GRANDE PRAIRIE FIRE DEPARTMENT
GRANDE PRAIRIE, ALBERTA
SVI #1048 PRODUCTION SPECIFICATION

Contract Administrtor; Bill Wood #7031
Sales Administrator; Bob Sorensen #7032

ROCK SOLID QUALITY

GENERAL CONSTRUCTION AND DESIGN

The design of the equipment shall be in accordance with the best engineering practices. The equipment design and accessory installation shall permit accessibility for use, maintenance and service. All components and assemblies shall be free of hazardous protrusions, sharp edges, cracks or other elements which might cause injury to personnel or equipment. All components shall be designed and protected so that heavy rains or other adverse weather conditions will not interfere with normal servicing or operation.

All oil, hydraulic and air tubing lines, and electrical wiring shall be located in protective positions properly attached to the frame or body structure and shall have protective loom or grommets at each point where they pass through structural members, except where a through frame connector is necessary.

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 personnel will be carried without injury to the apparatus. All dimensions are approximate and subject to a plus or minus 1/4" tolerance.

The following specifications describe minimum requirements for an emergency services vehicle designed for severe duty applications.

The materials specified are considered absolute minimum. Exceptions will not be accepted or permitted since all raw materials of the specified type are available to all Manufacturers. Since all custom Manufacturers have the ability to shear, break, and weld as these specifications require, all basic design requirements shall be complied with.

Subletting any part of the fabrication, painting, or finishing of the apparatus will not be acceptable.

ACCESSIBILITY

Parts and components shall be located or positioned for rapid and simple inspection and recognition of excessive wear or potential failure. Whenever functional layout of operating components determines that physical or visual interference between items cannot be avoided, the item predicted to require the most maintenance shall be located for best accessibility.

Cover plates which must be removed for component adjustment or part removal should be equipped with quick disconnect fasteners or hinged panels.

Drains, filler plugs, grease fittings, hydraulic lines, bleeders, and check points for all components should be located so that they are readily accessible and do not require special tools for proper servicing. Design practices should minimize the number of tools required for maintenance.

MATERIALS

The materials specifications are considered absolute minimum. Exceptions will not be accepted or permitted since all raw materials of specified type are available to all manufacturers. Since all manufacturers have the ability to shear, break and weld as these specifications require, all basic design requirements shall be complied with.

Materials shall conform to the specifications listed herein. When not specifically listed, materials shall be of the best quality for purpose of commercial practice. Materials shall be free of all defects and imperfections that might affect the serviceability of finished product.

QUALITY AND WORKMANSHIP

The manufacturing process, including quality control, shall be consistent with present industry standards. All equipment, material, and articles required under these specifications are to be new or fabricated from new materials produced from recovered materials. The term "Recovered Materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this document. The term "Heavy Duty", as used to describe an item, shall mean in excess of the standard, quantity, quality, or capacity and represents the best, most durable, strongest, etc., part, component, system, etc., that is available. The Grand Prairie Fire Department or their designate shall be the sole judge of quality, construction and stability of the apparatus and equipment being offered.

Welding shall not be employed in the assembly of the apparatus in a manner that will prevent the ready removal of any component part for service or repair. All steel and stainless steel welding shall be done to American Welding Society D1.1-83 recommendations for structural steel welding. All aluminum welding shall be done to American Welding Society and ANSI D1.2-83 requirements for structural welding of aluminum.

Defective components shall not be furnished. Parts, equipment, and assemblies, which have been repaired or modified to overcome deficiencies, shall not be furnished without the approval of the Grand Prairie Fire Department. Welded, bolted, and riveted construction utilized shall be in accordance with the highest standards of the industry. Component parts and units shall be manufactured to definite standard dimensions with proper fits, clearances, and uniformity. General appearance of the vehicle shall not show any evidence of poor quality of work.
SHOP NOTES
Deleted bid wording.

LIABILITY INSURANCE

The manufacturer shall furnish with the bid a certificate of insurance for;

Workman's Compensation and Employer's Liability Insurance covering for all employees.

General Liability (each occurrence) of $1,000,000.00. General Aggregate coverage of $2,000,000.00. Products Completed / Operations Aggregate coverage of $2,000,000.00. Medical Expense coverage of $5,000 (any one person). Personal Injury of $1,000,000.00.

Automobile liability of $1,000,000.00 combined single limit (each accident), including any auto, all owned autos, scheduled autos, hired autos, non-owned autos, and garage liability.

Excess Umbrella Liability coverage of $4,000,000.00 each occurrence, Aggregate of $4,000,000.00.
Garage Keepers Liability coverage of $4,000,000.00 combined limit.

All insurance policies must be;

- Maintained for the life of the contract,
- Must provide ten (10) days notice before cancellation,
- Must cover all operations of the contractor, or anyone employed by them.

SHOP NOTES
Deleted bid wording.

INTERNET IN-PROCESS SITE

The manufacturer shall post and maintain a website where the Grand Prairie Fire Department will be able to view digital images of their apparatus as its being built. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of unit.

VEHICLE STABILITY SUPPLIED WITH CAB/CHASSIS

The cab/chassis shall be equipped with a stability control system. The system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer and individual wheel brake controls.

FIRE APPARATUS PERFORMANCE

The fire apparatus shall meet the requirements of this standard at elevations of 2000 ft (600 m) above sea level.

The fire apparatus shall meet all the requirements of this standard while stationary on a grade of 10 percent in any direction.

The fire apparatus shall meet the requirements of this standard in ambient temperature conditions between 32°F (0°C) and 110°F (43°C).

ROADABILITY

The apparatus, when loaded to its estimated in-service weight, shall be capable of the following performance while on dry, paved roads that are in good condition:

1) From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
2) The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
3) The apparatus shall be able to maintain a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent.

The maximum top speed of fire apparatus with a GVWR over 33,000 lb (11,800 kg) shall not exceed 68 mph (105 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (85 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

The vehicle shall be capable of maneuvering across a 20 percent grade and up and down a 25 percent grade.

SERVICEABILITY

The fire apparatus shall be designed to allow the manufacturer's recommended routine maintenance checks of lubricant and fluid levels to be performed by the operator without lifting the cab of a tilt-cab apparatus or without the need for hand tools.

Where special tools are required for routine service on any component of the apparatus, such tools shall be provided with the apparatus.

Apparatus components that interfere with repair or removal of other major components shall be attached with fasteners, such as cap screws and nuts, so that the components can be removed and installed with ordinary hand tools. These components shall not be welded or otherwise permanently secured into place.

WILDLAND DOCUMENTATION

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

1. The manufacturer's record of apparatus construction details, including the following information:
   (a) Owner's name and address
   (b) Apparatus manufacturer, model, and serial number
   (c) Chassis make, model, and serial number
   (d) GAWR of front and rear axles and GVWR
   (e) Front tire size and total rated capacity in pounds (kilograms)
   (f) Rear tire size and total rated capacity in pounds (kilograms)
   (g) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
   (h) For each engine: make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
   (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) Ratios of all driving axles
   (n) Maximum governed road speed
   (o) For each pump: make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
   (p) For each pump transmission: make, model, serial number, and gear ratio
   (q) Reserved
   (r) Water tank certified capacity in gallons or liters
   (s) Reserved
   (t) Paint manufacturer and paint number(s)
   (u) Company name and signature of responsible company representative
   (v) Weight documents from a certified scale showing actual loading on the front axle, rear axle(s), and overall fire apparatus (with water tank full but without personnel, equipment, and hose)

2. Certification of compliance of the optical warning system
3. Siren manufacturer's certification of siren
4. Written load analysis and results of the electrical system performance tests
5. Certification of slip resistance of all stepping, standing, and walking surfaces
6. The wildland fire pump manufacturer's certification of suction capability
7. If special conditions are specified by the purchaser of the wildland fire pump, the pump manufacturer's certification of suction capacity under the special conditions
8. A copy of the apparatus manufacturer's approval for stationary pumping applications of the wildland fire pump

9. For each pump, the pump manufacturer's certification of the hydrostatic test
10. For each pump, the certification of inspection and test for the pump
11. The certification of water tank capacity
12. If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification that the foam proportioning system meets this standard
13. If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
14. If the apparatus has a line voltage power source, the certification of the test for the power source *(see NFPA 1901, Standard for Automotive Fire Apparatus, 22.15.7.2)*
15. If the apparatus is equipped with an air system, air tank certificates *(see NFPA1901, 24.5.1.2)*, the SCBAfill station certification *(see NFPA 1901, 24.9.7)*, and the results of the testing of the air system installation *(see NFPA 1901, 24.14.5 and NFPA 1901, 24.15.4)*
16. Certification of vehicle side slope stability, including the weight distribution assumed for the calculations or as loaded on the vehicle for the tilt table test
17. Any other required manufacturer test data or reports

OPERATIONS AND SERVICE DOCUMENTATION

The contractor shall deliver with the fire apparatus 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 also deliver with the fire apparatus the following documentation 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 for service and technical information
4) Parts replacement information
5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
6) Wiring diagrams for low voltage and line voltage systems to include the following information:
   a) Pictorial representations of circuit logic for all electrical components and wiring
   b) Circuit identification
   c) Connector pin identification
   d) Zone location of electrical components
   e) Safety interlocks
   f) Alternator–battery power distribution circuits
   g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing 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) Limitations of use
14) Inspection procedures
15) Recommended service procedures
16) Troubleshooting guide
17) Apparatus body, chassis and other component manufacturer's warranties
18) Special data required by this standard
19) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus
20) One copy of the latest edition of FAMA's *Fire Apparatus Safety Guide*

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.

NFPA REQUIRED DOCUMENTATION FORMAT - USB FLASH DRIVE

The vehicle construction details and the operations and service documentation as required per NFPA 1901 latest edition shall be provided on a USB Flash Drive. These manuals shall be divided into sections for ease of reference. There shall be two (2) USB flash drives provided with the completed vehicle.

FIRE APPARATUS SAFETY GUIDE

A Fire Apparatus Safety Guide published by Fire Apparatus manufacturer's Association shall be provided with delivered vehicle. This manual includes essential safety information for fire fighters, fire chiefs, apparatus mechanics, and fire department safety officers. The guide is applicable to municipal, wildland, and airport fire fighting apparatus manufactured on either custom or commercial chassis.

STATEMENTOF EXCEPTIONS

The final-stage manufacturer shall deliver with the fire apparatus either a certification that the apparatus fully complies with all requirements of this standard or alternatively, a Statement of Exceptions specifically describing each aspect of the completed apparatus that is not fully compliant with the requirements of this standard at the time of delivery.

The Statement of Exceptions shall contain, for each noncompliant aspect of the apparatus or missing required item, the following information:

1) A separate specification of the section of the applicable standard for which compliance is lacking
2) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
3) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
4) Identification of the entity that will be responsible for making the necessary post delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance with this standard

Prior to or at the time of delivery of the apparatus, the Statement of Exceptions shall be signed by an authorized agent of the entity responsible for final assembly of the apparatus and by an authorized agent of the purchasing entity, indicating mutual understanding and agreement between the parties regarding the substance thereof.

GVWR	**Chassis**		**Storage Area**		**Equipment Weight**		**Ground Clearance**	
Apparatus Type	**lb.**	**kg.**	**ft.3**	**m3**	**lb.**	**kg.**	**in.**	**mm.**
Wildland Fire Apparatus	15,000	7,000	20	0.56	200	90	12	300
	15,001 - 20,000	7,001 - 9,000	50	1.42	500	225	13	330
	20,001 - 26,000	9,001 - 12,000	50	1.42	500	225	15	380
	>26,000	>12,000	75	2.12	750	340		
Wildland Mobile Water Supply Fire Apparatus	All	All			200	90		

TESTING

ROAD TEST

Road test shall be conducted in accordance with this section to verify that the completed apparatus is capable of compliance with Roadability Section.

The tests shall be conducted at a location and in a manner that does not violate local, state or provincial or federal traffic laws.

The tests shall be conducted on dry, level, paved roads that are in good condition. The apparatus shall be loaded to its estimated in service weight.

The engine shall not operate in excess of the maximum governed speed. Acceleration tests shall consist of two runs in opposite directions over the same route. The fire apparatus shall attain a speed of 35 mph (55 km/hr) from a standing start within 25 seconds. The fire apparatus shall attain a minimum top speed of 50 mph (80 km/hr).

