headlights (Hi and Lo) shall be LED and 4" x 6" square. The headlights (Lo) shall be in the "on"		

	position when the battery switch is activated. 2) The Hi/Lo beams shall be activated from the cab.		
Y2.	**HEADLIGHT FLASHER** 1) There shall be an alternating headlight flasher. Controls with be controlled within the display screen.		
Z2.	**INBOARD FRONT WARNING LIGHTS** 1) Inboard front warning lights shall be LED, they shall be one (1) red and one (1) blue each side. On/Off switch shall be located within reach of the driver.		
A3.	**INTERSECTION WARNING LIGHTS** 1) Intersection warning lights, one on each side shall be LED, they shall be red and mounted on the bumper. On/Off switch shall be located within reach of the driver.		
B3.	**SIDE WARNING LIGHTS** 1) Side front warning lights shall be LED, they shall be blue. On/Off switch shall be located within reach of the driver.		
C3.	**CAB TANK LEVEL LIGHTS** 1) There shall be one (1) LED water tank level gauge located on each side of the apparatus cab. The water tank level shall reflect the water level in the water tank.		
D3.	**NFPA STEP GROUND LIGHTS** 1) All NFPA step ground lights shall be LED.		
E3.	**INTERIOR AND EXTERIOR COMPARTMENT LIGHTING** 1) There shall be LED strip style lighting installed to illuminate the interior and exterior compartments. The strip light shall be Gen3 LED, or equivalent. Amount of lighting will be dictated by the size of the compartment.		
F3.	**HELMET HOLDERS** 1) There shall be four (4) helmet holders that shall accommodate District fire helmets. These four items will be furnished and installed by the manufacturer.		
G3.	**MANUAL CAB LIFT** 1) In addition to the mechanical cab lift system, there shall be a manual cab lift system that can be used if there is no power available from the apparatus.		
H3.	**CAMERA** 1) A heavy-duty rearview camera system shall be supplied. The system shall include one (1) camera with a teardrop shaped chrome plated housing shall be shipped loose for		

	OEM installation in the body to afford the driver a clear view to the rear of the vehicle and one (1) shall be mounted on the officer side of the cab below windshield ahead of the front door at approximately the same level as the cab door handle.		
I3.	**360' CAMERA OPTION** 1) A 360' camera system shall be installed that provides a 360-degree view of the apparatus, preferably a 4-camera system that can be viewed when the vehicle is in motion and stationary at a scene.		
J3.	**AS BUILT WIRING DIAGRAMS** 1) The cab and chassis shall include one (1) complete set of wiring schematics and option wiring diagrams.		
K3.	**INSTRUMENTATION** 1) An ergonomically designed Driver's instrument panel shall be provided. Each gauge shall be backlit with LED lamps. Stepper motor movements shall drive all gauges. The instrumentation system shall be multiplexed and shall receive ABS, engine, and transmission information over the J1939 data bus to reduce redundant sensors and wiring. 2) The instrument panel shall contain the following gauges: a. One (1) electronic speedometer shall be included. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H. b. One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM. c. One (1) two-movement gauge displaying primary system, and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI). The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degrees Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions. d. One (1) four-movement gauge displaying engine oil		

	pressure, coolant temperature, fuel level, voltmeter, and an *indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included. The scale on the engine oil pressure gauge shall read from 0 to 120 pounds per square inch (PSI). The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F). The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the fuel level gauge shall read from empty to full as a percentage of fuel remaining. An amber indicator light shall indicate low fuel at 25% tank level. The scale on the voltmeter shall read from 10 to 16 volts with a red indication zone on the gauge showing critical levels of battery voltage. A red indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the DEF LED bar will consist of four (4) LEDs displaying levels in increments of 25% of usable DEF in green. Upon decreasing levels, the indicator bar will change colors to notify the driver of decreasing levels of DEF and action will be required. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen and an audible alarm. **3)** The instrument panel shall include a light bar that contains the following LED indicator lights and produce the following audible alarms in applicable configurations: **<u>RED LAMPS</u>** a. Stop Engine-indicates critical engine fault. b. Air Filter Restricted-indicates excessive engine air intake restriction. c. Park Brake-indicates parking brake is set. d. Seat Belt Indicator-indicates when a seat is occupied, and corresponding seat belt remains unfastened. e. Low Coolant-indicates engine coolant is required. **<u>AMBER LAMPS</u>** a. MIL-indicates an engine emission control system fault. b. Check Engine-indicates engine fault.		

c. Check Trans-indicates transmission fault.
d. High Transmission Temperature-indicates excessive transmission oil temperature.
e. ABS-indicates anti-lock brake system fault.
f. HEST-indicates a high exhaust system temperature.
g. Water in Fuel-indicates presence of water in fuel filter.
h. *DPF-indicates a restriction of the diesel particulate filter
i. *Regen Inhibit-indicates regeneration has been postponed due to user interaction
j. Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.
k. *SRS-indicates a problem in the supplemental restraint system
l. Check Message-Turn Signal On
m. Check Message-Door Ajar
n. Check Message-Cab Ajar
o. *Check Message-ESC Active
p. *Check Message-DPF Regen Active
q. Check Message-No Engine Data
r. Check Message-No Transmission Data
s. Check Message-No ABS Data
t. Check Message-No Data All Communication with the Vehicle Systems Has Been Lost
u. Check Message-Check Engine Oil Level
v. Check Message-Check Washer Fluid Level
w. Check Message-Check Power Steering Fluid Level
x. Check Message-Low Transmission Fluid Level
y. Check Message-Check Coolant Level

GREEN LAMPS

a. Left and Right turn signal indicators.

b.*ATC-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system

c. High Idle-indicates engine high idle is active.

d. Cruise Control-indicates cruise control is active.

e. OK to Pump-indicates the pump engage conditions have been met.

f. Pump Engaged-indicates the pump is currently in use.

g. Auxiliary Brake-indicates secondary braking device is active.

BLUE LAMP

a. High Beam Indicator

WHITE LAMP

a. Wait to Start-indicates active engine air preheat cycle

L3.	**AUDIBLE ALARMS FROM GAUGE PACKAGE** a. High Trans Temp b. High or Low Voltage c. Check Engine d. Check Transmission e. Stop Engine f. Low Air Pressure g. Fuel Low h. Water in Fuel i. *ESC j. High Coolant Temperature k. Low Engine Oil Pressure l. Low Coolant Level m. *Low DEF Level n. Air Filter Restricted o. Extended Left and Right Turn Remaining On p. Cab Ajar q. Door Ajar r. ABS System Fault s. Seatbelt Indicator		
M3.	**EXTERNAL AUDIBLE ALARM** a. Air Filter b. Cab Ajar c. Door Ajar d. Check Engine e. Stop Engine f. Low Air Pressure g. Low Engine Oil Pressure h. Water in Fuel i. *Low DEF j. ABS System Fault k. Seatbelt Indicator l. *Items marked with an asterisk are provided only in applicable configurations.		
N3.	**LCD MESSAGES** a. Transmission Temperature b. Battery Voltage c. Engine Hours d. Vehicle Speed e. Engine RPMs f. Fuel Level g. DEF Level h. Engine Oil Pressure i. Ammeter (If equipped) j. Auxiliary Ammeter (If equipped) k. Engine Coolant Temp l. Primary System Air Pressure m. Secondary System Air Pressure		

	n. Turbo Boost Pressure o. Exhaust Temperature p. Engine Load q. Engine Torque r. Instant Fuel Economy s. Average Fuel Economy		
O3.	**BACKLIGHTING COLOR** 1) The instrumentation gauges and the switch panel legends shall be backlit using red LED backlighting.		
P3.	**HOUR METER** 1) Within the instrument panel, a Honeywell brand, or equivalent, hour meter shall be installed which shall measure the number of hours the PTO has been operated. The hour meter shall be wired to the left-hand PTO and labeled "AERIAL HOURS".		
Q3.	**AUXILIARY SPEEDOMETER** 1) The right-hand side multiplex display and control screen shall include an auxiliary speedometer with a digital readout.		

SECTION G - CHASSIS

Item	Requirement	Comply (Y or N)	Exception (Y or N)
A.	**ENGINE** 1) The engine shall be EPA certified diesel engine to meet the very latest emissions standards without compromising performance, reliability or durability. The engine shall feature an air charge cooled engine which consists of an in line six (6) cylinders, four-cycle diesel-powered engine. The engine shall offer a rating at a minimum of 500 horsepower.		
B.	**ENGINE HIGH IDLE SPEED** 1) The engine high idle control shall maintain the engine idle at approximately 1200 RPM when engaged.		
C.	**ENGINE HIGH IDLE CONTROL** 1) The vehicle shall be equipped with an automatic high-idle speed control. It shall be pre-set so when activated, it will operate the engine at the appropriate RPM to increase alternator output. This device shall operate only when the master switch is activated, and the transmission is in neutral with the		

	parking brake set. The device shall disengage when the operator depresses the brake pedal, or the transmission is placed in gear and shall be available to manually or automatically re-engage when the brake is released, or when the transmission is placed in neutral. There shall be an indication on the computer screen(s) for the high idle speed control.		
D.	**AUXILIARY ENGINE BRAKE** 1) An engine compression brake, for the six (6) cylinder engine shall be provided. The engine compression brake shall actuate the vehicle's brake lights when engaged. A cutout relay shall be installed to disable the compression brake when in pump mode or when an ABS event occurs.		
E.	**AUXILIARY ENGINE BRAKE CONTROL** - An engine compression brake control device shall be included. The electronic control device shall monitor various conditions and shall activate the engine brake only if all the following conditions are simultaneously detected: - A valid gear ratio is detected. - The driver has requested or enabled engine compression brake operation. - The throttle is at a minimum engine speed position. 2) The electronic controller is not presently attempting to execute an electronically controlled final drive gear shift. The compression brake shall be controlled via on off/low/medium/high button. The multiplex system shall remember and default to the last engine brake control setting when the vehicle is shut off and re-started.		
F.	**ENGINE COOLING SYSTEM** 1) There shall be a heavy-duty aluminum cooling system designed to meet the demands of the emergency response industry. The cooling system shall have the capacity to keep the engine properly cooled under all conditions of road and pumping operations. The cooling system shall be designed and tested to meet or exceed the requirements specified by the engine and transmission manufacturer and all EPA requirements. The complete cooling system shall be mounted to isolate the entire system from vibration or stress. The individual cores of the cooling system shall be mounted in a manner to allow expansion and		

	contraction at various rates without inducing stress into the adjoining cores. 2) The cooling system shall be comprised of a charging air cooler to radiator serial flow package that provides the maximum cooling capacity for the specified engine as well as serviceability. 3) The cooling system shall be equipped with a surge tank that can remove entrained air from the system. The surge tank shall be equipped with a low coolant probe and sight glass to monitor the level of the coolant. The surge tank shall have a dual seal cap that meets the engine manufacturer's pressure requirements and allows for expansion ad recovery of coolant to a separate tank.		
G.	**AIR INTAKE PROTECTION** 1) If possible, a light duty skid plate shall be supplied for the engine air intake system below the right front side of the cab. The skid plate shall provide protection for the air intake system from light impacts, stones, and road debris. The skid plate shall be painted to match the frame color.		
H.	**FUEL TANK** 1) The fuel tank shall have a minimum capacity of sixty-five (65) gallons.		
I.	**FUEL FILTER/WATER SEPARATOR** 1) The fuel system shall have a fuel filter/water separator as a primary filter as approved by the engine manufacturer. The fuel filter shall have a drain valve. A "water in fuel" sensor shall be provided and wired to an instrument panel lamp and audible alarm to indicate when water is present in the fuel/water separator. A secondary fuel filter shall be included as approved by the engine manufacturer.		
J.	**TRANSMISSION** 1) The drive train shall include an Allison EVS 4500 torque converter, automatic transmission which shall include electronic controls. The transmission shall feature two (2) 10-bolt PTO pads located on the converter housing.		
K.	**TRANSMISSION MODE PROGRAMMING** 1) The transmission, upon start-up, will automatically select a fifth (5^{th}) speed operation without pushing		