If the apparatus is equipped with an auxiliary braking system, the Body Manufacturer shall road test the system to confirm that the system is functioning as intended by the auxiliary braking system manufacturer.

If the apparatus is equipped with an air brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 20 mph (32.2 km/hr) in a distance not exceeding 35 ft (10.7 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil or grease.

If the apparatus is equipped with a hydraulic brake system, the service brakes shall bring the apparatus, when loaded to its GVWR, to a complete stop from an initial speed of 30 mph (48.2 km/hr) in a distance not exceeding 88 ft (26.8 m) by actual measurement on a paved, level, dry surface road that is free of loose material, oil or grease.

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

The vehicles low voltage electrical system shall be tested and certified by the manufacturer. The certified test results shall be delivered with the completed vehicle. Tests shall be performed when the air temperature is between 0°F and 110°F (–18°C and 43°C).

TEST SEQUENCE

The following three (3) tests shall be performed in the order in which they appear below. Before each test, the batteries shall be fully charged until the voltage stabilizes at the voltage regulator set point and the lowest charge current is maintained for ten (10) minutes. Failure of any of these tests shall require a repeat of the sequence.

1. RESERVE CAPACITY TEST

The engine shall be started and kept running until the engine and engine compartment temperatures are stabilized at normal operating temperatures and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes.

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

2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

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

TEST AT FULL LOAD

The total continuous electrical load shall be activated with the engine running up to the engine manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during this test.

An alarm sounded by excessive battery discharge, as detected by the warning system required in 13.3.4, or a system voltage of less than 11.8 V dc for a 12 V nominal system, 23.6 V dc for a 24 V nominal system, or 35.4 V dc for a 42 V nominal system for more than 120 seconds shall be considered a test failure.

3. LOW VOLTAGE ALARM TEST

The following test shall be started with the engine off and the battery voltage at or above 12 V for a 12 V nominal system, 24 V for a 24 V nominal system or 36 V for a 42 V nominal system.

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

The test shall be considered a failure if the alarm does not sound in less than 140 seconds after the voltage drops to 11.70 V for a 12 V nominal system, 23.4 V dc for a 24 V nominal system, or 35.1 V for a 42 V nominal system.

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

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

VEHICLE INSPECTION PROGRAM (VIP)

The completed fire rescue vehicle with fire pump shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 or CAN/ULC S515 standards.

The vehicle shall be subjected to a visual inspection of approximately 150 items. Inspection items include measurements of the chassis, driving and crew areas, body, compartments and equipment mounting, and installed components and systems, including, but not limited to, low-voltage systems and warning devices, pump operator's panel, water and foam tanks, generators and associated electrical equipment, and foam systems.

Not all construction features are inspected on each truck. Construction features that are considered routine production items i.e. fuel tank, exhaust system are verified during the initial and follow-up audits.

UL verifies compliance with applicable component requirements in two ways:

(1) visual inspection and measurements, and

(2) verification of certain UL Certified components. UL does not independently verify supplier claims regarding installed components.

ULC PUMP CERTIFICATION

The completed unit upon completion shall be tested and certified by Underwriters Laboratories, Inc. (UL). The certification tests shall follow the guide lines outlined in "Standard for Automobile Fire Fighting Apparatus" CAN/ULC-S515, latest revision.

If the fire pump has a rated capacity of 3000 L/min (750 gpm) or greater, the pump shall be tested after the pump and all its associated piping and equipment have been installed on the apparatus.

The fire pump shall be tested and certified to perform as listed below:

- 100% of rated capacity at 700 kPa (100 psi) net pressure.
- 70% of rated capacity at 1,000 kPa (150 psi) net pressure.
- 50% of rated capacity at 1,400 kPa (200 psi) net pressure.

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

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 3,400 kPa (500 psi).

The pump shall comply with the applicable requirements of "Standard for Fire Apparatus 1901, latest edition.

The pump shall be capable of producing fire streams that are free from objectionable pulsation under all normal operating conditions.

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

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

A test plate shall be provided at the pump operator's panel that gives the rated discharges and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump as used, and the governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve.

PERFORMANCE BOND

The successful Bidder will be required to provide a 100% performance bond in the amount equivalent to the total amount of its bid including any additional options that may have been given. Performance bond shall be provided within two (2) weeks after notice of award.

If the Bidder to whom the contract is awarded, refuses or neglects to execute or fails to furnish the required 100% performance bond within two (2) weeks after notice, the amount of his deposit may be forfeited and retained by the Grand Prairie Fire Department as liquidated damages.

The terms of the performance bond shall continue one (1) year after completion and delivery of the apparatus. The balance of any warranty, if greater than 12 months, shall continue to be guaranteed solely by Contractor.

2.5% fee first $100K
1.5% fee over $100K, plus 12.5% fee of premium.

WARRANTY

A full statement shall be provided of the warranties for the vehicle(s) being bid. Warranties should clearly describe the terms under which the vehicle manufacturer accepts responsibility for the cost to repair defects caused by faulty design, quality of work or material and for the applicable period of time after delivery.

Cost of repairs refers to all costs related thereto including, but not limited to, the cost of materials and the cost of labor.

The Body Manufacturer shall warrant all materials and accessories used on the vehicle(s), whether fabricated by manufacturer or purchased from an outside source and will deal directly with the Grand Prairie Fire Department on all warranty work.
SHOP NOTES
Deleted bid wording.

GENERAL LIMITED WARRANTY - TWO (2) YEARS

The vehicle shall be free of defects in material and workmanship for a period of two (2) years or 36,000 miles (or 57,936 kilometers), whichever occurs first starting thirty (30) days after the original invoice date.

The Contractor must be the "single source" coordinator of all warranties on the vehicle.

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

The vehicle low voltage electrical system shall be free of defects in material and workmanship for a period of five (5) years or 60,000 miles (or 96,561 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

STRUCTURAL WARRANTY - TEN (10) YEARS

The body shall be free of structural or design failure or workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT LIMITED WARRANTY - TEN (10) YEARS

The body shall be free of bubbling or peeling as a result of a defect in the method of manufacture for a period of ten (10) years or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date. **Pro-rated warranties will not be acceptable.**

GRAPHICS LIMITED WARRANTY

The 3M graphics installation shall be warranted for a period of two (2) years. The 3M materials installed on completed vehicle shall be warranted for seven (7) years. The 3M Diamond grade film (if specified) shall be warranted for ten (10) years.

DARLEY THREE YEAR PUMP WARRANTY

The fire pump shall be warranted by Darley for a period of three (3) years from the date of delivery to the Grand Prairie Fire Department.

WATEROUS FIVE YEAR PUMP WARRANTY

The fire pump shall be warranted by Waterous for a period of five (5) years from the date of delivery to the Grand Prairie Fire Department.

STAINLESS STEEL PLUMBING WARRANTY

The stainless steel plumbing shall be free of defects in material and workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

The contractor shall supply details of their warranty information with their bid submission.

AKRON BRASS FIVE YEAR VALVE WARRANTY

The Akron Brass valves shall be warranted by Akron Brass for a period of ten (10) years from the date of delivery to the Grand Prairie Fire Department. The warranty for electronics shall be warranted by Akron Brass for a period of five (5) years from date of delivery to the Grand Prairie Fire Department.

UPF POLY WATER TANK WARRANTY

The UPF poly water tank shall be provided with a lifetime material and workmanship limited warranty. The manufacturer shall supply details of their warranty information with their bid submission.

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred ninety (390) days after receipt of a purchase order or contract.

Contractor shall not be held liable for delays of chassis delivery due to accidents, strikes, floods or other events not subject to their control. Contractor shall provide immediate written notice to Grand Prairie Fire Department as to delays and to what extent these delays have in completing vehicle within the stated construction time period.

OVERALL HEIGHT REQUIREMENT

The overall height (OAH) of the vehicle shall be approximately 124“ (10' - 4") from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 324“ (27' - 0").

OVERALL WIDTH

The overall width (OAW) of the body at drip rails shall be 100" (8' - 4"), and body shall be 98" (8' - 2").

ANGLE OF APPROACH

The angle of approach for this vehicle shall not be less than twenty (20) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1906.

ANGLE OF DEPARTURE

The angle of departure for this vehicle shall not be less than twenty (20) degrees when it is loaded to the estimated in-service weight as specified by the current edition of NFPA 1906.

INSPECTION TRIPS

All required inspection trips shall be the financial responsibility of the Grand Prairie Fire Department, including but not limited to transportation, food and lodging.

DELIVERY AND DEMONSTRATION

The Contractor shall be responsible for the delivery of the completed unit to the Grand Prairie Fire Department's location. On initial delivery of the apparatus, the Contractor shall supply a qualified representative to demonstrate the apparatus and provide initial instruction to representatives of the Grand Prairie Fire Department regarding the operation, care and maintenance of the apparatus and equipment supplied at Grand Prairie Fire Department location.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by Grand Prairie Fire Department.

After delivery of the apparatus, the Grand Prairie Fire Department shall be responsible for ongoing training of its personnel to proficiency regarding the proper and safe use of the apparatus and associated equipment.

Grand Prairie Fire Department

Heavy Rescue

CAB CHASSIS SPECIFICATION

MODEL: **2018 7400 SFA 4X4**

MISSION: Requested GVWR: 35000. Calc. GVWR: 36220
Calc. Start / Grade Ability: 27.54% / 3.00% @ 55 MPH
Calc. Geared Speed: 77.7 MPH

ENGINE, DIESEL: {Cummins L9 330} EPA 2017, 330HP @ 2000 RPM, 1000 lb-ft Torque @ 1400 RPM, 2200 RPM Governed Speed, 330 Peak HP (Max)

TRANSMISSION, AUTOMATIC: {Allison 3000 EVS} 5th Generation Controls, Close Ratio, 5-Speed with Overdrive, with PTO Provision, Less Retarder, Includes Oil Level Sensor, Max, GVW N/A

CLUTCH: Omit Item (Clutch & Control)

AXLE, FRONT DRIVING: {Fabco FSD-14A} Single Reduction, 14,600 lb Capacity with Hub Piloted Wheel Mounting

AXLE, REAR, SINGLE: {Meritor RS-23-160} Single Reduction, 23,000-lb Capacity, With 200 Wheel Ends Gear Ratio: 4.89

CAB: Conventional 6-Man Crew Cab

TIRE, FRONT: (2) 11R22.5 Load Range H X WORKS Z (MICHELIN), 495 rev/mile, 65 MPH, All-Position

TIRE, REAR: (4) 11R22.5 Load Range H XDN2 (MICHELIN), 497 rev/mile, 75 MPH, Drive

SUSPENSION, RR, SPRING, SINGLE: Vari-Rate; 23,500-lb Capacity

PAINT: Cab schematic 209GM
Location 1: 9036, Cool Gray Light (Std)
Location 2: 2562, Red (Prem)
Chassis schematic N/A

FRAME RAILS Heat Treated Alloy Steel (120,000 PSI Yield); 10.125" x 3.580" x 0.312" (257.2mm x 90.9mm x 8.0mm); 480.0" (12192) Maximum OAL

BUMPER, FRONT Stainless Steel Clad Aluminum, Swept Back

FRAME EXTENSION, FRONT Bolt On Type; 20" In Front of Grille, Without Crossmember

WHEELBASE RANGE 181" (460cm) Through and Including 205" (520cm)

AXLE, FRONT DRIVING {Fabco FSD-14A} Single Reduction, 14,600 lb Capacity with Hub Piloted Wheel Mounting

SUSPENSION, FRONT, SPRING Parabolic, Taper Leaf; 16,000-lb Capacity; With Shock Absorbers Includes
: SPRING PINS Rubber Bushings, Maintenance-Free

BRAKE SYSTEM, AIR Dual System for Straight Truck Applications
Includes
: BRAKE LINES Color and Size Coded Nylon
: DRAIN VALVE Twist-Type
: DUST SHIELDS, FRONT BRAKE
: DUST SHIELDS, REAR BRAKE
: GAUGE, AIR PRESSURE (2) Air 1 and Air 2 Gauges; Located in Instrument Cluster
: PARKING BRAKE CONTROL Yellow Knob, Located on Instrument Panel
: PARKING BRAKE VALVE For Truck
: QUICK RELEASE VALVE On Rear Axle for Spring Brake Release: 1 for 4x2, 2 for 6x4
: SLACK ADJUSTERS, FRONT Automatic
: SLACK ADJUSTERS, REAR Automatic
: SPRING BRAKE MODULATOR VALVE R-7 for 4x2, SR-7 with relay valve for 6x4

DRAIN VALVE {Berg} with Pull Chain, for Air Tank
Includes
: DRAIN VALVE Mounted in Wet Tank

AIR BRAKE ABS {Bendix AntiLock Brake System} Full Vehicle Wheel Control System (4-Channel) With Automatic Traction Control
AIR DRYER {Bendix AD-IP} With Heater
Includes
: AIR DRYER LOCATION Outside Left Rail, Back of Cab

BRAKE CHAMBERS, FRONT AXLE {MGM} 20 SqIn

BRAKE CHAMBERS, REAR AXLE {Bendix EverSure} 30/30 Spring Brake

BRAKES, FRONT, AIR CAM S-Cam; 16.5" x 5.0"; Includes 20 Sq. In. Long Stroke Brake Chambers

BRAKES, REAR, AIR CAM S-Cam; 16.5" x 7.0"; Includes 30/30 Sq.In. Long Stroke Brake Chamber and Spring Actuated Parking Brake

AIR COMPRESSOR {Cummins} 18.7 CFM Capacity

AIR TANK LOCATION (2) Mounted Left Side BOC Under Battery Box

AIR DRYER LOCATION Mounted Inside Left Rail, Behind Transfer Case Mounting

BRAKE PACKAGE, REAR {Bendix Spicer ES-165-7} Air, Cam Type, Extended Service; Size 16.5" x 7", Includes Gunite Slack Adjusters

BRAKE PACKAGE, FRONT {Bendix Spicer ES-165-5} Air, Cam Type, Extended Service; Size 16.5" x 5", Includes Gunite Slack Adjusters

STEERING COLUMN Tilting

STEERING WHEEL 2-Spoke, 18" Dia., Black

STEERING GEAR {Sheppard M110} Power

AFTERTREATMENT COVER Steel, Black

EXHAUST SYSTEM Single, Horizontal Aftertreatment Device, Frame Mounted Right Side, Under Cab, for Single Horizontal Tail Pipe, Frame Mounted Right Side Back of Cab, for All-Wheel Drive

ENGINE EXHAUST BRAKE for Cummins ISB/B6.7/ISL/L9 Engine with Variable Vane Turbo Charger

SWITCH, FOR EXHAUST 3 Position, Momentary, Lighted Momentary, ON/CANCEL, Center Stable, INHIBIT REGEN, Mounted in IP Inhibits Diesel Particulate Filter Regeneration When Switch is Moved to ON While Engine is Running, Resets When Ignition is Turned OFF

ELECTRICAL SYSTEM 12-Volt, Standard Equipment
Includes
: DATA LINK CONNECTOR For Vehicle Programming and Diagnostics In Cab
: HAZARD SWITCH Push On/Push Off, Located on Top of Steering Column Cover
: HEADLIGHT DIMMER SWITCH Integral with Turn Signal Lever
: HEADLIGHTS (2) Sealed Beam, Round, with Chrome Plated Bezels
: JUMP START STUD Located on Positive Terminal of Outermost Battery
: PARKING LIGHT Integral with Front Turn Signal and Rear Tail Light
: STARTER SWITCH Electric, Key Operated
: STOP, TURN, TAIL & B/U LIGHTS Dual, Rear, Combination with Reflector
: TURN SIGNAL SWITCH Self-Cancelling for Trucks, Manual Cancelling for Tractors, with Lane Change Feature
: WINDSHIELD WIPER SWITCH 2-Speed with Wash and Intermittent Feature (5 Pre-Set Delays), Integral with Turn Signal Lever
: WINDSHIELD WIPERS Single Motor, Electric, Cowl Mounted
: WIRING, CHASSIS Color Coded and Continuously Numbered

ALTERNATOR {Leece-Neville BLP4006HN} Brushless, 12 Volt 325 Amp. Capacity, Pad Mount, with Remote Sense

BODY BUILDER WIRING Back of Standard Cab at Left Frame or Under Extended or Crew Cab at Left Frame; Includes Sealed Connectors for Tail/Amber Turn/Marker/ Backup/Accessory Power/Ground and Sealed Connector for Stop/Turn

BATTERY SYSTEM {International} Maintenance-Free, (3) 12-Volt 2775CCA Total

2-WAY RADIO Wiring Effects; Wiring With 20 Amp Fuse Protection, Includes Ignition Wire With 5 Amp Fuse, Wire Ends Heat Shrink and 10' Coil Taped to Base Harness

HORN, ELECTRIC Disc Style

BATTERY BOX Steel, With Plastic Cover, 30" Wide, 2, 3 or 4 Battery Capacity, Mounted Left Side Back of Fuel Tank

HORN, AIR ACCOMMODATION PACKAGE; less Horn

HEADLIGHTS Long Life Halogen; for Two Light System

CLEARANCE/MARKER LIGHTS (5) {Truck Lite} Amber LED Lights, Flush Mounted on Cab or Sunshade

STARTING MOTOR {Delco Remy 38MT Type 300} 12 Volt; less Thermal Over-Crank Protection

COURTESY LIGHT (4) Mounted In Front & Rear Map Pocket Left and Right Side

INDICATOR, LOW COOLANT LEVEL With Audible Alarm

INDICATOR, BATTERY WARNING Green BATTERY ON Indicator, Mounted on Left Side of Instrument Panel, To be Used with Factory Installed or Customer Mounted Battery Disconnect Switch

CIRCUIT BREAKERS Manual-Reset (Main Panel) SAE Type III With Trip Indicators, Replaces All Fuses

TURN SIGNALS, FRONT Includes LED Side Turn Lights Mounted on Fender

BATTERY DISCONNECT SWITCH for Cab Power Disconnect Switch; Cab Mounted, Disconnects Power to Power Distribution Center (PDC) and Body Builder Through Solenoid, Does Not Disconnect Charging Circuits; Locks with Padlock

FENDER EXTENSIONS Rubber

INSULATION, UNDER HOOD for Sound Abatement

GRILLE Stationary, Chrome

INSULATION, SPLASH PANELS for Sound Abatement

FRONT END Tilting, Fiberglass, With Three Piece Construction; for WorkStar

GRILLE EMBER SCREEN Mounted to Grille and Cowl Tray to Keep Hot Embers out of Engine and HVAC Air Intake System

PAINT SCHEMATIC, PT-1 Two Tone, Design 209.

PAINT TYPE Base Coat/Clear Coat, 1-2 Tone

PAINT CLASS Premium Color

CLUTCH Omit Item (Clutch & Control)

ANTI-FREEZE Red, Extended Life Coolant; To -40 Degrees F/ -40 Degrees C, Freeze Protection

BLOCK HEATER, ENGINE 120V/1000W, for Cummins ISB/B6.7/ISL/L9 Engines

ENGINE, DIESEL {Cummins L9 330} EPA 2017, 330HP @ 2000 RPM, 1000 lb-ft Torque @ 1400 RPM, 2200 RPM Governed Speed, 330 Peak HP (Max)

FAN DRIVE {Horton Drivemaster} Direct Drive Type, Two Speed with Residual Torque Device for Disengaged Fan Speed
Includes
: FAN Nylon

RADIATOR Cross Flow, Series System; 1228 SqIn Aluminum Radiator Core with Internal Water to Oil Transmission Cooler and 1167 In Charge Air Cooler
Includes
: DEAERATION SYSTEM with Surge Tank
: HOSE CLAMPS, RADIATOR HOSES Gates Shrink Band Type; Thermoplastic Coolant Hose Clamps
: RADIATOR HOSES Premium, Rubber

AIR CLEANER Single Element
Includes
: GAUGE, AIR CLEANER RESTRICTION Air Cleaner Mounted

THROTTLE, HAND CONTROL Engine Speed Control; Electronic, Stationary, Variable Speed; Mounted on Steering Wheel

ENGINE WATER COOLER {Sen-Dure} Auxiliary, For Use With Fire Trucks

EMISSION COMPLIANCE Federal, Does Not Comply With California Clean Air Idle Regulations

ENGINE CONTROL, REMOTE MOUNTED Provision for; Includes Wiring for Body Builder Installation of PTO Controls; with Ignition Switch Control for Cummins ISB/B6.7 or ISL/L9 Engines

FEDERAL EMISSIONS {Cummins L9} EPA, OBD and GHG Certified for Calendar Year 2017

TRANSMISSION, AUTOMATIC {Allison 3000 EVS} 5th Generation Controls, Close Ratio, 5-Speed with Overdrive, with PTO Provision, Less Retarder, Includes Oil Level Sensor, Max, GVW N/A

TRANSFER CASE {Fabco TC-38} Two-Speed, 8,500 lb-ft Capacity with Air Control, With PTO Provision, With Reworked Air Ports

TRANSMISSION SHIFT CONTROL {Allison} Push-Button Type; for Allison 3000 & 4000 Series Transmission

TRANSFER CASE LUBE {EmGard 50W} Synthetic; 1 thru 14.99 Pints

TRANSMISSION OIL Synthetic; 29 thru 42 Pints

ALLISON SPARE INPUT/OUTPUT for Emergency Vehicle Series (EVS); Fire/Pumper, Tank, Aerial/Ladder

SHIFT CONTROL PARAMETERS Allison 3000 or 4000 Series Transmissions, 5th Generation Controls, Performance Programming

PTO LOCATION Left Side of Transmission

AXLE, REAR, SINGLE {Meritor RS-23-160} Single Reduction, 23,000-lb Capacity, With 200 Wheel Ends . Gear Ratio: 4.89
Includes
: REAR AXLE DRAIN PLUG (1) Magnetic, For Single Rear Axle

SUSPENSION, RR, SPRING, SINGLE Vari-Rate; 23,500-lb Capacity

LOCATION FUEL/WATER SEPARATOR Mounted Outside Left Rail 41" Back of Cab

FUEL/WATER SEPARATOR {Racor 400 Series,} Unheated, with Primer Pump, and WIF Sensor

FUEL TANK Top Draw; D-Style, Non-Polished Aluminum, 19" Deep, 50 U.S. Gal., 189 L Capacity, with Quick Connect Outlet, Mounted Left Side, Under Cab

FUEL COOLER Less Thermostat; Mounted in Front of Cooling Module

DEF TANK 7 U.S. Gal. 26.5L Capacity, Frame Mounted Outside Left Rail, Under Cab

Grand Prairie Fire Department

Heavy Rescue

CAB Conventional 6-Man Crew Cab
Includes
: ARM REST (2) Molded Plastic; One Each Door
: COAT HOOK, CAB Located on Rear Wall, Centered Above Rear Window
: CUP HOLDERS Two Cup Holders, Located in Lower Center of Instrument Panel
: DOME LIGHT, CAB Rectangular, Door Activated and Push On-Off at Light Lens, Timed Theater Dimming, Integral to Console, Center Mounted
: GLASS, ALL WINDOWS Tinted
: GRAB HANDLE, CAB INTERIOR (1) "A" Pillar Mounted, Passenger Side
: GRAB HANDLE, CAB INTERIOR (2) Front of "B" Pillar Mounted, One Each Side
: GRAB HANDLE, CAB INTERIOR (4) Two Each Side, Rear Door Mounted at Hinge Side and "C" Pillar Mounted
: INTERIOR SHEET METAL Upper Door (Above Window Ledge) Painted Exterior Color
: STEP (8) Two Steps Per Door

GAUGE CLUSTER Metric With Metric Electronic Speedomete
Includes
: GAUGE CLUSTER (6) Engine Oil Pressure (Electronic), Water Temperature (Electronic), Fuel (Electronic), Tachometer (Electronic), Voltmeter, Washer Fluid Level
: ODOMETER DISPLAY, Miles, Trip Miles, Engine Hours, Trip Hours, Fault Code Readout
: WARNING SYSTEM Low Fuel, Low Oil Pressure, High Engine Coolant Temp, and Low Battery Voltage (Visual and Audible)

SEATBELT WARNING PREWIRE Includes Seat Belt Switches and Seat Sensors for all Belted Positions in the Cab and a Harness Routed to the Center of the Dash for the Aftermarket Installation of the Data Recorder and Seatbelt Indicator Systems, for 4 to 6 Seat Belts