	the mode button. 2) The transmission gear ratios shall be: 1st 4.70:1 2nd 2.21:1 3rd 1.53:1 4th 1.00:1 5th 0.76:1 6th 0.67:1 (if applicable) Rev 5.55:1		
L.	**TRANSMISSION SHIFT SELECTOR** 1) An Allison pressure sensitive range selector touch pad shall be provided and located to the right of the driver within clear view and easy reach. The shift selector will provide a prognostic indicator (wrench symbol) between the selected and attained indicators.		
M.	**DRIVELINE** 1) All drivelines shall be heavy duty metal tube and equipped with Spicer 1710 series universal joints, or equivalent. The shafts shall be dynamically balanced prior to installation to alleviate future vibration. In areas of the driveline where a slip shaft is required, the splined slip joint shall be coated with Glide Coat®, or equivalent.		
N.	**EXHAUST HEAT DEFLECTOR SHIELD** 1) A deflector shield shall be provided to aid in dissipating exhaust heat from adversely affecting anything stored in the body.		
O.	**FRONT AXLE CRAMP ANGLE** 1) The chassis shall have a front axle cramp angle minimum of 44 degrees to the left and right a higher cramp angle to the left is preferred.		
P.	**FRONT AXLE** 1) The front axle shall be a Meritor Easy Steer Non drive front axle or similar. The axle shall include a conventional style hub with a standard knuckle. The weight capacity for the axle shall be rated to a minimum 23,000 pounds. This rating shall require special approvals from the wheel manufacturers.		
Q.	**FRONT AXLE WARRANTY** 1) The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the		

	general service application, or similar time and conditions from similar manufacturer. Details of the manufacturer's warranty are provided on the PDF document attached to this option.		
R.	**FRONT SUSPENSION** 1) The apparatus shall have an independent front suspension (IFS) rated for the weight of the apparatus to include equipment and personnel.		
S.	**FRONT WHEEL BEARING LUBRICATION** 1) The front axle wheel bearings shall be lubricated with clear oil. The oil level can be physically checked via check ports in the front axle hubs.		
T.	**BRAKE SYSTEM** 1) A rapid build-up air brake system shall be provided. The air brakes shall include a two (2) air tank, three (3) reservoir system. The rear axle spring brakes shall automatically apply in any situation when the air pressure falls below 25 PSI and shall include a mechanical means for releasing the spring brakes when necessary. An audible alarm shall be designated when the system air pressure is below 60 PSI. 2) An anti-lock braking system (ABS) shall be installed on the front and rear axles in order to prevent the brakes from locking or skidding while braking during hard stops or on icy or wet surfaces. A dash mounted ABS lamp shall be provided to notify the driver of a system malfunction. 3) Automatic traction control (ATC) shall be installed on the driver rear axle. The automatic traction control system shall apply the anti-lock braking system when the drive wheels lose traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces. 4) The system shall include roll stability control which shall monitor the vehicle's rollover threshold based on the lateral acceleration. The system shall activate a computerized device which shall slow the vehicle when the threshold is exceeded in either direction. Normal vehicle operation shall resume once the problematic conditions cease. Roll stability control shall be integral with the ABC and ATC systems.		

	5) An electronic stability control unit (ESC) shall be a functional extension of the electronic braking system. It shall detect any skidding of the vehicle on the vertical axis as well as any rollover tendency. The control unit shall have an angular-speed sensor that measures the vehicle's motion on the vertical axis. An acceleration sensor shall measure the vehicle's lateral acceleration. The system shall provide information on the lateral acceleration and steering angle to calculate a theoretical angular speed for the stable vehicle condition.		
U.	**FRONT BRAKE SLACK ADJUSTERS** 1) Front brake automatic slack adjusters shall be an integral part of the brake assembly and be supplied by the brake manufacturer.		
V.	**REAR AXLES** 1) The rear axle shall be a Meritor model RT-52-185 tandem drive axle, or similar. The axle shall include precision forged, single reduction differential gearing, and shall have a fire service rated capacity of 54,000 pounds. 2) The axle shall be built of superior construction and quality components to provide the rugged dependability needed to stand up to the fire industry's demands. The axle shall include rectangular shaped, hot-formed housing with a standard wall thickness of 0.56 inches for extra strength and rigidity and a rigid differential case for high axle strength and reduced maintenance. 3) The axle shall have heavy-duty Hypoid gearing for longer life, greater strength, and quieter operation. Industry-standard wheel ends for compatibility with both disc and drum brakes, and unitized oil seal technology to keep lubricant in and help prevent contaminant damage will be used.		
W.	**REAR AXLE DIFFERENTIAL LUBRICATION** 1) The rear axle differential shall be lubricated with oil.		
X.	**REAR AXLE WARRANTY** 1) The rear axle shall be warranted by the manufacturer for two (5) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option.		

Y.	**REAR WHEEL BEARING LUBRICATION** 1) The rear axle wheel bearings shall be lubricated with oil.		
Z.	**REAR AXLE DIFFERENTIAL CONTROL** 1) The tandem axle chassis shall include an inter-axle differential lock, which shall allow both axles to be engaged as drive axles. The inter-axle differential lock shall be controlled by a locking rocker switch on the switch panel. The light on the switch shall illuminate with positive engagement of the inter-axle differential lock.		
AA.	**REAR SUSPENSION** 1) The tandem rear axle shall feature a Ridewell Dynalastic RD202 with accordion style elastomer springs, or similar. The suspension shall incorporate a straddle mount pedestal and urethane pivot bushings, preset load distribution and independent axle movement. The rear tandem suspension shall include 54.00-inch axle centers.		
BB.	**REAR SHOCK ABSORBERS** 1) Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.		
CC.	**REAR AXLE RATIO** 1) The rear axle ratio shall be 5.38:1.		
DD.	**VEHICLE TOP SPEED** 1) The top speed of the vehicle shall be approximately 68 MPH +/-2 MPH at governed engine RPM.		
EE.	**FRONT TIRE** 1) The front tires shall be Goodyear G296 MSA 425/65R22.5		
FF.	**REAR TIRE** 1) The rear tires shall be Hankook Smart Work AM09 315/80R22.5		
GG.	**TIRE CHAINS** 1) A set of DOT/NHTSA winter tire chains shall be provided for the drive wheels. These shall be supplied by the manufacturer.		
HH.	**TIRE CHAINS**		

	1) Onspot brand six (6) strand automatic ice chains shall be installed on the rear axle of the chassis to provide instant traction while traveling on ice and snow at speeds below 35 MPH.		
II.	**TIRE CHAINS ACTIVATION** 1) The tire chain system shall be activated by a virtual button on the multiplex display and control screen. The virtual button shall display "Active" when the tire chains are engaged. The tire chains shall be interlocked with the transmission and shall engage only if the vehicle is traveling at 30 MPH or less. After traveling over 30 MPH, the vehicle must be reduced to a speed below 5 MPH for the tire chains to be engaged or re-engaged. The virtual button, once the vehicle reaches 35 MPH shall be reset to "Inactive". The vehicle must then reduce to a speed below 5 MPH to enable the tire chains virtual button.		
JJ.	**PARK BRAKE** 1) Upon application of the push-pull valve in the cab, the rear brakes will engage via mechanical spring force. This is accomplished by dual chamber rear brakes, satisfying the FMVSS parking brake requirements. In addition to the mechanical rear brake engagement, the front service brakes will also engage via air pressure, providing additional braking capability.		
KK.	**PARK BRAKE CONTROL** 1) A Meritor-Wabco, or equivalent, manual hand control push-pull style valve shall operate the parking brake system. The control shall be yellow in color. The parking brake actuation valve shall be mounted as far left as possible of the dash within easy access of the driver and away from loose equipment locations. A guard shall be installed over the parking brake control to prevent accidental application or release.		
LL.	**REAR BRAKE SLACK ADJUSTERS** 1) The rear brakes shall include Meritor, or equivalent, automatic slack adjusters shall be installed on the chassis which features a simple, durable design offering reduced weight. The automatic slack adjusters shall feature a manual adjusting nut which cannot inadvertently be backed off and threaded grease fittings for easy serviceability.		
MM.	**TIRE PRESSURE INDICATOR**		

	1) There shall be automatic, wireless (TPMS) tire pressure indicators at each tire valve stem on the vehicle that shall indicate if there is insufficient pressure in the specific tire. The display with tire pressures may either be located separately or integrated into the MultiPlex display. The TPMS system shall have an audible alarm or alert if tire pressure is lost. 2) OR electronic chrome LED valve caps shipped loose for installation by the OEM which shall illuminate with a red LED when tire pressure drops 8psi provided. The valve caps are self-calibrating and set to the pressure of the tire upon installation.		
NN.	**WHEELS** 1) The front and rear outside wheels shall be Alcoa hub piloted aluminum wheels with the Alcoa XBR Dura-Bright® wheel treatment as an integral part of the wheel. Alcoa XBR Dura-Bright® wheels keep their shine without polishing; the wheels shall come clean simply by spraying with soap and water. Brake dust, grime and dulling oxidation shall wash off with no scrubbing and no special chemicals required.		
OO.	**WHEEL TRIM** 1) The front wheels shall include stainless steel lug nut covers and stainless-steel baby moons with cutouts for oil seal viewing (there shall be no cutout on front drive, IFS axles, or when the front wheel bearing lubrication is grease). The covers and baby moons shall feature a mirror shine finish and shall be shipped loose with the chassis for installation by the apparatus builder. The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats, also in a mirror shine finish, which shall be shipped loose with the chassis for installation by the apparatus builder.		
PP.	**MOISTURE EJECTORS** 1) An automatic moisture ejector with a manual drain cable actuated drain provision shall be installed on all reservoirs of the air supply system. Each tank will have a cord to open the air tank release from the side of the apparatus without having to crawl under the apparatus.		
RR.	**AIR SUPPLY LINES** 1) A dual air system plumbed with color coded reinforced nylon tubing air lines shall be installed		

	on the chassis. The primary (rear) brake line shall be green, the secondary (front) brake line red, the parking brake line orange and the auxiliary (outlet) will be blue. Brass compression type fittings shall be used on the nylon tubing. All drop hoses shall include fiber reinforced neoprene covered hoses.		
SS.	**AIR INLET CONNECTION** 1) An air connection for the shoreline air inlet shall be supplied.		
TT.			
UU.	**PLUMBING AIR INLET CONNECTION** 1) The air inlet connector shall be plumbed to the air system with a check valve to prevent air from escaping through the inlet connector.		
VV.	**AIR INLET SHUTOFF VALVE** 1) The air inlet shall include a 1/4 turn shutoff valve which shall terminate the air supply between the inlet connection and the tank.		
WW	**AIR INLET/ OUTLET FITTING TYPE** 1) The air connector supplied shall be a 0.25-inch size Tru-Flate Interchange style manual connection which is compatible with Milton 'T' style, Myers 0.25-inch Automotive style and Parker 0.25-inch 10 Series connectors.		
XX.	**AIR HORN RESERVOIR** 1) One (1) air tank shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air brake system.		
YY.	**ELECTRICAL SYSTEM** 1) The chassis shall include a single starting electrical system which shall include a 12-volt direct current multiplexing system, suppressed per SAE J551. The wiring shall be appropriate gauge cross link with 311 Fahrenheit insulation. All SAE wires in the chassis shall be color coded and shall include the circuit number and function where possible. The wiring shall be protected by 275-degree Fahrenheit minimum high temperature flame retardant loom. All node and sealed Deutsch connectors shall be waterproof.		
ZZ.			
A1.	**REMOTE FILTERS**		

	1) The Fuel, Oil and Coolant filters shall be located in the same remote location. The filters shall be mounted to allow complete unrestricted access for routine maintenance and repair. The apparatus shall come with a Davco filter Fuel Pro 482, or equivalent.		