IP CLUSTER DISPLAY On Board Diagnostics Display of Fault Codes in Gauge Cluster

GAUGE, DEF FLUID LEVEL

SEAT, DRIVER {H.O. Bostrom Sierra Air 100} NFPA Compliant, Air Suspension, High Back, Vinyl with Covered Back and International on Headrest for Fire Truck
Includes
: SEAT BELT 3-Point, Lap and Shoulder Belt Type

SEAT, PASSENGER {H.O. Bostrom Tanker 450} for SCBA; Non-Suspension, High Back, Vinyl, Adjusters, 7-Degree Back Angle, with Covered Back, International Logo on Headrest
Includes
: SEAT BELT 3-Point, Lap and Shoulder Belt Type

SEAT, REAR {H.O. Bostrom Tanker 400CT} for SCBA with SecureAll Locking System, Three Individual Seats on One Riser, Non Suspension, High Back, Vinyl, With Covered Back and International on Head Rest

GRAB HANDLE (2) Chrome Towel Bar Type With Anti-Slip Rubber Inserts; for Cab Entry, Mounted Left and Right, Each Side at "B" Pillar

MIRRORS (2) {Lang Mekra} Styled; Rectangular, Power Both Sides, Thermostatically Controlled Heated Heads, Clearance Lights LED, Bright Finish Heads & Brackets, Breakaway Type, 7.09" x 15.75" & Integral Convex Both Sides, 102" Inside Spacing

SEAT BELT All Red; 4 to 6

AIR CONDITIONER {Blend-Air} With Integral Heater & Defroster
Includes
: HEATER HOSES Premium
: HOSE CLAMPS, HEATER HOSE Mubea Constant Tension Clamps
: REFRIGERANT Hydrofluorocarbon HFC-134A

INSTRUMENT PANEL Center Section, Ergonomic Panel

WINDOW, POWER (4) And Power Door Locks, Front and Rear Doors, Left and Right, Includes Express Down Feature

HVAC FRESH AIR FILTER

STORAGE POCKET, DOOR Molded Plastic, Full Width; Mounted on Passenger Door

CAB INTERIOR TRIM Deluxe; for Crew Cab
Includes
: CAB INTERIOR TRIM PANELS Cloth Covered Molded Plastic, Full Height; All Exposed Interior Sheet Metal is Covered Except for the Following: with a Two-Man Passenger Seat or with a Full Bench Seat the Back Panel is Completely Void of Covering
: CONSOLE, OVERHEAD Molded Plastic; With Dual Storage Pockets with Retainer Nets and CB Radio Pocket
: DOOR TRIM PANELS Molded Plastic; Driver and Passenger Doors
: FLOOR COVERING Rubber, Black
: HEADLINER Soft Padded Cloth
: INSTRUMENT PANEL TRIM Molded Plastic with Black Center Section
: STORAGE POCKET, DOOR (1) Molded Plastic, Full-Length; Driver Door
: SUN VISOR (2) Padded Vinyl with Driver Side Toll Ticket Strap, Integral to Console

CAB REAR SUSPENSION Air Bag Type

WHEELS, FRONT DISC; 22.5x8.25 Rims, Polished Aluminum, 10-Stud, 285.75mm BC, Hub-Piloted, Flanged Nut, with Steel Hubs

WHEELS, REAR DUAL DISC; 22.5x8.25 Rims, Polished Aluminum, 10-Stud, 285.75mm BC, Hub-Piloted, Flanged Nut, with Steel Hubs
Notes
: Aluminum Wheels not Painted or Coated
: Polished Surface Outside Dual Only

WHEEL BRAND, FRONT/REAR {Alcoa} Disc Wheels

(4) TIRE, REAR 11R22.5 Load Range H XDN2 (MICHELIN), 497 rev/mile, 75 MPH, Drive

(2) TIRE, FRONT 11R22.5 Load Range H X WORKS Z (MICHELIN), 495 rev/mile, 65 MPH, All-Position
SHOP NOTES
Updated with Cummins engine for order. BTW

CAB TO AXLE DIMESION

Cab to axle will be 62”.

CHASSIS MODIFICATIONS

LUBRICATION AND TIRE DATA PLATE

A permanent label in the driving compartment shall specify the quantity and type of the following fluids used in the vehicle and tire information:

- Engine oil
- Engine coolant
- Chassis transmission fluid
- Pump transmission lubrication fluid . . (if applicable)
- Pump priming system fluid, if applicable . . (if applicable)
- Drive axle(s) lubrication fluid
- Air conditioning refrigerant . . (if applicable)
- Air conditioning lubrication oil . . (if applicable)
- Power steering fluid
- Cab tilt mechanism fluid . . (if applicable)
- Transfer case fluid . . (if applicable)
- Equipment rack fluid (if applicable)
- CAFS air compressor system lubricant . . (if applicable)
- Generator system lubricant . . (if applicable)
- Front tire cold pressure
- Rear tire cold pressure
- Maximum tire speed ratings

VEHICLE DATA PLATE

A permanent label in the driving compartment which indicates the following:

- Filter part numbers for the;
  - Engine
  - Transmission
  - Air
  - Fuel
- Serial numbers for the;
  - Engine
  - Transmission
- Delivered Weights of the Front and Rear Axles
- Paint Brand and Code(s)
- Sales Order Number

OVERALL HEIGHT, LENGTH DATA PLATE (METRIC)

The fire apparatus manufacturer shall permanently affix a high-visibility label in a location visible to the driver while seated.

The label shall show the height of the completed fire apparatus in meters (to nearest 1/10th), the length of the completed fire apparatus in meters (to nearest 1/10th), and the GVWR in kilograms.

Wording on the label shall indicate that the information shown was current when the apparatus was manufactured and that, if the overall height changes while the vehicle is in service, the fire department must revise that dimension on the plate.

PERSONNEL CAPACITY

A label that states the number of personnel the vehicle is designed to carry shall be located in an area visible to the driver.

SEAT BELT WARNING - FAMA06/07

A safety sign FAMA06 shall be visible from each seat that is not equipped with occupant restraint and therefore not intended to be occupied while the vehicle is in motion.

A safety sign FAMA07, which warns of the importance of seat belt use, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

EQUIPMENT MOUNTING FAMA10

A safety sign FAMA10, which warns of the need to secure items in the cab, shall be visible inside the cab.

FIRE SERVICE TIRES - FAMA12

A safety sign FAMA12, which warns of the special requirements for fire service–rated tires, shall be visible to the driver entering the cab of any apparatus so equipped.

HELMET WARNING - FAMA15

A safety sign FAMA15, which warns not to wear helmets while the vehicle is in motion, shall be visible from each seat that is intended to be occupied while the vehicle is in motion.

CLIMBING METHOD - FAMA23

A safety sign FAMA23, which warns of the proper climbing method, shall be visible to personnel entering the cab and at each designated climbing location on the body.

REAR STEP CROSSWALK WARNING - FAMA24

A safety sign FAMA24, which warns personnel not to ride on the vehicle, shall be located at the rear step areas and at any cross walkways.

FINAL STAGE MANUFACTURER VEHICLE CERTIFICATION

A final stage manufacturer vehicle certification label shall be provided and installed in the driver cab door jamb area.

FRONT BUMPER EXTENSION

The front bumper of the chassis shall be extended approximately 20" ahead of the cab using Junior I-beams.

The bumper mounting plate shall be welded to the Junior I-beam for mounting of the chassis bumper. After fabrication of the bumper extension, the panels shall be removed and the unit shall be primed and painted black.

BUMPER GRAVEL SHIELD

The front bumper extension shall have a 3/16" NFPA compliant aluminum tread plate gravel shield. The gravel shield shall cover the full width of the front bumper to the front of the cab and the full height of the bumper on each end.

BUMPER PRE-CONNECT COMPARTMENTS

The bumper extension shall have two (2) fire hose pre-connect compartments, one (1) on streetside, and one (1) on curbside. The compartments shall be as large as room allows. Compartment doors shall be 1/8" NFPA compliant aluminum tread plate with stainless steel hinge wrapped with vinyl and chrome push release type latches. Doors shall be notched to allow fire hose to be pre-connected to swivel located on front bumper. The compartment doors shall have a gas shock type hold open device. Compartments shall not be watertight but shall include a compartment drain.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at each hose storage area.

If the bumper compartments are greater than 4 cu.ft. in volume and has an opening greater than 144 sq.in. it shall have sufficient compartment lighting to provide a minimum of 2 fc (20 lx) at any location on the floor of the compartment without any equipment in the compartment. There shall be one (1) 9" OnScene LED type ground light mounted below the bumper.

A flashing warning light signal shall be provided indicating when a compartment door is not in a closed position as required by NFPA 1901.

AIR HORN

One (1) Grover 24" Stuttertone chrome plated air horn shall be mounted below the front bumper, centered. An emergency air shut off valve shall be provided in the cab.

AIR HORN ACTIVATION

The air horn(s) activation shall be supplied by the cab/chassis manufacturer.

FRONT TOW PLATE

A horizontal full frame width, 1/2" thick steel plate, center pull, front tow eye shall be furnished and installed through or below the front bumper. The tow eye plate shall be triangle shaped extended 6" beyond the front bumper with a 3" x 4" rectangle tow eye. The tow eye must be braced and gusseted to prevent frame rail or bumper damage and bolted to the front frame rail web with eight (8) 5/8" SAE Grade 8 frame bolts and lock nuts.

AIR INTAKE SYSTEM

An air filter shall be provided in the engine's air intake system by the body builder. Air inlet restrictions shall not exceed the engine manufacturer's recommendations. The air inlet shall be equipped with a means of separating water and burning embers from the air intake system.

In addition to the engine's air intake, the cab fresh air intake and/or outside cab vent shall be equipped with a means of separating water and burning embers from the air intake system

This requirement shall be permitted to be achieved by either of the following methods:

1. Provision of a device such that burning particulate matter larger than 0.039 in. (1.0 mm) in diameter cannot reach the air filter element.
2. Provision of a multi screen ember separator capable of meeting the test requirements defined in the Parker Hannafin, Racor Division, publication LF 1093-90, *Ember Separation Test Procedure*, or an equivalent test.

EXHAUST

The exhaust system shall be as provided by cab/chassis manufacturer. The tailpipe may require some modifications for proper ground clearances and fit with body.

The exhaust piping and discharge outlet shall be located or shielded so as not to expose any portion of the vehicle or equipment to excessive heating.

Exhaust pipe discharge shall be directed away from any operator's position or entry doors on body.

Where parts of the exhaust system are exposed so that they are likely to cause injury to operating personnel, protective guards shall be provided.

NEDERMAN EXHAUST ANCHOR PLATE

A Grand Prairie Fire Department supplied Nederman transmitter and an exhaust anchor plate shall be mounted in fender area near chassis engine exhaust tail pipe for use with Nederman exhaust extraction system. Center of anchor plate to center of exhaust pipe should be 24".

RADIO/ANTENNA INSTALLATION

There shall be one (1) Grand Prairie Fire Department supplied Kenwood NX5900 radio(s) with antenna installed in the cab within easy reach of driver. The location of radio shall be determined by the Grand Prairie Fire Department at the pre-construction meeting. All required radio programming shall be responsibility of Grand Prairie Fire Department. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of Grand Prairie Fire Department after delivery.

Radio shall be installed per Manufacturer's requirements and wired for proper 12 volt power and ground.

12 VDC FUSE BLOCK

There shall be two (2) Blue Sea Systems 100 amp ST Series blade type fuse block with screw type terminals for both positive and negative buss with cover provided for distribution of up to six (6) 30 amp, 12 VDC circuits. Fuse block shall be located per required circuits and be protected from damage.

SEAT BELT COLOR

Section 14.1.3.4 of the NFPA 1901 Standards, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

SEAT BELT WEB LENGTH - COMMERCIAL CAB

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 standards, require the effective seat belt web length for a Type 1 lap belt for pelvic restraint to be a minimum of 60", and a Type 2 pelvic and upper torso restraint-style seat belt assembly to be a minimum of 110".