SECTION H - PUMP

A.	**FIRE PUMP** 1) The pump shall have a capacity of 2000 gallons per minute, shall be a Waterous Model CSU. The anodes shall be installed in the left and right steamer inlets and shall be easily replaceable. The pump shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association and shall have a rated minimum capacity of 1500 GPM. The pump shall be free from objectionable pulsation and vibration under all normal operating conditions. 2) Consideration for pump style will be given to allow plumbing, and/or piping, for pre-connected hose lines (speedlays) to be oriented at the front of the pump panel in a stacking position with the two 1.75" speedlays stacked below the 2.5" speedlay. (see section A1 below).		
B.	**Pump Body** 1) The pump body shall be close-grained, gray iron and must be horizontally split in two sections for easy removal of the entire impeller shaft assembly, and designed for complete servicing from the bottom of the truck without disturbing setting of the pump in the chassis or apparatus piping which is connected to the pump. Pump body halves shall be bolted together on a single horizontal face to minimize leakage and facilitate reassembly.		
C.	**Discharge Manifold** 1) The discharge manifold shall be cast as an integral part of the pump body assembly and shall provide at least three full 2-1/2-inch openings for ultimate flexibility in providing various discharge outlets for maximum efficiency, and shall be located as follows: a. One outlet on the right side of the pump body b. One outlet on the left side of the pump body		

	c. One outlet directly on top of the pump discharge manifold		
D.	**Impeller** 1) The impeller shall be bronze with double suction inlets, accurately balanced (mechanically and hydraulically), of mixed flow design with reverse flow, labyrinth type, wear rings that resist water bypass and loss of efficiency due to wear.		
E.	**Flame Plating** 1) The impeller shall have flame plated hubs to assure maximum pump life and efficiency despite the presence of abrasive particles, such as fine sand, in the water being pumped.		
F.	**Wear Rings** 1) The wear rings shall be bronze and shall be easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.		
G.	**Impeller Shaft** 1) The impeller shaft shall be stainless steel, accurately ground to size. The impeller shaft shall be of two-piece construction separable between the pump and pump transmission to allow true separation of the transmission from the pump without disassembly of either component.		
H.	**Anti-Friction Bearings** 1) The impeller shaft shall be supported at each end by oil or grease lubricated anti-friction ball bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable seal housings, flinger rings, and oil seals. No sleeve type bearings shall be used.		
I.	**Seal Housings** 1) The seal housings shall be equipped with two-piece glands to permit adjustment or replacement of packing without disturbing pump. Lantern rings shall be located at inner ends of seal housings so that all rings of packing can be removed without removal of the lantern rings. Water shall be fed into seal housing lantern rings for proper lubrication and cooling when the pump is operating.		
J.	**Pump Transmission** 1) The pump transmission shall be rigidly attached to		

	the pump body assembly and be of latest design incorporating a high strength, involute tooth form Morse™ HV, or equivalent, chain drive capable of operating at high speeds to provide smooth, quiet transfer of power. The shift engagement shall be accomplished by a free-sliding collar and shall incorporate an internal locking mechanism to ensure that collar will be maintained in ROAD or PUMP position.		
K.	**PUMP SHIFT** 1) An electric powered pump shift shall be installed in the cab driver's area where not subject to accidental engagement. The pump shift system shall permit stationary pumping operations. 2) The following indicator lights shall be included with pump shift: a. A green indicator light, labeled "PUMP ENGAGED" shall indicate pump shift has successfully been completed. b. A green indicator light, labeled "OK TO PUMP" shall indicate the chassis transmission is in proper gear and parking brake is engaged. 3) Pump shift and interlocks shall comply with applicable sections of NFPA standards. The pump shift shall have an instruction label and nameplate to indicate proper pump shift instructions.		
L.	**Intake Relief Valve** 1) The intake relief valve shall be a pilot-operated intake relief valve and shall be provided by the pump manufacturer. The pilot valve shall be mounted in a position specified by the purchaser, and allow adjustment from 50 P.S.I.G. to 250 P.S.I.G. A pilot-operated intake relief valve will allow full opening of the relief valve with a very small rise in intake pressure above set pressure.		
M.	**Manifold Drain Valve Assembly** 1) The manifold drain valve assembly shall consist of a stainless-steel plunger in a bronze body with multiple ports. The valve shall be designed so that the pump discharge pressure prevents it from opening accidentally. The drain valve control shall be panel mounted, cable or rod operated and identified PUMP DRAIN.		

N.	**Pump Intake Strainers and Anodes** 1) The pump intake strainers shall be removable, die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump. Anodes are normally mounted on the pump intake piping, but they may also be installed in the discharge piping if no intake mounting locations were available. Physical mounting of the anode may be via an NPT tap or bolt-on flange.		
O.	**REMOTE THROTTLE HARNESS** 1) An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a FRC Pump Boss pressure governor and a multiplexed gauge. Separate circuits shall be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indication light. The harness shall be designed for a side mount pump panel. 2) An apparatus interface wiring harness shall also be included which shall be wired to the cab harness interface connectors and shall incorporate circuits with relays to control pump functions. This harness shall control the inputs for the transmission lock up circuits, governor/hand throttle controls and dash display which shall incorporate "Pump Engaged" and "OK to Pump" indicator lights. The harness shall contain circuits for the apparatus builder to wire in a pump switch.		
P.	**PUMP CERTIFICATION** 1) The pump will meet and perform the following third-party test requirement. a. 100% Rated Capacity at 150 PSI net pump pressure. (1500 GPM) b. 100% Rated Capacity at 165 PSI net pump pressure. (1500 GPM) c. 70% Rated Capacity at 200 PSI net pump		

	pressure. (1050 GPM) d. 50% Rated Capacity at 250 PSI net pump pressure. (750 GPM)		
Q.	**RELIEF VALVE** 1) There shall be a pressure relief valve built as an integral part of the pump and provide complete control through the full range of pressure and capacity. There shall be an Elkhart #40, or equivalent, suction relief valve piped under the apparatus and terminate with a 2-1/2" NST (M) fitting. There shall be a sign on the running board that says" Suction Relief Valve Do Not Cap."		
R.	**MECHANICAL SEALS** 1) The pump shall be equipped with self-adjusting, maintenance-free shaft seals that shall not require manual adjustment.		
S.	**PUMP TRANSMISSION** 1) The pump shall have a Waterous Model C10 series transmission. The drive chain shall be a Morse HV, or equivalent, high strength involute form chain. The pump and transmission shall be easily separable.		
T.	**STAINLESS STEEL PLUMBING** 1) Each valve shall be individually attached to the manifold of the pump with stainless steel- (304 Scheduled 40) pipe or high-pressure hose 1000 psi rated. All piping that remains in the pump module for the deck gun, speedlays, cross lays, or LDH discharges shall be Schedule 40-304 Stainless Steel pipe. All bends shall be accomplished with sweep bends when possible. Victaulic adapters will be used when piping must be removed for servicing valves. 2) All plumbing that must extend beyond the pump module, like front bumper or rear discharges will be plumbed with Steel Braided High-Pressure hose with stainless steel ends. For serviceability, all high-pressure hose must be made at the plant where the truck is manufactured. **Plumbing is a very important component to fire apparatus. No Exceptions will be allowed to this specification.**		
U.	**DISCHARGE THREADS**		

	1) All Discharges smaller than 4” in diameter shall be National Standard Threads.		
V.	**PUMP DRAIN VALVE** 1) A drain shall be provided to drain the entire pump by turning a single control.		
W.	**PUMP COOLER LINE** 1) There shall be a line installed from the discharge side of the pump used to cool the pump during long periods of pumping.		
X.	**INLET DRAIN VALVE** 1) There shall be a Class1 0.75" drain valve provided at all low points of the piping with a quarter-turn hand wheel/quarter turn valve, or open/shut lever.		
Y.	**PUMP PANELS** 1) All pump controls and gauges shall be located on the driver side/left side of the apparatus and shall be properly labeled. 2) All discharge outlets shall have color-coded identification tags, and the tags associated with each discharge shall have a unique color. The color-coding shall include the labeling of the outlet and the drain for each corresponding discharge.		
Z.	**MASTER GUAGES FOR PUMP VACUUM AND PRESSURE** 1) The pump vacuum and pressure master gauges shall be interlube-filled and manufactured by Class 1. The fluid fill shall include an anti-freeze agent that acts as a lubricant and a shock absorber. The accuracy of the gauges shall be compliant with the ANSI B40.1 Grade B standards. The temperature range for both gauges shall be from -40 degrees to +150 degrees (Fahrenheit) 2) The pump intake gauge shall have a pressure range of -30” Hg to 600 psi. The pump discharge gauge shall have a pressure range of -30” Hg to 600 psi. The pump pressure gauge and the vacuum gauge shall be installed adjacent to each other at the pump operator's control panel. Test port connections shall also be provided at the pump operator's panel, one connected to the intake side of the pump and the other connected to the discharge manifold of the pump. Each shall have 0.25" standard pipe thread connections and polished stainless-steel plugs.		

	Each gauge shall be clearly marked with a label.		
A1.	**PRECONNECTED HOSE BEDS W/ TRAYS** 1) There shall be two (2) 1.50" hose beds and one (1) 2.50" hose beds located forward of the pump panel. They will be capable of carrying 200' of 1.75" double jacket hose and 200' of 2.50" double jacket hose. 2) A removable tray shall be provided for each hose bed and one (1) additional tray for standby. The trays shall be constructed of a lightweight and sturdy material. Two (2) hand holes shall be provided in the floor of each tray, and additional hand holes shall be installed as needed for easy removal and installation of the trays in the compartments. The floors of the trays shall be perforated to allow for drainage and hose drying. - One (1) TFT Dual-Force w/ Grip 2.5" handline nozzle, 95-300gpm @ 100psi - Two (2) TFT Dual-Force w/ Grip 1.5" handline nozzles, 95-200gpm @ 75psi - One (1) TFT 3-Stacked Tips – 2.5" Female Inlet with shutoff and 1", 1 1/4", 1 ½" tips.		
B1.	**CROSSLAY COVER** 1) There shall be a Red vinyl covers installed over the crosslays.		
C1.	**MANUAL PUMP SHIFT** 1) The pump shall have a manual pump shift lever located on the driver side/left side of the pump panel. The lever shall be a push/pull type of lever. The lever shall have all steps in order to complete the manual shift located next to the lever.		
D1.	**PRESSURE GOVERNOR and ENGINE MONITORING DISPLAY** **1) Fire Research PumpBoss, or equivalent,** pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 6 3/4" high by 4 5/8". The control knob shall be 2" in diameter with no mechanical stops, have a serrated grip, and a red idle push button in the center. It shall not extend more than 1 3/4" from the front of the control module. Inputs for monitored information shall be from a J1939 databus or independent		

sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

2) The following continuous displays shall be provided:

a. Engine RPM; shown with four daylight bright LED digits more than 1/2" high.
b. Check engine and stop engine warning LEDs.
c. Engine oil pressure; shown on a dual color (green/red) LED bar graph display.
d. Engine coolant temperature; shown on a dual color (green/red) LED bar graph display.
e. Transmission Temperature: shown on a dual color (green/red) LED bar graph display.
f. Battery voltage; shown on a dual color (green/red) LED bar graph display.
g. Pressure and RPM operating mode LEDs
h. Pressure / RPM setting; shown on a dot matrix message display.
i. Throttle ready LED.

3) An electronic message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and nighttime operation.

4) The program shall store the accumulated operating hours for the pump and engine to be displayed with the push of a button. It shall monitor inputs and support audible and visual warning alarms for the following conditions:

a. High Battery Voltage
b. Low Battery Voltage (Engine Off)
c. Low Battery Voltage (Engine Running)
d. High Transmission Temperature
e. Low Engine Oil Pressure
f. High Engine Coolant Temperature
g. Out of Water (visual alarm only)
h. No Engine Response (visual alarm only).

5) The program features shall be accessed via push buttons located on the front of the control module. There shall be a USB port located at the rear of the control module to upload future firmware enhancements, if applicable.

6) The governor shall operate in two control modes, pressure, and RPM. No discharge pressure or

	engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor shall automatically regulate the discharge pressure at the level set by the operator. **7)** In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.		
E1.	**PUMP PRIMER** 1) An oil-free electric pump-priming system shall be furnished with the apparatus.		
F1.	**AIR OUTLETS** 1) There shall be one (1) 1/4" quick connect female air outlet. This outlet shall be used for filling tires or fire extinguishers. The air outlet shall be located on the driver/left side pump panel.		
G1.	**ENGINEER'S COMPARTMENT** 1) There shall be an Engineer's compartment installed adjacent to the pump operator's instrument panel.		
H1.	**AIR HORN BUTTON** 1) One (1) air-horn button shall be provided on the pump panel driver/left side.		
I1.	**DISCHARGE ELBOWS** 1) All discharges that are 2" or larger shall be equipped with a downward pointing elbow of 30 degrees or more.		
K1.	**2 ½" OUTLETS** 1. There shall be 2 ½" discharges on the apparatus in the following locations: a. Two (2) on the driver/right side pump panel. b. Two (2) on the officer/left side pump panel.		
L1.	**LARGE DIAMETER DISCHARGE** 1) There shall be one (1) large diameter discharge on the officer/right side of the apparatus. This discharge shall be piped with stainless steel		

	schedule 40 pipe with a minimum of 4" diameter piping from the pump body to the 5" Storz fitting.		
M1.	**WATER TANK** 1) The tank shall be constructed of polypropylene plastic, by United Plastic Fabricating (UPF), with a lifetime warranty and it shall have a water capacity of 500 gallons. There shall be a combination vent and manual fill tower. The tank shall be equipped with a minimum of a 4" overflow/vent pipe. There shall be one (1) tank drain valve under the tank sump. The valve shall have a locking lever to prevent accidental draining of the tank. The tank shall be positioned at the lowest gravity level possible of the apparatus and chassis.		
N1.	**ISO CERTIFICATION** 1) The water tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified in each of its locations. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.		
O1.	**CENTER OF GRAVITY** 1) A center of gravity calculation shall be determined for each water tank and provided as requested in order to provide the apparatus manufacturer with the necessary data to design and certify the apparatus with respect to the NFPA requirements regarding rollover stability. This information may be used by the apparatus manufacturer to assist in the calculation of the apparatus's ability to meet the tilt table static rollover threshold or calculated Center of Gravity requirements per NFPA. A center of gravity and weight calculation for both empty and full conditions shall be required with each tank.		
P1.	**TANK TO PUMP** 1) The water tank shall be connected to the intake side of the pump with 3.00" heavy-duty piping and a 3.00" valve. A rubber coupling shall be included in this line to prevent damage from vibration or chassis flexing. A check valve shall be installed in line to prevent the possibility of back filling the water tank. The line shall be designed to comply with the current NFPA requirements for flow. 2) This inlet line shall have an Akron Brass 8000 series, or equivalent, heavy-duty style valve with a stainless-steel ball, a simple two-seat design, and		

	no lubrication or regular maintenance required. The valve shall have a remote control, with the operating mechanism acting as the position indicator, located at the pump operator panel.		
Q1.	**MASTER LEVEL GUAGE FOR WATER TANK** 1) An electronic water level gauge shall be provided at the pump operator's panel, to indicate the water level using five (5) colored LED lights. This light display shall be a durable, ultra-bright, five (5) LED design that is viewable through 180 degrees, to indicate the following conditions: a. 100% (tank full) = green b. 75% = yellow c. 50% = yellow d. 25% = yellow e. Refill (tank empty) = red 2) Each light shall flash when the water tank level drops below the corresponding fill level, to provide indication for each 1/4 increment. To further alert the pump operator, the lights shall all flash sequentially when the water tank is empty. 3) The LED display shall be constructed of a solid plastic material with a chrome-plated die cast bezel, to reduce vibrations that can cause broken wires and can loosen electronic components. An encapsulated design shall provide complete protection from water and environmental elements. An industrial transducer shall be mounted on the outside of the tank. 4) The water level gauge shall be capable of field calibration and shall sense head pressure of the fluid in the tank, to provide accurate readings of the tank level.		

SECTION I - BODY

A.	**BODY - SLAM COMPARTMENT DOORS** 1) The exterior compartment doors shall be lap style, with double-panel construction. These doors shall be at least 1.50" thick. To provide additional door strength, C section reinforcement shall be installed between the inner and outer panels. 2) Each compartment shall be properly vented in a manner that will reduce the amount of dirt and		

	water that may enter the compartment. 3) All door lock mechanisms shall be fully enclosed within the door panels to prevent damage to the locks caused by equipment shifting. The latches shall be recessed. Polished stainless-steel non-locking D ring handles. 4) The doors shall provide a weather-resistant seal from the environment. A closed-cell rubber gasket around the door surface shall lap onto the body. A second, heavy-duty automotive rubber molding with a hollow core shall be installed on the door framing and shall seal onto the interior panel. 5) To prevent corrosion caused by dissimilar metals, the compartment door handles shall not be attached to the outer door panels with screws. A rubber gasket shall be provided between the D ring handle and the door. 6) At least one (1) compartment shall be vented appropriately for the storage of flammable and combustible fuels used by the equipment carried on the apparatus.		
B.	**RUB RAILS** 1) There shall be bolt on 7/8" x 3" or similar sized clear anodized aluminum extrusion rub rails around the base of the body spaced 1/2" from the body with Delrin spacers. The rub rails shall be mounted to the body with ¼/20 stainless steel counter sunk screws a minimum of 12" apart. The rub rail shall be a C-channel shape and feature 4 grooves in the extrusion. There shall be a polished aluminum fenderette attached to the fender liners.		
C.	**WALKWAYS** 1) All walkways shall be covered with 3003H14 bright aluminum treadplate (.125). It shall be supported to hold the weight of firefighters by using (.187) wall aluminum extrusions. The rear and side steps shall be bolted on for ease of service and replacement and spaced 1/2" from the body to allow for water runoff. These steps and walkways shall be bolted on using stainless steel bolts.		
D.	**HEAT DEFLECTOR SHIELD** 1) To keep the exhaust from adversely affecting anything stored in the body, a deflector shield shall		

	be provided to aid in dissipating the heat.		
E.	**TOOL BOARD** 1) There shall be two (2) full height pull out tool boards located in the front compartment on the officer/right side of the apparatus.		
F.	**ADJUSTABLE SHELVES** 1) There shall be two (2) adjustable shelves in compartments that are over 36" in height, all other compartments shall have one (1) adjustable shelf.		
G.	**ROLLOUT TRAYS** 1) There shall be two (2) roll out trays capable of storing a minimum of 500 pounds of weight and shall extend completely outside of the apparatus body. They shall be located inside the rear compartment on the driver/left and officer/right sides of the apparatus.		
H.	**SCBA AIR BOTTLE STORAGE** 1) There shall be storage for six (6) or more SCBA style air bottles located on the apparatus body. There shall also be storage for a seventh (7) and eighth (8) bottles located on each side of the apparatus body and marked as "air tool".		
I.	**WHEEL CHOCK COMPARTMENT** 1) There shall be storage for the recommended number wheel chocks. The builder shall supply the wheel chocks. It is preferred that the wheel chock(s) has their own separate compartments without losing any cab or apparatus body compartment space, secure hanging brackets will be allowed on the underbody, forward of the rear tires. 2) Wheel chocks "Zico" folding wheel chocks shall be installed by the manufacturer.		
J.	**MUD FLAPS** 1) The rear wheels shall have mud flaps installed on them.		
K.	**FUEL FILL** 1) There shall be two (2) fuel fills on the apparatus, one (1) on the driver/right side and one (1) on the officer/left side. Both shall be located behind the rear wheels.		
L.	**HARD SUCTION HOSE**		

	1) There shall be two (2) 10' lengths of 6.00" corrugated PVC hard suction hose. Storage for the hard suction shall be on or inside of the apparatus body.		
M.	**BACKBOARD STORAGE** 1) There shall be storage for two (2) backboards inside of the apparatus body.		
N.	**HOSE BED CAPACITY** 1) Hose bed shall have the capacity to hold a minimum of 500' of 5.0" LDH hose or larger. 2) The hose bed shall have the capacity to hold a minimum of 300' of 2.50" hose. 3) A vinyl hose bed cover shall be provided. 4) Should the hose "pay-out" at the rear of the apparatus through an opening, that opening shall have a door, not netting, that can be locked or secured. The exterior of the door shall be painted to match the rear of the apparatus.		
O.	**EXTENSION LADDERS** 1. The following ladders shall be provided: a. One (1) 10' folding attic ladder, Duo Safety b. One (1) 14' roof ladder with hooks on both ends, Duo Safety – on the side of the aerial device c. One (1) 20' combination ladder d. One (1) 16' roof ladder with hooks on both ends, Duo Safety e. One (1) 24' two-section extension ladder, Duo Safety f. One (1) 35' two-section extension ladder, Duo Safety, if possible. 2. The ladders shall be accessed from the rear of the apparatus and shall be staggered, as such, to allow for room between and for room for the below tools: a. One (1) 10' Steel NY Roof Hook with Pry Tip in the aerial walkway c. Two (2) 8' Steel NY Roof Hook with Pry-Tip d. Two (2) 10' Steel NY Roof Hook with Pry-Tip		
P.	**REAR INTAKE** 1) There shall be a 5" intake at the rear of the apparatus as low as possible. The intake shall be able to supply either the main fire pump or the aerial waterway. There shall be a control at the pump panel that shall select either pump or aerial water way.		

	2) There shall also be a gauge located near the rear intake which shall display incoming pressure to the rear intake.		
Q.	**LEVEL GUAGE** 1) There shall be a site gauge which shall indicate the level of the apparatus from side to side. The gauge shall indicate when the apparatus is level (using the color green), when the apparatus is caution area (using the color yellow) and not recommended (using the color red).		
R.	**OUTRIGGER CONTROLS** 1) Controls for deploying/retracting the outriggers shall be located at the rear of the apparatus. The operator shall be able to visualize each side of the apparatus and work the controls at the same time.		
S.	**REAR TOW-EYE** 1) There shall be one (1) rear tow eye installed directly below the rear of the chassis frame rails. They shall be crossed brace and attached as part of the frame.		
T.	**120-VOLT AC RECEPTACLES** 1. The following receptacles shall be provided: a. One (1) 120-volt AC, 15-amp, connections receptacle shall be provided. This receptacle shall be installed on the driver side/right side in the rear fender area. b. One (1) 120-volt AC, 15-amp, connections receptacle shall be provided. This receptacle shall be installed on the passenger side/left side in the rear fender area. c. One (1) 120-volt AC, 15-amp, straight blade receptacle shall be provided. This receptacle shall be powered by the shoreline. This receptacle is to be located in the passenger side/right side EMS cabinet. d. One (1) 120-volt AC, 15-amp, straight blade receptacle shall be provided. This receptacle shall be powered by the shoreline. This receptacle is to be located on the top of compartment located between the two (2) EMS cabinets. e. One (1) 120-volt AC, 15-amp, straight blade receptacle provided in the rescue tool compartment to accommodate the battery powered tool charger(s).		