The chassis seat belt web length as supplied by the commercial chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

SEAT BELT MONITORING AND VEHICLE DATA RECORDER (VDR) SYSTEMS

SEAT BELT MONITORING

A Weldon 6204 series system with Vista IV display shall be provided and installed to allow the driver to know if all persons seated in the vehicle are secured with seat belts before moving the vehicle. Built-in smart seating logic shall detect if the correct sit and buckle sequence is not followed for all seats. System shall also provide an output for an external alarm. Weldon diagnostic port will be located under dash on driver side. System shall include the following features;

VEHICLE DATA RECORDER (VDR)

The vehicle data recorder shall have the following features;

- Recorded Data Includes: Vehicle Speed, Acceleration, Deceleration, Engine Speed, Engine Throttle Position, ABS Event, Seat Occupied Status, Seat Belt Status, Master Optical Warning Switch, Park Brake, Service Brake, Time, Date and Engine Hours.
- Password Protected by the customer
- Six (6) seat position inputs for occupied and belts buckled. Additional six (6) seat expansion module available.
- Easily interfaces with V-MUX™ or other multiplexing systems
- Data is extracted by a standard, mini USB cable

OCCUPANT RESTRAINT INDICATOR

The occupant restraint indicator shall have the following features;

- Will be displayed on Vista IV panel.
- Supports commercial and custom cab seating layouts; up to 12 seats
- Built-in audible alarm
- Use in conjunction with Vehicle Data Recorder (VDR)

IGNITION KEY

If the vehicle is specified to have an ignition key it will be attached to steering column or dash with vinyl covered steel cable.

SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS

Each tire valve stem shall be equipped with an LED Tire Alert (or equal), heavy duty valve cap LED indicator that indicates proper tire pressure. The LED Tire Alert valve cap is self-calibrating. When the cap is mounted on the valve stem the first time, it will memorize that tire pressure, and can be set to recognize a drop in pressure as little as 6 psi. It can be checked for functionality and battery condition by simply unscrewing the cap. If it is in working condition, it will immediately start blinking.

HELMET STORAGE

No helmet storage is required in the cab driving area.

HELMET STORAGE

No helmet storage is required in the cab crew area.

GEAR HOOKS

Two (2) hooks shall be provided at interior back wall of cab for individual bunker gear.

CAB CRASH TEST CERTIFICATION

A cab crash test certification from the fire apparatus manufacturer shall be provided with the equipment. A copy of this certification shall be included with the bid.

NOTE: There shall be no exception to any portion of the cab integrity certification requirements. Nonconformance shall lead to immediate rejection of bid.

The certification shall state that the cab does meet or exceed the requirements below:

1) European Occupant Protection Standard ECE Regulation No. 29.
2) SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

CAB MIRRORS, DRIVER ADJUSTABLE

Section 14.3.5 of the NFPA 1901 Standards, 2009 edition, requires all primary rear view mirrors used by the driver to be adjustable from the driver's position.

ADD UPPER SECOND COLOR

The cab exterior (door jambs not painted unless specified otherwise) shall be re-painted with a second color over the main cab color from the bottom of the glass up over cab roof with PPG Delfleet Evolution paint.

Color: White

Paint Number: FBCH 2185

CHASSIS PAINT WARRANTY

The portion of the cab re-painted shall be provided with a ten (10) year, non-prorated paint warranty to the original owner. The warranty shall be provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle.

CAB STEP AND FUEL TANK COVER

The stock cab upper and lower entry steps shall be overlaid with 1/8" NFPA compliant aluminum treadplate. There will be a removable panel to access and replace the chassis batteries and a hinged fuel fill access door.

The maximum stepping height shall not exceed 18", with the exception of the ground to first step, which shall not exceed 24" when the vehicle is loaded to its estimated in-service weight. All steps shall have a minimum area of 35 sq in and shall be of such a shape that a 5" diameter disk does not overlap any side when placed on the step, and shall be arranged to provide a t least 8" of clearance between the leading edge of the step and any obstruction. All platforms shall have a minimum depth of 8" from the leading edge of the platform to any obstruction.

The following options will be cut into the step cover:

BATTERY CHARGING RECEPTACLE LOCATION

The specified battery charging receptacle and/or display panel shall be located on front face of specified cab step cover.

HUB AND NUT COVERS

Front and rear wheels shall be provided with stainless steel hub caps and wheel nut covers.

COAT HOOKS

Two (2) heavy duty coat hooks shall be provided on rear wall of cab to hold bunker jackets.

MUDFLAPS

There shall be 1/4" rubber mudflaps provided and installed behind each set of tires to prevent throwing road debris and lower road spray.

AIR BRAKE SYSTEM QUICK BUILD-UP

There shall be one (1) Milton male quick connector type air shoreline inlet to provide air to the chassis air tanks from an external source compressed air shoreline hookup in order to maintain full operating air pressure while the vehicle is not running. Air inlet shall be located near driver's door. The female end of the connector shall be supplied by the Grand Prairie Fire Department.

The quick buildup system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time.

CHASSIS AIR TANK VALVES

The cab/chassis air brake system tank drains shall be extended to Class 1 brass petcock valves with chrome plated zinc handle located on forward streetside lower body. Each air tank and valve shall be inter-piped with color coded reinforced nylon tubing. Brass compression type fittings shall be used on the nylon tubing, meeting all DOT requirements where applicable.

Each handle shall be properly labeled with colored tag to identify each tank.

DRIVELINE GUARD

There shall be one (1) driveline guard provided per drive shaft. Driveline guards shall be a "U" bolt type driveline guard to provide protection in case of driveline or universal joint failure.

ROAD EMERGENCY SAFETY KIT

The completed unit shall be supplied with one (1) set of three (3) dual faced reflective triangles, and three (3) warning flares complete with storage case per DOT requirements.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket per DOT requirements shall be provided and mounted inside cab area.

BODY DESIGN

The importance of public safety associated with emergency vehicles requires that the construction of this vehicle meet the following specifications. These specifications are written to establish the minimum level of quality and design. All Bidders shall be required to meet these minimum requirements.

It is the intent of these specifications to fully describe the requirements for a custom built emergency type vehicle. In order to extend the expected service life of this vehicle, the body module shall be removable from the chassis frame and be capable of being installed on a new chassis.

The sheet metal material requirements, including alloy and material thickness, throughout the specifications are considered to be a minimum. Since such materials are available to all Manufacturers, the material specifications shall be strictly adhered to.

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Grand Prairie Fire Department to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the Grand Prairie Fire Department from such repair and shall NOT be used.

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body shall be built directly on the subframe. The joining of the subframe and body shall be of a welded integral construction.

The sheet metal fabrication of the body shall be performed using inert gas continuous feed welders only. The entire body shall be welded construction. The use of pop rivets in any portion of structural construction may allow premature failure of the body structure. Therefore, pop rivets shall NOT be used in the construction of the structural portions of the body. This includes side body sheets, inner panels of compartment doors, and any other structural portions of the body.
SHOP NOTES
Deleted bid wording.

EXTERIOR ALUMINUM BODY

The fabrication of the body shall be constructed from aluminum 3003H-14 alloy smooth plate. This shall include compartment front panel, vertical side sheets, side upper rollover panels, rear panels and compartment door frames.

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas, No Exceptions.

The front and rear corners of body shall be formed as part of the front or rear body panels. This provides a stronger body corner and finished appearance. The use of extruded corners, or caps will not be acceptable, No Exceptions.

The door side frame openings shall be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments shall be provided. This raceway shall contain all 12 volt wiring running to the rear of the apparatus, permitting easy accessibility to wiring.

Individual compartment modules, with dead air space voids between compartments, will not be an acceptable method of compartment construction.

The compartments shall be an integral part of the body construction. Compartment floors from front of body to ahead of rear axle, also from rear axle to rear of body shall be single one-piece sections. Compartment floors shall be preformed, then positioned in body and welded into final position.

Compartment floors shall have a "sweep-out" design with door opening threshold positioned lower than compartment floor, permitting easy cleaning of compartments. Angles, lips, or door moldings are not acceptable in the base of compartment door opening. One-way rubber drain valves shall be provided in compartment floors so that a water hose may be used to flush-out compartment area.

All exterior seams in sheet metal below frame, and around the rear wheel well area shall be welded and caulked to prevent moisture from entering the compartments. All other interior seams and corners shall be sealed with silicone based caulk prior to painting.

Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment.

DRIP RAILS

The body shall have drip rails over the side full height compartments. The drip rails shall be formed into the upper body panels providing a ridged lower panel and a flat upper body panel surface. The use of mechanically fastened, taped or glued on drip rails will not be acceptable, No Exceptions.

ROOF CONSTRUCTION

The roof structure shall be integral with the body sheet metal construction and shall be an all welded assembly. The body roof structure shall be overlaid with not less than 3/16" aluminum 3003H-14 alloy tread plate and welded to roof structure and body sheet metal. All seams in roof material shall be fully and continuously welded to prevent entry of moisture.

There shall be a total of four (4) 2" x 2" x 1/4" 6061-T6 alloy aluminum "C" channels running the length of body, two (2) on each outboard side. These "C" channels shall be used for roof support and in addition shall be used for mounting of any specified reels. This open "C" channel design along with special reel mounting clips allows for a universal location of any specified reels within each compartment.

In between the two (2) center "C" channels running the length of body shall be 2" x 2" x 1/4" 6061-T6 alloy aluminum tubing running in between and welded in place on approximate 16" centers to support roof and/or walkway structure if specified.

A 2" formed radius shall be provided along the body sides and utilized as a wiring trough. The use of aluminum extrusions in this area shall not be acceptable, .

BODY SUBFRAME

The chassis frame rails shall be fitted with 1/4" custom extruded UHMW polyethylene rail cap to isolate the body frame members from direct contact with chassis frame rails.

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 4" x 1/4" aluminum tubes minimum, the same width as the chassis frame rails. Welded to this tubing shall be cross members of 2" x 4" x 1/4" aluminum. Smaller dimension, lighter gauge tubing or angle material subframe shall not be accepted.

These cross members shall extend the full width of the body to support the compartments. Cross members shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum cross members shall be located on 16" centers, or as necessary to support walkway or heavy equipment.

To form the frame, the tubing shall be beveled and welded at each joint using 5356 aluminum alloy welding wire.

BODY MOUNTING

The body subframe shall be fastened to the chassis frame with a minimum of four (4) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilizing two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement will not be acceptable.

10" REAR STEP BUMPER

The full width rear bumper shall be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel 10" and provide a rear step with a minimum of 1/2" space at body for water drainage.

The corners of bumper shall have a 45 degree chamfer.

REAR TOW EYES

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below body. The tow eyes shall be fabricated from 3/4" thick steel plate with a 3" diameter opening. Tow eyes shall have a black powder coat finish.

GROUND LIGHTS

There shall be two (2) OnScene 8" Access LED lights installed below bumper capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting shall be switchable but activated automatically when the vehicle park brake is set.

WHEEL WELL EXTERIOR PANEL

The exterior panel of the body wheel well enclosure shall be constructed from 3/16" smooth aluminum panels.

RUBBER BODY FENDERS

The body wheel well openings shall be provided with round radius, rubber fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using stainless steel fasteners with plastic isolators to help prevent corrosion.

WHEEL WELL LINERS

The wheel wells shall be provided with an easily removable polymer, circular inner fender liner. The inner liner shall be bolted to the wheel well with stainless steel bolts and spaced away from the wheel well so the liner will not accumulate dirt or water.

SCBA CYLINDER COMPARTMENTS

There shall be four (4) SCBA cylinder storage compartments, two (2) on each side of body in the rear wheel well area. Each compartment shall have a stainless steel hinge with brushed stainless steel door assembly with a positive catch latch. Each compartment shall have a 8" diameter tube behind the wheel well panel attached to the door assembly. Each compartment shall allow the storage of an SCBA cylinder or a fire extinguisher up to 7-3/4" in diameter and 22" deep. The door shall activate the "Hazard Warning Light" in the cab when not in the closed position.

BODY PAINT SPECIFICATIONS

BODY PAINT PREPARATION

After the body and components have been fabricated they shall be disassembled so when vehicle is complete there shall be finish paint beneath the removable components. The body shall be removed from chassis during the paint process to insure proper paint coverage. The body and components shall be metal finished as follows to provide a superior substrate for painting.

The exterior (and interior, if painted) body shall undergo a thorough cleaning process starting with a biodegradable phosphoric acid solution to begin the etching process followed by a complete clear water rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the metal surface for greater film adhesion.