U.	**REAR TRAFFIC DIRECTING LIGHTS** 1) There shall be one (1) traffic directing light module centered at the rear of the vehicle. This module shall be recessed with an aluminum tread plate cover. This module shall consist of a minimum of eight (8), LED, amber lights. 2) There shall be one (1) control head installed within reach of the driver in the cab. The control unit shall simulate the action of the light at the rear of the vehicle. The rear traffic directing lights shall be activated in the flashing mode by the emergency master switch.		
V.	**REAR WARNING LIGHT BAR** 1) There shall be two (2) mini light bars located on both sides of the rear of the apparatus. The driver side/left side shall have red LED lights and the officer/right side shall have yellow LED lights.		
W.	**CABINET ELECTRIC REEL** 1) There shall be two (2) Akron ERWC series electric rewind cord reels provided and mounted. A heavy-duty solenoid and rewind button shall be provided in the compartment where the reel is mounted. 2) There shall be 200 ft of 10/3 SO Black cable installed and will terminate with an Akron 4-outlet Lighted Junction Box. 3) A 4-Point Roller and a cable stop shall be provided. 4) One (1) electrical reel shall be located on each side of the apparatus.		
X.	**GENERATOR** 1) One (1) Smart Power Systems®, Model ER-6.2, fully enclosed 6,200-watt hydraulic generator shall be provided. The generator shall be capable of being mounted on top of the vehicle or in a body compartment as per customer or apparatus manufacturer requirements. The generator system shall be provided with a digital meter display in compliance with NFPA 1901 Chapter 22.4.6. The CCC (Command and Control Center) meter panel display shall be an interactive operator control center, equipped with Smart Touch® solid state buttons, with displays for voltage, frequency,		

	amperage, total running hours, service reminders, operator warnings, system faults and diagnostics. The generator's hydraulic motor, generator, fan (side venting), cooler, reservoir and all other necessary hydraulic and electric components shall be housed in a severe duty solid stainless steel housing case. The installation of the generator shall be designed for continuous operation without overheating and undue stress on components. The generator tray assembly shall be delivered with the cooler/fan assembly mounted such that hot air is exhausted horizontally.		
Y.	**GENERATOR DIGITAL METER DISPLAY GAUGE** 1. The Command Control Center (CCC) digital meter display shall be in compliance with NFPA 1901 Chapter 22.4.6. The CCC shall be an interactive operator control center, equipped with Smart Touch® solid state buttons, with super bright red LED displays for: • Voltage (VAC) • Frequency (Hz) • Dual Current Display (Amps) • System Hydraulic Pressure (PSI) • Running Time Display (Hours) • Service Reminders • Operator Warnings • System Faults • Prognostics & Diagnostics 2) The CCC shall be permanently mounted at an operator's panel, shall be located in a plane facing the operator, and shall be constructed in weatherproof integral enclosure/bezel.		
Z.	**GENERATOR MULTIPLEXING CAPABILITY (SAE J1939)** 1. The generator shall have the capability to interface with the apparatus multiplexing system, with all generator prognostic, diagnostic, control, and display features accessed from any of the multiplexing system display screen(s) on the vehicle. It shall constantly monitor the performance and condition of the generator and provide real-time data to the vehicle's multiplexing system. The J1939 messages must originate from the generator's integrated ECU (electronic control unit) to ensure the highest performance and		

	reliability.		
AA.	**GENERATOR PROGNOSTICS AND DIAGNOSTICS** 1. The generator system shall be equipped with diagnostic capabilities which are monitored by the operator through the CCC digital display meter panel and or the vehicle's multiplexing display screen. Some of the Diagnostics Features include: • Overheat Warning • System Service Reminders • Low Fluid Warning • No PTO Engagement Indication • Low DC Input Voltage Alert • Cooling Fan Problem Alerts • Over Current Warning 2. All diagnostic codes that are stored on the generator ECU shall be retrievable from either the CCC and/or the multiplex system display screen (if applicable). No external device shall be required to access the ECU.		
BB.	**GENERATOR CHASSIS TRANSMISSION DRIVE** 1. The hydraulic pump shall be driven by the chassis transmission mounted power take off (PTO).		
CC.	**GENERATOR OPERATION** 1. The output of the generator shall be controlled by an integral, patented, solid state Electronic Control Unit. The ECU shall be connected directly to the NFPA 1901 required digital instrumentation display. 2. The generator shall be operable in the stationary mode and/or when driving, utilizing the standard soft start system for engagement at any speed. 3. The generator shall be engaged by a lighted control switch or through the multiplex system in the cab.		
DD.	**STOP/TAIL/TURN LIGHTS** 1. There shall be two (2) Whelen LED 600 series, or equivalent, stop/tail/turn assemblies at the rear of the apparatus located on each side. 2. The rear of the apparatus shall be equipped with extended, flexible marker lights on the rear corners of the apparatus.		
EE.	**REAR SCENE LIGHT** 1. There shall be two (2) LED rear scene lights located on the upper driver/right and upper officer/left side		

	at the rear of the apparatus. They shall be placed so they do not impede the operation of the aerial device at any time.		
FF.	**MIDSHIP TURN SIGNAL** 1. There shall be one (1) LED midship auxiliary turn signal installed on the rub rail on each side of the apparatus.		

SECTION J – AERIAL

Item	Requirement	Comply (Y or N)	Exception (Y or N)
A.	**AERIAL DEVICE** The rear mounted elevating aerial turntable ladder shall be a three (3) section telescoping steel ladder assembly, with steel turntable and a tube torque box that shall be designed to emphasize safety, product reliability, and ease of operation. The criteria for design are: • All structural load supporting elements of the aerial ladder that are made of a ductile material, shall 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 American National Standards Institute (ANSI) and the current National Fire Protection Association (NFPA) 1901 standard. • The aerial device shall 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 and level surface. • The aerial device shall be capable of sustaining a static load one and one-third times it's rated tip load capacity (live load) in every position in which the aerial devices can be placed when the vehicle is on a slope of five degrees downward in the direction most likely to cause overturning. • The hydraulic system shall be designed so that if a failure of any component or assembly within the system occurs, a single point failure of the entire system will not occur. • The aerial shall be capable of operating with a rated tip		

	load of either of the two of the following conditions: o Conditions of high wind of up to 50+ mph. o Conditions of icing, up to a coating thickness of .25 inch over the entire aerial structure. All of the design criteria must be supported by the following test data: • Strain gauge testing of the complete aerial device certified by a Registered Professional Engineer. • Analysis of deflection data taken while the aerial device was under test load. • Hydraulic component operating and burst strength testing. All structural materials used in the aerial shall be certified by the mill of the manufactured material. Materials that are not certified shall not be acceptable. The aerial ladder height shall be a minimum of 75.00 feet as measured by NFPA-1901 requirements, *which requires the rated vertical height of an aerial ladder shall be measured in a vertical plane with the ladder at maximum elevation and extension from the outermost rung of the outermost fly section to the ground.* The horizontal reach of the unit shall be a minimum of 72.00 feet as measured by NFPA-1901 requirements, which states, *The rated horizontal reach of an aerial ladder shall be measured in a horizontal plane from the centerline of the turntable rotation to the outermost rung on the outermost fly section with the aerial ladder extended to its maximum horizontal reach.* The hydraulic system shall provide power to the entire aerial device as efficiently as possible without the use of a hydraulic cooler. Master ladder power shall be provided through the chassis aerial PTO control for engagement of all the ladder hydraulic functions and 12-volt power. The emergency pump circuit shall be controlled separately. A load sensing axial piston hydraulic pump shall be provided. The pump shall be capable of operating under any rated ladder tip load condition and aerial device position at normal engine idle or governor controlled fast idle. The hydraulic pump shall		

	be capable of generating sufficient flows to allow multiple aerial functions without significant loss of speed. A hydraulic system relief valve as well as individual circuit relief valves shall be provided to prevent damage to any function or circuit. The relief valve shall have a relief spring to ensure proper function and product reliability. A hydraulic oil reservoir shall be provided to supply the needs of the hydraulic system. The tank shall be constructed from steel, which shall be welded at all interior and exterior seams. A 1.50 inches diameter gated suction line shall be provided between the oil reservoir and the primary hydraulic pump. The tank fill shall be provided with a strainer screen, vent cap, and magnetic drain plug. There shall be a sight level gauge for checking fluid levels. The tank shall be cleaned and free from all contaminants before adding any fluid. Outgoing and return line filtration shall be provided. The pressure and return filters shall be easily accessible for maintenance. Outgoing filtration shall be in the form of a pressure line filter installed between the hydraulic pump and entrance to any system components. The filter shall have an absolute rating of ten (10) microns. The pressure filter shall have a bypass circuit protected by a check valve, which shall be installed around the pressure filter. The pressure line filter shall be required even if a suction line filter is provided in the reservoir due to the suction line filter's inability to trap contaminates entering the system. A filter condition indicator shall be provided. The return line flow shall be filtered by means of a return line filter. This filter shall have an absolute rating of ten (10) microns. All hydraulic steel tubing, hydraulic rubber covered wire-braided hoses, and hydraulic fittings/adapters shall have a minimum burst pressure rating of four times the operating pressure. Hoses and tubing shall be properly sized to minimize heat buildup during extended periods of operation. Hoses and tubing shall be properly sized to minimize flow restrictions. All hydraulic hose shall have a tube and cover constructed of Nitrile elastomers and shall have braided/spiral wire reinforcement capable of maintaining a 4:1 safety factor in all		

	areas of the hydraulic system. The hose shall meet the appropriate SAE performance specifications: 100R2 or 100R12. The hydraulic fittings shall utilize o-ring face seal technology to minimize fluid leakage and improve serviceability. The aerial hydraulic system shall include an interlock feature that will prevent the accidental operation of the outriggers during aerial operation. This interlock shall also prevent accidental operation of the aerial device prior to the outriggers being properly deployed. In the event of electrical failure, the operator shall be able to override the hydraulic system to operate the ladder or outriggers for continuous, uninterrupted operation. The lift, extension, and rotation systems shall be controlled by a proportional, load sensing directional control valve. This valve shall be of a modular construction that simplifies troubleshooting, minimizes downtime, and simplifies field service. The main control valve shall be positioned at the turntable control console for direct manual control of each aerial function. A torsion box sub-frame shall be installed over the chassis frame rails. The torque box assembly shall be capable of withstanding torsion and bending loads. The torque box shall be bolted to the chassis frame with SAE grade 8 bolts. The torque box shall be constructed of a minimum of 0.35 inches thick steel bottom plate and a stiffened diaphragm top plate. The torque box shall be designed to enclose the ground ladders. Hydraulic power to the turntable hydraulic circuits shall be provided through a three port, high pressure, hydraulic swivel that permits 360-degrees of continuous turntable rotation. A collector ring assembly shall provide electrical power to the turntable electric circuits. The collector rings shall be used for electrical ground, ladder control functions, and a 110-volt A. C. system during 360-degrees of continuous turntable rotation. The collector ring assembly shall have sufficient rings to provide power, ground, control functions and four spare circuits. Water shall be transferred to the aerial waterway by means of a 5.00 inches diameter water swivel enabling 360-degree continuous rotation of the turntable. A heavy-duty rest shall be provided to support the aerial in the		