All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be chrome plated. Iron fittings shall be copper under plated prior to chrome plating.

PAINT PROCESS

The paint process shall follow the strict standards set forth by PPG Industries guidelines. Painters applying PPG products will be PPG Certified Commercial Technicians, and re-certified every two (2) years. The body shall go through the following paint process;

1) Clean bare metal with a wax and grease remover using low lint rags.
2) Inspect, straighten, and hammer high points, grind all seams, sharp edges, and welds. DA sand entire paintable surfaces using 24-180 grit dry paper. Plastic fill all low spots and DA sand fill areas using 36-180 grit dry paper. Apply pinhole filler and DA sand areas using 80-180 grit dry paper.
3) Re-clean bare metal using a wax and grease remover and low lint rags.
4) Within 24 hours, a PPG Delfleet® epoxy color primer with proper hardener for corrosion resistance using a pressure pot spray gun and applying 2-5 full wet coats or 1.5-8.0 dry mils max. achieving full hiding and allow to air dry 60 minutes @ 70°F or bake for 45 minutes @ 140°F degree.
5) Inspect, putty fill, and dry guild coat entire body surface and DA sand using 180-400 grit dry paper.
6) Re-clean bare metal using a wax and grease remover using low lint rags.
7) A PPG Delfleet® primer sealer with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 1 full wet coat or 1.0-2.0 dry mils achieving full hiding and allow to flash off in spray booth for minimum of 60 minutes @ 70°F.
8) A PPG Delfleet® FBCH basecoat (color) with proper hardener and dry additive shall then be sprayed using a pressure pot set @ 45-60 PSI and achieving full hiding or 1.5-2.0 wet mils and allow to flash off in spray booth 45-60 minutes before applying clearcoat.
9) A PPG Delfleet® clearcoat with proper hardener and thinner shall be sprayed using a pressure pot spray gun and applying 2-3 full wet coats or 5.0 wet mils for a uniform gloss and allow to flash off in spray booth 10 minutes and bake for 120-140 minutes @ 125°F (surface temp.).
10) After cooling, DA sand heavy orange peel or runs using 1000 grit dry sand paper and final DA sand using 1500-2000 grit dry sand paper. Wipe off all surfaces to remove dust and debris. Buff unit as needed using 3M rubbing compound and a white wool pad and inspect until all sand scratches are removed.
11) Polish as needed using 3M Perfect-It-Polish and a black foam pad, repeat as necessary and inspect until all sand scratches are removed.

PAINT - ENVIRONMENTAL IMPACT

The contractor shall meet or exceed all current State (his) regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. PPG Delfleet® Evolution paint shall be free of all heavy metal (lead & chromate) components. Paint emissions from sanding and painting shall be filtered and collected. All paint wastes shall be disposed of in an environmentally safe manner. Solvents used in cleanup operations shall be collected, sent off-site for distillation and returned for reuse.

FASTENERS

Prior to the assembly and reinstallation of exterior components; i.e. warning and DOT lights, handrails, steps, door hardware, and miscellaneous items, a Mylar isolation tape, or gasket shall be used to prevent damage to the finish painted surface. These components shall be fastened to body using either a plastic insert into body metal with stainless steel screws or zinc coated nut-surts into body surface using stainless steel bolts to prevent corrosion from dissimilar metals.

ELECTROLYSIS CORROSION CONTROL

The vehicle shall be assembled using ECK brand or similar corrosion control compound on all high corrosion potential areas.

ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

PAINT FINISH - SINGLE COLOR

The body shall be painted with a single color of PPG Delfleet® Evolution per Grand Prairie Fire Department approved paint spray out provided.

A small touch-up bottle of paint shall be provided with completed vehicle.

- Paint Color: Match cab/chassis supplied paint color.

BODY UNDERCOATING

The entire underside of body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas underside of body and wheel well area to help prevent corrosion under the vehicle.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT WARRANTY

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle. **Pro-rated warranties will not be acceptable.**

COMPARTMENT INTERIOR FINISH

The interior of all exterior body compartments shall be a "Maintenance Free" smooth unpainted finish. All body seams shall be finished with a caulk sealant for both appearance and moisture protection.

REFLECTIVE STRIPE REQUIREMENTS

Material

All retroreflective materials shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

All retroreflective materials used that are colors not listed in ASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retro-reflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.

Minimum Requirements

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the apparatus.

The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The 4 in. (100 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

GRAPHICS PROOF

A color graphics proof of the reflective striping layout shall be provided for approval by Grand Prairie Fire Department prior to installation. The graphics proof shall be submitted to Grand Prairie Fire Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

REFLECTIVE STRIPE - CAB SIDE

The reflective stripe material shall be 6" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1/2" Scotchcal reflective stripe located 1/2" above and a second 1/2" Scotchcal reflective stripe located 1/2" below the main stripe.

- This reflective stripe shall be white in color.

CHEVRON STRIPE - CAB BUMPER

A reflective stripe shall be affixed to the front of cab. The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The approximate 10" wide Chevron retroreflective stripe shall be affixed to at least 25 percent of the width of the front of the apparatus with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shall be 6" width. Chevron panels shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panels shall have a minimum 10 year warranty for material failure, and colorfastness.

- The stripe material shall be 3M Scotchlite Diamond Grade.

All retroreflective materials required shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

This reflective chevron stripe shall alternate red and fluorescent yellow-green in color.

REFLECTIVE STRIPE - CAB DOOR INTERIOR

Any door of the apparatus designed to allow persons to enter or exit the apparatus shall have at least 96 in.2 (62,000 mm2) of retroreflective material affixed to the inside of the door.

The stripe material shall be 3M Scotchlite 680.

- This reflective stripe shall be white in color.

REFLECTIVE STRIPE - BODY SIDES

The reflective stripe material shall be 6" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1/2" Scotchcal reflective stripe located 1/2" above and a second 1/2" Scotchcal reflective stripe located 1/2" below the main stripe.

- This reflective stripe shall be red in color on roll-up doors, and white in color on body door frame.

The stripe shall extend straight from front of cab, then ahead of the rear wheels, it shall form a "Z" shape and extend straight back to the rear of the body.

CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

At least 50 percent of the rear-facing vertical surfaces, visible from the rear of the apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shall be 6" width.

The rear side panels of the body on each side of a rear stairway or compartment shall have a chevron style reflective stripe, extending from bumper height up to side compartment drip rail height. Each chevron panel shall be a full sheet and shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panel shall have a minimum 10 year warranty for material failure, and colorfastness.

The stripe material shall be 3M Diamond Grade.

This reflective chevron stripe shall alternate red and fluorescent yellow-green in color.

LETTERING

GRAPHICS PROOF

A color graphics proof of the lettering layout shall be provided for approval by Grand Prairie Fire Department prior to installation. The graphics proof shall be submitted to Grand Prairie Fire Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

The following lettering shall be provided and installed on the completed unit as follows;

SIDE CAB DOOR LETTERING

There shall be forty six (46) 3" high reflective letters furnished and installed on the vehicle.

"Proudly Serving Since 1915"

- This reflective lettering shall be white in color.

REAR BODY LETTERING

There shall be sixteen (16) 4" high reflective letters furnished and installed on the vehicle.

"KEEP BACK"
"50 METERS" - On lower rear roll-up door.

- This reflective lettering shall be red in color.

There shall be four (4) 8" high reflective letters furnished and installed on the vehicle.

"GPFD" - On upper rear roll-up door.

- This reflective lettering shall be red in color.

CUSTOM DECAL LOGO - 12" -18"

One (1) custom designed 12" - 18" Scotchcal type retroreflective logo shall be provided and located on the completed vehicle. The exact design and/or artwork shall be provided by the Grand Prairie Fire Department prior to construction.

One (1) copy of the above custom logo shall be provided and located on the completed vehicle as directed by Grand Prairie Fire Department.

DIAL 911 DECAL

Two (2) "Dial 911" decals shall be provided one (1) on each side of vehicle, located on side rear roll-up doors below main stripe. Decals shall be Scotchcal 680 series red reflective material.

EXTERIOR COMPARTMENT DOORS

ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)

The vehicle shall be equipped with R•O•M Series IV roll-up exterior compartment doors. The R•O•M roll-up doors shall be complete with the following features;

Each shutter slat, track, bottom rail, and drip rail shall be constructed from anodized 6063 T6 aluminum. Shutter slats shall feature a double wall extrusion 0.315” thick with a concave interior surface to minimize loose equipment jamming the shutter door closed. Shutter slats shall feature an interlocking end shoe to prevent side to side binding of the shutter door during operation. Slats must have interlocking joints with an inverted locking flange. Slat inner seal shall be a one piece PVC extrusion; seal design will be such to prevent metal to metal contact while minimizing dirt and water from entering the compartment.

Shutter door track shall be one piece design with integral overlapping flange to provide a clean finished look without the need of caulk. Door track shall feature an extruded Santoprene rubber double lip low profile side seal with a silicone co-extruded back to reduce friction during shutter operation.

Shutter bottom rail shall be a one piece double wall extrusion with integrated finger pull. Finger pull shall be curved upward with a linear striated surface to improve operator grip while operating the shutter door. Bottom rail shall have a smooth contoured interior surface to prevent loose equipment from jamming the shutter door. Bottom rail seal shall be made from Santoprene; it will be a double “V” seal to prevent water and debris from entering compartment. Bottom rail lift bar shall be a one piece “D” shaped aluminum extrusion with linear striations to improve operator grip during operation. Lift bar shall have a wall thickness of 0.125”. Lift bar shall be supported by no less than two pivot blocks; pivot blocks shall be constructed from Type 66 Glass filled reinforced nylon for superior strength. Bottom rail end blocks shall have incorporated drain holes which will allow any moisture that collects inside the extrusion to drain out.

Shutter door shall have an enclosed counter balance system. Counter balance system shall be 4” in diameter and held in place by two (2) heavy duty 18 gauge zinc plated plates. Counter balance system shall have two (2) over-molded rubber guide wheels to provide a smooth transition from vertical track to counter balance system; no foam material of any kind shall be permitted or used in this area.

ROM DOOR BOTTOM RAIL

All exterior compartment doors shall have the standard 3.0" tall bottom rail extrusion for easy one (1) hand opening and closing.

The specified retroreflective stripe material shall be applied on the roll-up compartment doors. The stripe shall be precision machine cut for each door slat of the roll-up doors. Under no circumstance will the stripe material be cut on roll-up door surface.

BODY WIDTH DIMENSIONS

The wildland body shall be 98.0" wide, and 100.0" wide at drip rails. Interior compartment depth dimensions shall be approximately:

Area Description	Dimension
Compartment depth above subframe	12.5"
Compartment depth below subframe	22.5"

STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S1)

The interior useable compartment width shall be approximately 54.0" wide.

The compartment door opening shall be approximately 49.5" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be horizontally mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.

SHOP NOTES
Striping will be red, diamond grade. Adjusted price.

- There shall be one (1) 400 lbs. slide-out tray(s) approximately 22" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front and side faces of the tray. The striping shall be 2" wide and red/white in color.

SHOP NOTES
Striping will be red, diamond grade. Adjusted price.

- The back wall of compartment shall be covered with PAC Trac single face model 7000 aluminum extrusion with the tracks in a horizontal orientation.

  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on complete front face of the PAC Trac back compartment wall. The striping shall be red in color.

- Two (2) OnScene Access LED, full height compartment lights, vertically mounted.

STREETSIDE COMPARTMENT - REAR (S2)

The interior useable compartment width shall be approximately 47.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.

SHOP NOTES
Striping will be red, diamond grade. Adjusted price.

- There shall be one (1) adjustable shelf/shelves approximately 22" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.

SHOP NOTES
Striping will be red, diamond grade. Adjusted price.

- The back wall of compartment shall be covered with PAC Trac single face model 7000 aluminum extrusion with the tracks in a horizontal orientation.

  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on complete front face of the PAC Trac back compartment wall. The striping shall be red in color.

- Two (2) OnScene Access LED, full height compartment lights, vertically mounted.

- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

CURBSIDE COMPARTMENT - ABOVE REAR WHEELS (C1)

The interior useable compartment width shall be approximately 54.0" wide.