	travel position. Stainless steel bedding plates shall be attached to the aerial base section to protect the aerial when the unit is in the travel position. Two (2) double acting lift cylinders shall be attached between the turntable and the base section creating an effective lifting geometry resulting in lower hydraulic operating pressures and improved load distribution on the base ladder section. The lift cylinder shall be attached to the ladder with a high capacity bearing and pin and the rod shall attach to the turntable utilizing self-aligning swivel bearings which prevent side loading on the lift cylinders resulting in longer cylinder seal life. They shall provide smooth precise elevation from 5 degrees below horizontal to 75-degrees above horizontal. The lift cylinders shall have an internal bore diameter of 5.00 inches and a rod diameter of 3.00 inches. The lift cylinders shall be equipped with integral (on the cylinder) holding valves, which prevent the ladder from lowering should a hydraulic line rupture at any point within the hydraulic system. They shall also have a manifold line with velocity fuses between the cylinders to prevent uneven cylinder lift and they shall have both rod and piston hydraulic cushions. A limit switch at the aerial travel support shall be provided to prevent operation of the outriggers once the aerial device has been elevated from the nested position. A dual system of hydraulic cylinders and cables shall provide full power operation of the extension and retraction modes. Each system shall be capable of supporting the ladder in the event of failure of one of the systems. The cylinders shall be used to extend and retract the inner midsection and a cable system shall be used to extend the outer mid and the fly section. The cable system shall utilize two (2) extension cables on the mid and (2) extension cables on the fly. The cables shall have a safety factor based on breaking strength of 8:1. In order to increase cable life, the ratio of sheave diameter to cable diameter shall be a minimum of 16 to 1. A stroke multiplier cable system shall be provided as it reduces cylinder weight, shifts the ladder center of gravity toward the heel pin during extension, improves overall vehicle stability and does not subject the cylinder to buckling forces caused by normal ladder loads. The base section handrails shall be provided with red Scotch-Lite reflective striping and numbers to indicate the extension of the aerial device. The stripes and numbers shall be spaced to		

	indicate each 10.00 feet of aerial extension beyond the fully retracted position. An additional stripe shall be provided between the numbered stripes to indicate each 5.00 feet of aerial extension. Two (2) slide pads shall be provided on each ladder section for load transfer between sections. The pads shall utilize low coefficient of friction materials to reduce the resistance between the pads and ladder sections. Ladder cable and routing of electrical lines, air hose lines or hydraulic lines to the ladder tip shall be enclosed and protected from the turntable to the ladder tip. The lines shall be routed and horizontally guided between the ladder section side rails to minimize obstruction to climbing areas. An external tooth bearing shall be provided for smooth 360-degree continuous rotation and sufficient strength. The inner and outer race of the bearing shall be bolted to the open base and turntable support plates using grade 8 bolts. All bearing bolts shall be accessible from the upper side of the turntable for ease of access to inspect and torque the bolts. Both upper and lower bearing surfaces shall be milled to ensure a true mounting surface for the rotation bearing. A single hydraulic driven planetary swing drive system shall provide smooth and precise rotation. A spring applied, hydraulically released, disc type brake shall be provided on the swing drive gearbox to provide positive braking of the turntable assembly against reactionary forces such as water and gravity. The planetary drive shall be mounted using an eccentric ring to provide minimal gear backlash in the drive system. The planetary drive shall be positioned on the turntable so it shall not obstruct any walking area or stepping surface on the turntable deck. The Rotation Safety System shall be designed to prevent the operator who has primary operational responsibility from rotating the aerial device into an overturning mode. This system senses outrigger and outrigger jack positioning in conjunction with the aerial device movement. If any outrigger beam is not fully extended, the "Outrigger Short Set" indicator light on the control console shall remain illuminated. The aerial device operator shall then be required to engage the "Outrigger Short Set Override" switch in order to lift the aerial device from the travel rest. If the aerial device operator attempts to rotate the aerial device (in excess of approximately 5-degrees beyond vehicle center)		

towards the side of the vehicle in which the outriggers are not fully deployed, the Rotation Safety System shall sense this fault and prevent the aerial from rotating further in said direction. At this point only rotation to the fully deployed outrigger side shall be allowed.

The elevating ladder shall consist of three (3) steel ladder sections referred to as the base section, midsections, and fly section.

The design and construction criteria for these ladder sections shall be:

- Each section shall be fabricated using high strength steel, welded together to form a structural unit.
- Welding shall be done by welders that have been certified in accordance with the American Welding Society Standard specifications.
- Each ladder section shall be constructed on an infinitely rotating assembly fixture to ensure uniformity and interchangeability.
- K-bracing at each rung shall be utilized to minimize side deflection of the ladder.
- All rungs shall be 1.25 inches in diameter, spaced at 14.00 inches center to center and be covered with deeply serrated, replaceable rubber sheaths held in place with contact cement and metal clips for ease of replacement.
- All rungs, K-braces, and diagonals shall be positioned so that they are continuously welded to the ladder section in the number one welding position.

Each rung shall be equipped with a heavy duty serrated, replaceable rubber sheath to provide an anti-slip surface for fire-fighting personnel. For additional safety, the covers shall be constructed from rubber to allow ice buildup to easily break off when the rung is stepped on by fire-fighting personnel. This shall be an added safety feature during water tower operation in cold weather conditions.

The aerial unit shall be capable of leveling on a slope of 8 degrees. Operation beyond this limit shall be at the operator's discretion.

The following ladder tip load capacities shall be established with the truck level, the outriggers fully extended, and lowered to

relieve the chassis weight from the axles. Capacities are based upon full extension and 360-degree rotation.

The ladder with water system shall be designed to permit the following flows:

- 1000 GPM at 90 degrees to ladder centerline either side.
- 1000 GPM parallel to ladder centerline and as far below horizontal as nozzle design allows.
- 1000 GPM above the ladder centerline as far as the deck gun design allows.

The fly ladder tip shall be equipped with a bolt-on tip section. The bolt-on section shall be easily replaced if damaged during fire-fighting operations.

For ease of service, the first rung of each section shall be integrated with the rear ladder side guides and vertical load transfer mechanism. The assembly shall be removable from the rear of the section by removing four bolts to allow for easy service access to slide pads and rollers.

A toolbox shall be shipped loose with the following special tools for checking the torque of specified bolts as recommended by the aerial manufacturer:

- Torque wrench
- 4:1 multiplier
- Extensions, adapters and sockets as required.

Warning decals shall be provided in appropriate locations to alert the operator of potential hazards and operating instructions. All warning labels shall be in general compliance with A.N.S.I. Z534.1 recommendation.

The aerial unit shall be tested and certified for the apparatus manufacturer by Underwriters Laboratories Inc. (UL) Underwriters Laboratories Inc. (UL) is recognized worldwide as a leading third-party product safety certification organization for over 100 years. UL has served on the National Fire Protection Association (NFPA) technical committees for over thirty years. All listed tests shall be witnessed and certified by UL to ensure the device meets all current requirements of NFPA-1901. The testing company shall not be affiliated with the manufacture or repair of the apparatus.

	Independent testing to be performed shall include all work outlined in NFPA 1911, current Edition, including nondestructive testing and shall be conducted at the manufacturer's facility. In addition, the following test work, Certification Test sections of NFPA 1901, 2009 Edition shall be conducted: • 1-1/2 Times Rated Capacity on Level Ground Stability Test: A load of 1-1/2 times rated capacity (as specified by the manufacturer) shall be suspended from the tip of the aerial ladder, or the platform of the elevating platform, when it is in the position of least stability. If the manufacturer specifies a rated capacity while flowing water, then one times the water load and the worst-case nozzle reaction shall be added to the stability test weights. The apparatus shall show no signs of instability. For a water tower, the stability test includes 1-1/2 times the weight of the water in the system and 1-1/2 times the maximum nozzle reaction force when it is in the position of least stability. • 1-1/3 Times Rated Capacity on a 5-degree Slope Stability Test. A load of 1-1/3 times rated capacity shall be suspended from the tip of the aerial ladder, the platform of the elevating platform, or the tip of the water tower when it is in the position of least stability. The apparatus shall show no signs of instability. • A friction loss test shall be conducted for an aerial device equipped with a permanent water system and has a rated vertical height of 110 ft. or less. A flow test shall be conducted to determine that the friction loss in the water system between the base of the swivel and the monitor outlet does not exceed 100 psi with 1000 GPM flowing and the water system at full extension. • A maximum vertical height flow test shall be conducted to determine that the water system is capable of flowing 1000 GPM at 100 psi nozzle pressure with the aerial device at full elevation and extension. If the apparatus is equipped with a fire pump designed to supply the water system, the test shall be conducted using the onboard fire pump. The intake pressure to the fire pump shall not exceed 20 psi. A complete written examination and test report for each aerial device inspection performed at the manufacturer's facility shall be provided. The test report, as required by NFPA 1914, shall include the following test results:		

- Torque verification of all mounting bolts including bolt size, grade, and torque specification.

- The following NDT methods and results shall be recorded. All ferrous welds shall be magnetic particle inspected for defects. All nonferrous welds shall be visually inspected, and if questionable defects are identified, a penetrating dye shall be used to further evaluate the quality of the weld. All bolts and pins shall be ultrasonically inspected for internal flaws. A waterway pressure test shall be performed, and a hydraulic oil sample taken.

- The following measurements shall be taken and recorded in the examination and test record: bearing clearance and backlash, elevation cylinder drift, engine speed operating rpm, relief pressure, stabilizer extension cylinder drift, ladder section twist, hardness readings, base rail thickness, winch drift, extension brake drift, and extension cylinder drift.

Ongoing structural and physical property testing during construction shall also be done.

The following tests shall be conducted:

- Magnetic particle inspection shall be conducted on all ferrous welds to assure the integrity of the weldments and detect any flaws or weaknesses. These tests shall be performed prior to painting or assembly.

- Ultrasonic inspection shall be used to detect any flaws in pins, bolts and other critical mounting components. The bolts shall be tested after they have been torqued to ensure the bolt was not damaged.

- All extension/retraction cables shall be tested and certified by the cable vendor.

- All extension/retraction shall be tested and certified by the cable vendor.

- Functional tests, load tests, stability tests and visual structural examination shall be performed. These tests will determine any unusual deflection, vibration, or instability characteristic of the unit.

- Hydraulic oil shall be sample tested prior to delivery.