The compartment door opening shall be approximately 49.5" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be horizontally mounted aluminum Shelf-Trac on back wall of compartment, for Grand Prairie Fire Department mounted SCBA pack brackets. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- Two (2) OnScene Access LED, full height compartment lights, vertically mounted.

CURBSIDE COMPARTMENT - REAR (C2)

The interior useable compartment width shall be approximately 47.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 12" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.

SHOP NOTES
Striping will be red, diamond grade. Adjusted price.

- There shall be one (1) adjustable shelf/shelves approximately 22" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.

SHOP NOTES
Striping will be red, diamond grade. Adjusted price.

- The back wall of compartment shall be covered with PAC Trac single face model 7000 aluminum extrusion with the tracks in a horizontal orientation.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on complete front face of the PAC Trac back compartment wall. The striping shall be red in color.
- Two (2) OnScene Access LED, full height compartment lights, vertically mounted.
- Two (2) 3-1/2" x 3-1/2" black plastic louvered vents shall be provided in the lower compartment.

REAR COMPARTMENT - CENTER (RC1)

The rear center compartment shall start at the top of the body sub-frame and be as high as the side compartments, unless specified otherwise.

The interior useable compartment width shall be approximately 50.0" wide.

The compartment door opening shall be approximately 31.0" wide.

This compartment shall have a R•O•M series IV roll-up door.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) 1" wide nylon strap shall be provided to assist in closing the compartment door. The strap shall be fastened to the lower left inside door sill with a nickel plated Footman loop secured to back of door. The strap shall extend from door to a nickel plated Footman loop secured to wall or vertical slot of Shelf-Trac on left side of the door opening.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) adjustable shelf/shelves approximately 25" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
  - 3M™ Diamond Grade™ Conspicuity striping shall be provided on the front face of the shelf. The striping shall be red/white in color.

SHOP NOTES
Striping will be red, diamond grade. Adjusted price.

- There shall be two (2) aluminum handrail sections with brackets assembled under the hose bed extension step. Brackets shall be designed to hold the handrails in position with a quick pin to hold in place for operation. Inside the right rear ladder compartment door shall be a storage bracket to hold the handrails when not in use. The I-Zone brackets are provided to lace the hose between when moving from house to house during structure fire protection operations.
- Two (2) OnScene Access LED, full height compartment lights, vertically mounted.
- One (1) booster hose reel(s) shall be located in this compartment area.

ROPE ANCHOR OR PORTABLE WINCH RECEIVERS

The completed unit shall have an integrated receiver or anchor system for use with removable rope anchor point and/or a portable electric winch, when specified.

Receivers or anchors installed at any location on the apparatus for use as removable winch anchors shall be designed and affixed to provide at least a 2.0 to 1 straight line pull no-yield safety factor over the load rating of the removable winch.

Receivers or anchors installed at any location on the apparatus for use with rope operations shall be designed and affixed to the apparatus to provide at least a 9,000 lbf (40,000 N) no-yield condition with a straight line pull.

A safety sign FAMA28 shall be located on or near each receiver or anchor stating the maximum straight line pull rating.

Side receiver(s) (if specified) shall have the following load rating:

	STRAIGHT PULL	SAFETY FACTOR
Rope Tie Off:	600 Lbs.	15:1
Winch:	5,000 Lbs.	2:1

Front and/or rear receiver(s) (if specified) shall have the following load rating:

	STRAIGHT PULL	SAFETY FACTOR
Rope Tie Off:	600 Lbs.	15:1
Winch:	Winch Load Rating (9,000 Lbs. Max)	2:1

The following items shall be provided to accomplish rope rescue and/or portable winch operation;

- There shall be one (1) 2" x 2" x 1/4" wall steel receiver tube(s) with black hammertone powder coat paint finish located at the front bumper for use with removable rope anchor point and/or a portable electric winch (when specified) and/or a removable hose roller.
  - There shall be one (1) 12 VDC plug(s) with quick connect provided to power a Ramsey portable winch. All 12 VDC cables to be sized according to Ramsey and installation for intended use.
  - The receiver(s) shall have one (1) rubber cover(s) provided.
- There shall be one (1) 2" x 2" x 1/4" wall steel receiver tube(s) with black hammertone powder coat paint finish located at the center of rear bumper for use with removable rope anchor point and/or a portable electric winch (when specified).
  - There shall be one (1) 12 VDC plug(s) with quick connect provided to power a Ramsey portable winch. All 12 VDC cables to be sized according to Ramsey and installation for intended use.
  - The receiver(s) shall have one (1) rubber cover(s) provided.

EQUIPMENT STORAGE, REAR STREETSIDE

There shall be an equipment storage compartment located on the rear streetside of vehicle. The bottom of compartment shall be located at approximate top of fender height extending thru body behind the streetside compartments and the booster tank.

Access to the compartment shall be from a rear facing vertically hinged compartment door. The door shall be fabricated from 3/16" smooth aluminum with full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin, a 6" stainless steel locking "D" ring handle. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary to prevent corrosion. Door shall overlap body surface to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Compartment shall have a flush mounted OnScene LED light near door opening that shall be automatically activated when door is opened, and wired to compartment door ajar warning light provided in cab.

Devices to secure equipment, compartment dividers, or UHMW plastic angles, or sheeting shall be used for storage of specified equipment as required to prevent damage to equipment.

Storage shall be provided for the following equipment with proper labeling;

- Two (2) pike pole(s). Manufacturer, model number of the pike pole shall be provided in equipment section of specification, or at pre-construction meeting when provided by Grand Prairie Fire Department.

- Three (3) 8' length of hard suction hose. Hard suction hose(s) shall be supplied by contractor with completed unit. See equipment section.

LADDER / EQUIPMENT STORAGE, REAR CURBSIDE

There shall be a ladder and/or equipment storage compartment located on the rear curbside of vehicle. The bottom of compartment shall be located at approximate top of fender height extending thru body behind the streetside compartments and the booster tank.

Access to the compartment shall be from a rear facing vertically hinged compartment door. The door shall be fabricated from 3/16" smooth aluminum with full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin, a 6" stainless steel locking "D" ring handle. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary to prevent corrosion. Door shall overlap body surface to prevent entry of moisture and sealed with automotive type rubber molding to provide a weather resistant seal.

Compartment shall have a flush mounted OnScene LED light near door opening that shall be automatically activated when door is opened, and wired to compartment door ajar warning light provided in cab.

Devices to secure equipment, compartment dividers, or UHMW plastic angles, or sheeting shall be used for storage of specified equipment as required to prevent damage to equipment.

Storage shall be provided for the following ladders and equipment with proper labeling;

- One (1) 20' 3-section ladder(s). Manufacturer, model number of the ladder shall be provided in equipment section of specification, or at pre-construction meeting when provided by Grand Prairie Fire Department.

FRONT PROTECTION PANELS

To protect areas subject to intensive wear, scuffing or abuse, protection panels shall be installed on the front vertical body panels and wrapped around to the front compartment door opening. The protection panels shall be fabricated from 20 gauge brushed stainless steel.

REAR BODY HANDRAILS

There shall be two (2) 24" vertical handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

REAR BODY HANDRAILS

There shall be two (2) 24" horizontal handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

PUMP MODULE HANDRAILS

There shall be two (2) 24" handrails, one (1) each side of pump module for access to upper dunnage area. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

FOLDING STEP(S)

There shall be four (4) Innovative Controls polished cast aluminum folding step(s) provided and installed on completed vehicle. Each step shall be heavy duty with stainless steel spring and textured step surface meeting NFPA standards. Each step shall include an LED light.

Location(s): _____

REAR STEP

Two (2) Zico PS-8 manual pull-out and down step(s) shall be installed below the rear bumper. The step surface, when pulled out from its nested position, shall be approximately 8" below the rear bumper step.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

Any low voltage electrical systems or warning devices installed on the fire apparatus shall be appropriate for the mounting location and intended electrical load.

Where wire passes through sheet metal, grommets shall be used to protect wire and wire looms. Electrical connections shall be with double crimp water-tight heat shrink connectors.

All 12 VDC wiring running from front to back of vehicle body shall be run in full length electrical wiring raceway down each side of body.

Wiring

All electrical circuit feeder wiring supplied and installed by the fire apparatus manufacturer shall meet the requirements of NFPA Chapter 13.

The circuit feeder wire shall be stranded copper or copper alloy conductors of a gauge rated to carry 125% of the maximum current for which the circuit is protected. Voltage drops in all wiring from the power source to the using device shall not exceed 10%. The use of star washers for circuit ground connections shall not be permitted.

All circuits shall otherwise be wired in conformance with SAE J1292, *Automobile, Truck, Truck-Tractor, Trailer, and Motor Coach Wiring.*

Wiring and Wire Harness Construction

All insulated wire and cable shall conform to SAE J1127, *Low Voltage Battery Cable,* or SAE J1128, *Low Voltage Primary Cable,* type SXL, GXL, or TXL.

All conductors shall be constructed in accordance with SAE J1127 or SAE J1128, except where good engineering practice dictates special strand construction. Conductor materials and stranding, other than copper, shall be permitted if all applicable requirements for physical, electrical, and environmental conditions are met as dictated by the end application. Physical and dimensional values of conductor insulation shall be in conformance with the requirements of SAE J1127 or SAE J1128, except where good engineering practice dictates special conductor insulation. The overall covering of conductors shall be moisture-resistant loom or braid that has a minimum continuous rating of 194°F (90°C) except where good engineering practice dictates special consideration for loom installations exposed to higher temperatures. The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C), except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

All wiring connections and terminations shall use a method that provides a positive mechanical and electrical connection. The wiring connections and terminations shall be installed in accordance with the device manufacturer's instructions. All ungrounded electrical terminals shall have protective covers or be in enclosures. Wire nut, insulation displacement, and insulation piercing connections shall not be used.

Wiring shall be restrained to prevent damage caused by chafing or ice buildup and protected against heat, liquid contaminants, or other environmental factors.

Wiring shall be uniquely identified at least every 2 ft (0.6 m) by color coding or permanent marking with a circuit function code. The identification shall reference a wiring diagram.

Circuits shall be provided with properly rated low voltage over-current protective devices. Such devices shall be readily accessible and protected against heat in excess of the over-current device's design range, mechanical damage, and water spray. Circuit protection shall be accomplished by utilizing fuses, circuit breakers, fusible links, or solid state equivalent devices.

If a mechanical-type device is used, it shall conform to one of the following SAE standards:

1) SAE J156, *Fusible Links*
2) SAE J553, *Circuit Breakers*
3) SAE J554, *Electric Fuses (Cartridge Type)*
4) SAE J1888, *High Current Time Lag Electric Fuses*
5) SAE J2077, *Miniature Blade Type Electrical Fuses*

Switches, relays, terminals, and connectors shall have a direct current (dc) rating of 125% of maximum current for which the circuit is protected.

Power Supply

A 12 V or greater electrical alternator shall be provided. The alternator shall have a minimum output at idle to meet the minimum continuous electrical load of the vehicle, at 200°F (93°C) ambient temperature within the engine compartment, and shall be provided with full automatic regulation.

Minimum Continuous Electrical Load

The minimum continuous electrical load shall consist of the total amperage required to simultaneously operate the following in a stationary mode during emergency operations:

1) The propulsion engine and transmission
2) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
3) The radio(s) at a duty cycle of 10 percent transmit and 90% receive (for calculation and testing purposes, a default value of 5 A continuous)
4) The lighting necessary to produce 2 fc (20 lx) of illumination on all walking surfaces on the apparatus and on the ground at all egress points onto and off the apparatus, 5 fc (50 lx) of illumination on all control and instrument panels, and 50 percent of the total compartment lighting loads
5) The minimum optical warning system, where the apparatus is blocking the right-of way
6) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
7) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

If the apparatus is equipped to tow a trailer, an additional 45 A shall be added to the minimum continuous electrical load to provide electrical power for the federally required clearance and marker lighting and the optical warning devices mounted on the trailer.

The condition of the low voltage electrical system shall be monitored by a warning system that provides both an audible and a visual signal to persons on, in, or near the apparatus of an impending electrical system failure caused by the excessive discharge of the battery set.

The charge status of the battery shall be determined either by direct measurement of the battery charge or indirectly by monitoring the electrical system voltage.