	• A waterway system pressure test shall be performed. Upon completion of the preceding inspections, the independent testing company shall issue a Certificate of Inspection indicating that all specified standards have been satisfied. The Type I certification shall be provided by Underwriters Laboratories Inc. (UL). The following test shall be conducted on the aerial device prior to delivery. The manufacturer of the aerial device shall provide a written statement signed by a Registered Professional Engineer certifying the aerial's ability to perform the following tests: • 1-1/2:1 DYNAMIC STABILITY AND LIFT TEST - A test of the apparatus shall be performed that the ladder sections are so designed and powered to support a load representing 150% of the manufacturer's rated tip load capacity at maximum horizontal reach on level ground. Since this is a dynamic test, the load must be raised, lowered and rotated without evidence of instability. Specifically, 750 pounds at the ladder tip with the ladder fully extended at zero degrees shall be rotated 360 degrees. • 1-1/3:1 DYNAMIC STABILITY AND LIFT TEST - A test of the apparatus shall be performed that the tip and ladder sections are so designed and powered to support a load representing 133% of the manufacturer's rated tip load capacity at maximum horizontal reach on a five (5) degree slope. Since this is a dynamic test, the load must be raised, lowered, and rotated without evidence of instability. Specifically, 666 pounds at the ladder tip with the ladder fully extended at zero degrees shall be rotated 360 degrees. • TIME TEST - A test of the apparatus shall be performed to raise the ladder from a bedded position extended to full height and rotated through a 90 degree turn smoothly and without undue vibration in not over 120 seconds. The inspectors performing the test work on the units are certified to Level II in the required NDT methods, under the requirements outlined in ASNT document CP-189. The aerial apparatus shall be certified when the unit successfully meets all the requirements outlined in NFPA 1901, (latest edition). UL shall issue a Certificate of Automotive Fire Apparatus Examination and Test stating the unit’s compliance with NFPA 1911. The manufacturer of the aerial device shall maintain a network		

	of service centers with factory-trained personnel to keep this vital piece of firefighting apparatus in service with a minimum of downtime.		
B.	**AERIAL DEVICE WATER SYSTEM** 1. The aerial waterway system shall be capable of being supplied by both the pump and an external water source with the inlet on the rear of the apparatus. 2. All piping from the pump or the inlet at the rear of the apparatus to the turntable swivel shall be 4.00 inches Schedule 40 aluminum 6061T pipe. Piping at the rear of the apparatus shall terminate with a victaulic groove. All aerial waterway piping shall be completely removable for service or replacement.		
C.	**AERIAL DEVICE WATERWAY FLOW METER** 1. The apparatus shall be equipped with a Fire Research Insight, or equivalent, digital flow meter. The flow meter case shall be waterproof and shall be manufactured of anodized machined aluminum. It shall have an LED display with super bright digits more than .50 inches high located at the turntable control console.		
D.	**AERIAL ELECTRIC MONITOR** 2. Task Force Tips Monsoon electrically controlled monitor shall be provided. 3. The monitor shall have 135 degrees of vertical travel flow with capability of 2000 GPM, maximum operating pressure of 200 PSI. 4. For resistance to corrosion the monitor shall be constructed from hard-coat anodized aluminum with a silver powder coat interior and exterior finish. A threaded port for an optional pressure gauge shall be provided. 5. The aerial ladder waterway monitor shall be capable of being positioned at either the fly section for water tower operation or at the next lower ladder section for rescue. 6. The monitor position shall be controlled by a stainless-steel spring loaded, lift to release mechanical lever located on the monitor carriage. The system shall lock the monitor to the midsection for rescue, or to the fly section for water tower operation. Lights at the control console shall indicate the operating position of the monitor. An alarm shall sound at the fly tip and control console when the lever is not in a latched position. To maintain alignment consistency, there shall be no pins on		

	the ladder to position the monitor. 7. The monitor shall be remotely operable from either position and shall transfer the electrical power and controls automatically. The power transfer shall be achieved by a cable carrier system. 8. The monitor shall auto stow when the ladder is centered in the cradle and at 10 degrees or less elevation angle.		
E.	**AERIAL ELECTRIC NOZZLE** 1. Task Force Tips Master Stream 1500 ER w/ plug 2.5" automatic nozzle, or equivalent, with electrically operated pattern control shall be provided. The nozzle design shall allow for straight stream through dense wide fog patterns. 2. The electric drive unit shall be enclosed in a waterproof cast aluminum housing and include a manual override device in the event the power source fails. The unit shall be 12 volts and require no more than a 3-amp power draw. 3. For corrosion resistance and durability, the nozzle and actuator shall be constructed from hardcoat anodized aluminum alloy, include a protective rubber bumper with fog teeth, laser engraved serial number, and reflective labeling. 4. The nozzle shall have a swivel rocker lug coupling and a flow range of 150-1250 GPM at 100 PSI.		
F.	**REAR AERIAL DEVICE OUTRIGGERS** 1. Two (2) outriggers to provide vehicle stability during aerial operation. 2. The outrigger beams shall be raised and lowered by the outrigger jack cylinder. The jack cylinders shall be equipped with integral (on the cylinder) holding valves, which shall hold the jack cylinder in either the stowed position or the deployed position should a hydraulic line be severed at any point within the hydraulic system. Each jack cylinder shall also have a thermal relief system that shall prevent the cylinder fluid pressure from rising due to fluid temperature increase. 3. Due to the redundancy of this system design, jack pins are not needed. This shall eliminate the possibility of damage to the housing should the outriggers be retracted with the jack pins left in. It shall also provide faster setup		

	time for the aerial on the fire ground. 4. For ease of maintenance, the outer jack tube shall be designed so that the cylinder can be removed from the top. 5. A permanently attached self-centering steel outrigger pad shall be provided on each outrigger. The pad shall swivel and require no adjustment during outrigger set-up. 6. The outrigger pad shall be attached without the use of a bearing type swivel to reduce maintenance. 7. A directional control valve designed for parallel hydraulic circuit operations shall control the outrigger cylinder system. This valve shall be modular in design so that individual sections can be replaced in the field, rather than complete valve assemblies, thus reducing maintenance costs. Each valve shall be equipped with a heavy-duty electric solenoid for electric control of the outrigger from the remote operator's station. 8. Each outrigger control function shall be operated independently, so that the vehicle may be set up in restricted areas or on uneven terrain. 9. Each outrigger control station shall incorporate the following: a) -Outrigger joystick controls b) -Outrigger deployed indicator lights c) -Fast idle switch d) -Emergency pump control switch e) -Warning decals 10. A gauge shall be provided at the rear of the apparatus to monitor hydraulic system line pressure. 11. An interlock system shall be provided between the outriggers and aerial device that prevents the operation of the aerial until the operator places all jacks in the load-supporting configuration. All jacks shall be equipped with a ground force sensitive switch that closes only when the jack is firmly in contact with the ground. 12. Until all the switches close, electrical, and hydraulic power shall not be transmitted to the turntable, hence preventing aerial operation. Green indicator lights shall be provided on the outrigger control panel to indicate that the outrigger foot is in firm contact with the ground and		

	in a load supporting position. 13. An outrigger deployment-warning device shall be provided to warn personnel in the vicinity of the apparatus that the outriggers are in motion. Whenever an outrigger control handle is utilized, the device shall produce a pulsing tone. When the outrigger control handle is released to its neutral position, the signal shall cease. 14. Outriggers shall have a minimum of 4" chevron red-yellow decal stripping installed to provide visibility when deployed.		
G.	**AERIAL DEVICE AUXILIARY OUTRIGGER PADS** 1. An auxiliary pad for additional load distribution on soft surfaces shall be supplied for each stabilizer. The pads shall be constructed of ultra-high molecular weight composite material that is a minimum of 1" thick with a minimum surface area of 576 square inches. Each auxiliary pad shall be constructed with an attached rope handle for deployment.		
H.	**AERIAL DEVICE OUTRIGGER GROUND LIGHTS** 1. One LED light mounted on each outrigger location shall illuminate the footpad area. The outrigger ground lights shall be activated by the aerial power switch.		
I.	**AERIAL DEVICE OUTRIGGER WARNING LIGHTS** 1. One double faced 4.00-inch minimum diameter; red flashing LED light shall be mounted on the vertical jack tower of each outrigger. The outrigger ground lights shall be activated by the aerial power switch.		
J.	**AERIAL DEVICE OUTRIGGER ARM WARNING LIGHTS** 1. Eight LED red flashing lights shall be mounted on the stabilizer beams. Each stabilizer beam shall include two (2) lights, one (1) facing forward and one (1) facing rearward. The lights shall be mounted inboard of vertical jack tubes. The warning lights shall be activated by the aerial master switch.		
K.	**AERIAL DEVICE EMERGENCY HYDRAULIC PUMP** 1. In the event of failure of the main hydraulic pump or vehicle engine, the unit shall be equipped with an emergency hydraulic pump. 2. The pump shall be plumbed into the hydraulic system and be electrically driven from the chassis batteries. The		

	emergency pump shall be capable of limited functions of the ladder and outriggers to stow the unit. The pump shall be controlled from the right and left outrigger, and the turntable control stations with spring loaded momentary contact switches. 3. The emergency pump shall have a separate hydraulic oil supply line, attached directly to the hydraulic oil reservoir. A shutoff valve shall be provided, and a check valve shall be incorporated on the pressure side of the pump.		
L.	**AERIAL DEVICE TURNTABLE** 1. A full-size turntable deck shall be provided to maximize the safe work area around the control console and to allow unimpeded access to and from the aerial ladder and the ground. 2. The front and rear walking areas of the turntable shall be free of any air bottle or drive motor mounting mountings. 3. The turntable shall be a fabricated steel weldment designed for the rotation and elevation of the ladder sections and platform. It shall consist of the following: a. A steel bearing plate and matching top plate shall be machined to ensure proper fit to the rotation bearing. b. An NFPA compliant, non-skid walking surface shall be provided. c. An aluminum diamond plate access step shall be mounted at the heel of the ladder. 4. All handrails shall be fabricated from 1.25 inches outer diameter, non-slip tubing and shall be a minimum of 42.00 inches high. Handrails shall be capable of withstanding a 225-pound force applied from any direction.		
M.	**TURNTABLE DECK ACCESS** 1. Each of the two (2) turntable handrail openings shall be equipped with safety chains at the rear of the turntable.		
N.	**TURN TABLE CONTROL STATION** 1. There shall be a control station at the turntable. All elevation, extension and rotation operational controls shall operate from this position. These controls shall be arranged to permit the operator to regulate the speed of these operations within the safe limits as determined by the manufacturer. Load instruction plates shall be located at the control station to show the recommended safe load of the ladder. The control devices shall be clearly marked and suitably lighted.		

	2. The control station shall be located on the left side of the turntable, as the operator is facing the tip of the ladder (Driver's side of the apparatus), in order to provide increased visibility of the ladder tip while operating the controls. The lower part of the console shall be angled away from the operator, to provide as much foot room as possible for the operator. 3. An access panel door shall be provided on the front of the console and an access door at the rear of the console to provide complete service to the electrical and hydraulic components mounted inside the console. 4. The aerial controls shall be hydraulic only, no electric over hydraulic system(s) shall be allowed.		
O.	**TURNTABLE WORK LIGHTS** 1. Five (5), LED turntable work lights shall be installed in the turntable step cover to illuminate the turntable area.		
P.	**AERIAL LADDER FLY TIP STEPS** 1. Two (2) folding steps shall be conveniently located at the end portion of the fly section. These shall be used for one person to place their feet so that they are positioned parallel to the ladder. The steps shall fold into proper position for usage and fold toward the sides of the ladder when not in use to provide adequate clearance when the ladder is being climbed.		
Q.	**AERIAL LADDER CREEPER CONTROLS** 1. A remote ladder creeper control shall be provided at the tip of the fly section. The control shall consist of three (3) spring loaded, triple pole double throw, return to center switches, one for each main ladder function. Each function switch shall be labeled on a black and white label that is located adjacent to the switches. Each switch shall be encircled by a rubber boot to protect the switch box from collecting moisture. The creeper control shall allow the crew member on the tip of the ladder to operate these three functions within the speed limitations as set forth in accordance with NFPA 1901, current edition. 2. A momentary switch shall be provided at the lower turntable control console to activate the creeper control system. When the button is held in the "on" position, power shall be available to the tip allowing adjustments to the aerial with the creeper controls. When the button is not depressed, the creeper system will be de-energized.		
R.	**AERIAL DEVICE SPOTLIGHT** 1. A 12V Hi-Viz LED spotlight shall be mounted at the tip		

	ladder section. The light shall be capable of swiveling 180 degrees. The lights shall include an on/off switch on the light. 2. The light shall be mounted below handrail height, so as not to increase the overall height of the vehicle.		
S.	**AERIAL DEVICE TRACKING SPOTLIGHT** 1. Two (2) 12V Hi-Viz LED spotlights shall be mounted at the rear of the base ladder section on the handrail. The spot/floodlight shall be capable of swiveling a 180-degree arc to direct light up the inside or outside of the ladder walkway. A "Spot/Off/Flood" switch shall be on each light. The lights shall be mounted below handrail height, so as not to increase the overall height of the vehicle.		
T.	**AERIAL DEVICE ELECTRICAL OUTLET** 1. One (1) 120-volt weatherproof outlet, NEMA L5-15R, twist lock type and an environmental cover shall be furnished at the fly tip section.		
U.	**AERIAL DEVICE UNDER LADDER LIGHT** 1. There shall be an 12V Hi-Viz LED light bar installed on the under brace of the ladder directly forward of the turntable. The light shall be powered by the on-board power system and activated by the aerial ladder lights. This LED bar shall be high visibility white LED's.		
U.	**AERIAL DEVICE TIP SCENE LIGHT** 1. Two (2) Unity 12VDC LED spotlights model P46SLC series flood lights, or equivalent, with pedestal mounts shall be installed at the tip of the ladder, one on each side. The lights shall be wired to the aerial 120-volt circuit and shall be equipped with a separate switch.		
V.	**AERIAL LADDER RUNG ILLUMINATION** 1. The climbing area of the ladder shall be illuminated utilizing LED lights.		
W.	**APPARATUS LEVEL INDICATOR** 1. Two (2) bubble type level indicators shall be shipped loose for installation on the body to assist in the aerial device setup. The leveling indicators shall be backlit, and color coded indicating the following conditions: **a. "Green" Safe Operating Zone** b. **"Yellow" Caution Operating Zone** c. **"Red" Do Not Operate Zone – Reposition Apparatus**		
X.	**AERIAL COMMUNICATION SYSTEM**		

	1. A communication system shall be furnished between the ladder tip/platform and the turntable operator's position. The communication speaker at the ladder tip shall require no operator attention to transmit or receive. The transmitting receiving volume controls shall be located on the base section adjacent to the turntable operator's position.		
Y.	**AERIAL DEVICE RESCUE ROPE** 1. Two (2) tip anchors shall be provided at the end of the fly section with a total capacity of 500+ lbs.		
Z.	1.		
AA.	**LADDER BASE SECTION STOKES BASKET MOUNT** 1. There shall be a mount installed on the outside of the base section of the ladder for a standard vendor supplied Stokes basket. The mounting location shall be on the opposite side of the aerial ladder as the control console for increased visibility for the aerial ladder operator. 2. The Stokes basket shall be easily accessible from the ladder or body.		
BB.	**AERIAL DEVICE PAINT** 1. The aerial device paint color shall be LIGHT GREY. 2. Prior to any painting, all weldments such as the outrigger beams, torque box, turntable, and aerial ladder sections shall be shot blasted, cleaned and inspected to insure the removal of any surface imperfections and to insure superior paint adhesion to the metal. 3. The entire painting system shall utilize a single manufacturer's paint for compatibility between primers and finished coats. All painting shall be done in atmosphere-controlled spray booths. The weldments will then be primed with a Ditzler PPG zinc corrosive inhibitor, or equivalent, and a Ditzler (PPG) Epoxy Primer, or equivalent. All seams between adjoining pieces that are not continuously welded shall be caulked to inhibit corrosion. 4. Before assembly, in preparation for final painting, the aerial unit shall be thoroughly cleaned, conforming to good painting practices.		
CC.	**AERIAL DEVICE LIFT CYLINDER PAINT** 1. The aerial lift cylinder paint color shall be RED, the same as the primary upper cab.		
DD.	**AERIAL DEVICE TRAVEL REST PAINT**		

	1. The aerial travel rest paint color shall be PPG FBCH 9000 black or similar.		
EE.	**AERIAL OUTRIGGER PAINT** 1. The aerial outrigger paint color shall be PPG FBCH 9000 black or similar.		
FF.	**TORQUE BOX/TURNTABLE/CONTROL STATION PAINT** 1. The torque box, turntable structure, and turntable control station paint color shall be RED, the same as the primary upper cab.		
GG.	**AERIAL EXTENSION/RETRACTION CYLINDER PAINT** 1. The aerial extension/retraction cylinder paint color shall be RED, the same as the primary upper cab.		
HH.	**AERIAL DEVICE TIP PAINT** 1. The tip of the aerial ladder shall be a fluorescent orange, or similar, highly visible color.		
II.	**AERIAL DEVICE OPERATION MANUALS** 1. The aerial manufacturer shall provide the following manuals pertaining to the aerial device: a. Two (2): Operators' manuals in digital format. b. Two (2): Parts manuals in a digital format.		
JJ.	**AERIAL DEVICE AS BUILT WIRING DIAGRAM** 1. The aerial manufacturer shall provide two (2) complete sets of electrical wiring diagrams in digital format.		
KK.	**AERIAL DEVICE AS BUILT HYDRAULIC PLUMBING DIAGRAM** 1. The aerial manufacturer shall provide two (2) complete sets of hydraulic plumbing diagrams in digital format.		
LL.	**AERIAL DEVICE WARRANTY** 1. The aerial device manufacturer shall guarantee to the original purchaser to repair or replace any defective structural component resulting from faulty material or workmanship for a period of twenty (20) years. The warranty period shall commence on the date the aerial device is delivered to the first end user. The warranty shall cover the aerial ladder weldments, open base, torque box and outrigger weldments. 2. The manufacturer of the aerial device shall guarantee the purchaser to repair or replace any defective or prematurely failed parts, resulting from faulty material or workmanship, for a period of two (2) years. The warranty period shall commence on the date the aerial		

	device is delivered to the first end user. 3. The manufacturer of the aerial device shall guarantee to the purchaser to repair or replace any defective or prematurely failed hydraulic cylinder parts, resulting from faulty material or workmanship, for a period of two (2) years. The warranty period shall commence on the date the aerial device is delivered to the first end user. **4.** The manufacturer of the aerial device shall guarantee to the purchaser to repair or replace any defective or prematurely failed hydraulic cylinder parts, resulting from structural defects or failures, for a period of five (5) years. The warranty period shall commence on the date the aerial device is delivered to the first end user. 5. The manufacturer of the aerial device shall also guarantee the cylinder seals to be free from Type III leakage for a period of two and one half (2-1/2) years. The warranty period shall commence on the date the aerial device is delivered to the first end user. 6. The manufacturer of the aerial device shall guarantee the purchaser to repair or replace any defective or prematurely failed Telescopic Waterway Assembly, resulting from structural defects or failures, for a period of ten (10) years. The warranty period shall commence on the date the aerial device is delivered to the first end user.		
MM.	**AERIAL DEVICE TRAINING** 1. The aerial manufacturer shall provide three (3) days of aerial device training to a designated trainer if requested.		
NN.	**TOOL STORAGE** 1. There shall be storage for one (1) pick head axe and one (1) halligan tool at the tip. The axe shall be secured with the head down. The axe shall be secure, so it does not dislodge when the apparatus is in motion or when the aerial device is being used.		
OO.	**MONITOR** 1. There shall be one (1) electronic controlled monitor at the tip rated at 1,250gpm. Controls for the monitor shall be located at the tip and at the turntable controls. The monitor will be capable of flowing water at min. 45-degree angle up when ladder is below grade for blitz attack on first floor.		
PP.	**BREATHING AIR TO THE TIP** 1. There needs to be a minimum of 1 connection point at the tip to supply breathing air to firefighters with their SCBA. The connections need to be compatible with the Scott Nex-Gen air packs. Air shall be supplied from a		

	high-pressure bottle (minimum of 400 cubic feet of air) located on the aerial or the turntable. 2. The bottles shall be painted to match the aerial ladder, light gray.		
RR.	**HARNESS STORAGE** 1. There shall be storage for four (4) PacMule Ultra Quick Release Class 1 Ladder Belts with Tool Loops, one (1) Large, two (2) Xtra Large, one (1) XX Large, located on the officer/right side of the turntable. The storage shall be weather tight and shall have a cover with a push button locking mechanism.		
SS.	**LADDER BANNER** 1. There shall be two (2) ladder panels on each side of the aerial bed section. They shall be painted white. They shall be a minimum length of 10 feet and the height shall not exceed the height of the base section of the aerial.		
TT.	**SAW STORAGE COMPARTMENT** 1. On the driver/left side of the bed section of the aerial, there shall be a storage compartment large enough to house one (1) chain saw and one (1) demo/circular saw.		
UU.	**10FT. PIKE POLE** 1. There shall be one (1) 10ft Steel NY Roof Hook with Pry-Tip stored inside the last fly section of the aerial device on the officer/right side. The roof hook shall be secure, so it does not dislodge when the apparatus is in motion or when the aerial device is being used.		
VV.	**INCLINOMETER** 1. There shall be two (2) inclinometers. One (1) located on the bed section of the aerial, visible from the turntable controls. One (1) in the last fly section of the aerial, visible from the aerial tip.		
WW	**AERIAL HOUR USE COUNTER** 1. There shall be a separate counter to show the total hours of use time of the aerial device. This counter shall be separate from the engine hour counter.		

SECTION K - PAINT

A.	**PAINT – ENVIRONMENTAL IMPACT** 1. The contractor shall meet or exceed his or her current State regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water, and soil. The contractor shall, upon demand,		

	provide a description of the methods used and shall present evidence that his or her manufacturing facility is in compliance with his or her State EPA rules and regulations.		
B.	**REFLECTIVE STRIPING** 1. Reflective striping shall be applied to the exterior of the apparatus in a manner consistent with the National Fire Protection Association Pamphlet 1901, latest edition. It shall consist of a 6" wide stripe low across the front of the chassis and along the sides of the apparatus. The reflective striping shall be RED, same as the primary upper cab, in color.		
C.	**CHEVRON REFLECTIVE STRIPING, ENTIRE REAR OF UNIT** 1. In addition to the custom striping pattern supplied on the apparatus, there shall be additional reflective striping applied to the entire rear of the unit. The striping shall consist of alternating red and fluorescent yellow reflective stripes (final colors to be determined at pre-build trip). Each stripe shall be a minimum of 6" in width and shall be applied to the apparatus at 45° angle. Only 3M™ reflective stripping shall be used. The complete rear of the apparatus shall be covered.		
D.	**CHEVRON STRIPING, FRONT BUMPER** 1. In addition to the custom striping pattern supplied on the apparatus, there shall be additional reflective striping applied to the front bumper. The striping shall consist of alternating red and fluorescent yellow reflective stripes (final colors to be determined at pre-build trip). Each stripe shall be a minimum of 6" in width and shall be applied to the apparatus at 45° angle. Only 3M™ reflective stripping shall be used. 2. A center oval shall be left for the District "Scramble" on the face of the front bumper. No chevron behind the "scramble".		
E.	**RUB RAIL REFLECTIVE STRIPING** 1. There shall be reflective stripping installed in the rub rail channel on the apparatus body.		

SECTION L - OPTIONS

A.	**2ND 2 ½" SUPPLY** 1. A 2nd 2 ½" NST gate discharge located behind the monitor on the ladder tip.		

B.	**500-WATT BODY SCENE LIGHTS** 1. Four (4) 500-watt LED lighting strips mounted on the body of the apparatus. Two (2) shall be located on the driver/left side and two (2) on the officer/right side. They shall be part of the aerial avoidance system. The lights shall be powered by the on-board generator.		
C.	**WHEEL WELL STORAGE** 1. There shall be wheel well storage areas where available. They shall be constructed of smooth aluminum sheet and set into the rear wheel wells. 2. The driver side front area shall remain as large as possible for storage of SCBA composite bottles. 3. The Passenger side front area shall remain as large as possible for storage of misc. equipment to include potential Water Can extinguishers. 4. There shall be heavy duty rubber matting glued into the bottom of each storage space. 5. A smooth aluminum door shall be provided to cover each storage area. Each door shall have a positive latching mechanism to secure the contents of each area and be trimmed with weather strip material to keep the contents dry. Each spot designated to hold an SCBA cylinder shall have an auxiliary retention strap installed to further secure the bottle in.		
D.			
E.			