If electrical system voltage is monitored, the alarm shall sound if the system voltage at the battery or at the master load disconnect switch drops below 11.8 V for 12 V nominal systems, 23.6 V for 24 V nominal systems, or 35.4 V for 42 V nominal systems for more than 120 seconds.

A voltmeter shall be mounted on the driver’s instrument panel to allow direct observation of the system voltage.

Electromagnetic Interference

Electromagnetic interference suppression shall be provided, as required, to satisfy the radiation limits specified in SAE J551/1, *Performance Levels and Methods of Measurement of Electromagnetic Compatibility of Vehicles, Boats (up to 15 m), and Machines (16.6 Hz to 18 GHz)*.

Wiring Diagram

A complete electrical wiring schematic of actual system shall be provided with finished apparatus. Similar or generic type electrical schematics shall NOT BE ACCEPTABLE.

Low Voltage Electrical System Performance Test

A low voltage electrical system test certification shall be provided with delivered apparatus.

12 VOLT MULTIPLEX CONTROL CENTER

The apparatus shall be equipped with a Weldon V-MUX multiplexed 12 volt electrical system that will provide complete diagnostic capability, No Exception. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

The multiplex system shall be responsible for providing power management functions as well as load shedding. The warning light system shall be controlled by the multiplex system. The system shall be capable of displaying text and/or graphic messages on a display module. The system shall be based on solid-state technology and shall include self-contained diagnostic indicators.

Outputs:
The outputs shall perform all the following items without added modules to perform any of the tasks;

1. Load Shedding: The system shall have the capability to load shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like load shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs.

2. Load Sequencing: The system shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1 second delay, 2 being a 2 second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system.

3. Output Device: The system shall have solid-state output devices. Each solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay when loaded to spec has a life of 100,000 cycles. The life of a FET is more than *100 times* that of a relay.

4. Flashing Outputs: The system shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, 160 or 200 FPM. This means any light can be specified with a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems or other unique idea you may come up with.

5. PWM: The modules shall have the ability to PWM at some outputs so that a headlight PWM module is not needed.

6. Diagnostics: An output should be able to detect either a short or open circuit. The system should be able report in “real time” a text based message that points the maintenance person to a specific output.

Inputs:
1. The inputs shall have the ability to switch by a ground or vbatt signal.

2. The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.

Auto-Throttle:

The multiplex system shall be able to perform automatic high idle via a network gateway or by using an existing output on a module to provide the proper signals to an OEM Engine ECU. This task should be handled with existing inputs and outputs.

Displays:

Displays shall be able to provide real time information regarding load shedding and system status, such as network traffic/errors or shorts and open circuits.

System Network:

The multiplex system shall contain a Peer-to-Peer network. A Master Slave Type network is not suitable for this type of unit. A Peer-to-Peer network means that all the modules are equal on the network; a Master is not needed to tell other nodes when to talk, **No Exceptions.**

System Reliability:

The multiplex system shall be able to perform in extreme temperature conditions, from 40° to +85° C (-40° to +185° F.) The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.

WELDON CERTIFICATION

A letter shall be provided with bid submittal that the Contractor has successfully completed the Weldon training requirements for Level 1 of the V-MUX Certified Supplier Program and is authorized to design, build, and service V-MUX electrical systems.

MULTIPLEX SYSTEM INTERFACE DISPLAY

One (1) Weldon V-MUX Vista IV multiplex system interface display(s) with push-button control shall be provided in cab on angled dash area. The full-color Vista interface display allows the user to control warning and scene lighting, HVAC controls (when specified), and view on-board diagnostics including service information. This display has a wide operating temperature range, automatic screen switching in response to current conditions, and a sleep mode option to eliminate night glare. The following features shall be included;

- 800 x 480 resolution
- Four video ports
- Flash updates with USB memory stick
- Display inside and outside temperature (when specified)
- Automatic climate control (when specified)
- 100% Configurable (OEM Level)
- Field re-programmable
- Peer to peer network
- On-board diagnostics / service information
- Colors change to indicate button status
- Video Ready for: Backup camera, Thermal camera, DVD, GPS...

The V-Mux display shall be located in the cab center console for control of all master and emergency lights.

CAB CONSOLE

A center cab console shall be provided between the Driver's and Officer's seats. Console shall be as large as possible and fabricated of 1/8" smooth aluminum. A textured powder coat paint finish shall be provided for durability and finished appearance.

The rear portion of the console shall be provided with open top storage for notebooks or maps. Two (2) adjustable dividers shall be provided in the storage area. The forward portion of console shall be slanted for easy viewing of the V-Mux display screen, and any siren or radio equipment. The area shall be within easy access to both Driver and Officer.

The final design of console shall be determined by the Grand Prairie Fire Department at the pre-construction meeting.

The following options shall be provided in specified console. Final layout to be determined by Grand Prairie Fire Department at pre-construction meeting.

There shall be one (1) communications radio and/or siren 3" recess mount(s) with black powdercoat paint finish in specified console.

There shall be one (1) Blue Sea 12 VDC USB port(s) provided in forward console area.

BATTERY SYSTEM

The battery connectors shall be heavy duty type with cables terminating in heat shrink loom. Heavy duty battery cables shall provide maximum power to the electrical system. Where required, the cables shall be shielded from exhaust tubing and the muffler. Large rubber grommets shall be provided where cables enter the battery compartment.

Batteries shall be of the high-cycle type. With the engine off, the battery system shall be able to provide the minimum continuous electrical load for 10 minutes without discharging more than 50 percent of the reserve capacity and then to restart the engine. The battery system cold cranking amps (CCA) rating shall meet or exceed the minimum CCA recommendations of the engine manufacturer. The batteries shall be mounted to prevent movement during fire apparatus operation and shall be protected against accumulations of road spray, snow, and road debris. The batteries shall be readily accessible for examination, testing, and maintenance.

A means shall be provided for jump-starting the engine if the batteries are not accessible without lifting the cab of a tilt-cab apparatus.

Where an enclosed battery compartment is provided, it shall be ventilated to the exterior to prevent the buildup of heat and explosive fumes. The batteries shall be protected against vibration and temperatures that exceed the battery manufacturer’s recommendation.

An onboard battery conditioner or charger or a polarized inlet shall be provided for charging all batteries. Where an onboard conditioner or charger is supplied, the associated line voltage electrical power system shall be installed in accordance with Chapter 22.

One of the following master disconnect switches shall be provided:

1) A master body disconnect switch that disconnects all electrical loads not provided by the chassis manufacturer
2) A master load disconnect switch that disconnects all electrical loads on the apparatus except the starter

Electronic control systems and similar devices shall be permitted to be otherwise connected if so specified by their manufacturer.

The alternator shall be wired directly to the batteries through the ammeter shunt(s), if one is provided, and not through the master load disconnect switch.

A green “battery disconnect on” indicator light that is visible from the driver’s position shall be provided.

Rechargeable hand lights, radios, and other similar devices shall be permitted to be connected to the electrical system ahead of the master disconnect switch.

A sequential switching device shall be permitted to energize the optical warning devices and other high current devices required in minimum continuous electrical load, provided the switching device shall first energize the electrical devices required in minimum continuous electrical load within 5 seconds.

BATTERY SWITCH

One (1) battery "On/Off" switch in cab located within easy reach of Driver with green "BATTERY ON" pilot light that is visible from the driver’s position shall be provided.

BATTERY SOLENOID

Battery switch shall consist of a minimum 200 ampere, constant duty solenoid to feed from positive side of battery.

BATTERY CONDITIONER

One (1) Kussmaul model Auto Charge 1000 single battery conditioner, with 120 VAC input and 15 amp, 12 volt output shall be provided. This system shall monitor the condition of batteries and provide an electrical current at variable rates to overcome battery failure. A display shall be provided with charge indicator, remote mounted.

SHORE POWER INLET

One (1) manual 120 VAC, 20 amp shore power inlet with weather resistant snap cover shall be provided. The protective ground from the shoreline inlet shall be bonded to the vehicle frame.

- The shore power plug shall be located near the Driver door area.

SHOP NOTES
Plug and display located below driver door.

ENGINE COMPARTMENT LIGHT

There shall be one (1) OnScene Severe Service LED light(s) mounted in the engine compartment with integral switch with a light output of at least 20 candlepower (250 lumens). The engine compartment light(s) shall operate only when the master battery switch is turned "On".

CAB HAZARD WARNING LIGHT

A Truck-Lite red LED flashing ligh shall be provided and located in the driving compartment and be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

- Any passenger or equipment compartment door is not closed.
- Any ladder or equipment rack is not in the stowed position.
- Stabilizer system is not in its stowed position.
- Powered light tower is not stowed.
- Any other device permanently attached to the apparatus is open, extended, or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved.

Compartments and equipment meeting all of the following conditions shall be permitted to be exempt from being wired to the hazard light:

- The volume is less than or equal to 4 ft3 (0.1 m3).
- The compartment has an opening less than or equal to 144 in.2 (92,900 mm2).
- The open door does not extend sideways beyond the mirrors or up above the top of the fire apparatus.
- All equipment in the compartment is restrained so that nothing can fall out if the door is open while the apparatus is moving.
- Manually raised pole lights with an extension of less than 5 ft (1.5 m).

The hazard light shall be labeled "DO NOT MOVE APPARATUS WHEN LIGHT IS ON".

An audible alarm shall be provided for the door ajar light.

BACK-UP ALARM

An electronic back-up alarm shall be supplied and installed by the cab/chassis manufacturer. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse.

REAR VIEW CAMERA

There shall be one (1) ASA Voyager rear observation camera system provided and installed on completed unit. The system shall include one (1) model VCC150 high resolution CCD color camera installed on the rear body.

The camera(s) shall be wired to the cab/chassis supplied Weldon Vista display(s). The rear camera shall activate when the transmission is placed in reverse. If a right camera is provided it shall activate with the right side turn signal and if a left camera is provided it shall activate with the left side turn signal. All camera(s) shall also be activated by a button on the Vista display(s).

TAIL LIGHTS

Rear body tail lights shall be vertically mounted and located per Federal Motor Vehicle Safety Standards, FMVSS and Canadian Motor Vehicle Safety Standards CMVSS. The following lights shall be furnished;

- Two (2) Whelen M6 Series M6T amber LED turn lights
- Two (2) Whelen M6 Series M6BTT red LED stop/tail lights
- Two (2) Whelen M6 Series M6BUW clear LED back-up lights with clear lens

Each light above shall be mounted in an M6FC chrome finish bezel.

MARKER LIGHTS

The body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS) regulations. All body clearance lights shall be Truck-Lite Model 18 LED to reduce the need for maintenance and lower the amp draw. Clearance lights shall be wired to the headlight circuit of the chassis.

CAB STEP LIGHTS / GROUND LIGHTS

There shall be four (4) OnScene 8" Access LED light(s) installed on the vehicle capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting designed to provide illumination on areas under the driver and crew riding area exits shall be switchable but activated automatically when the exit doors are opened.

LICENSE PLATE LIGHT

One (1) Arrow #437 chrome plated LED license plate light shall be installed on the rear of the body. License plate light shall be wired to the headlight circuit of chassis. A fastener system shall be provided for license plate installation.

ELECTRONIC SIREN

One (1) Whelen model 295SLSA1 electronic siren control with selectable 100 or 200 watt output, hands-free operation, user selectable siren tones, park kill, and standard hard wired microphone shall be provided and installed in cab within easy reach of Driver. Siren power shall be wired through the master warning light switch.

SIREN SPEAKER

Two (2) Whelen model SA314A 100 watt aluminum, 6.4" x 6.1" x 3.1" deep siren speakers shall be provided behind the front bumper, one (1) on streetside, and one (1) on curbside. The solid state siren speaker shall be vibration resistant. The SA314A shall comply with California Title XIII, Class A, and SAE J1849 requirements and with OSHA 1910.95 Guidelines regarding “Permissible Noise Exposure”. All mounting hardware shall be stainless steel and covered by a two year factory warranty.

FRONT LED FLOODLIGHT

One (1) Rigid Industries E-Series model 120312, 20" combination spot/flood LED light(s) with white housing color and cradle mount brackets shall be provided on front of vehicle. The E-Series 20" LED light(s) shall have 9,200 lumen output each.

Each light shall be wired directly to the 12 VDC electrical system with stranded copper wire. The floodlights shall be protected with circuit breakers rated at the proper amperage and wire size.

The lights shall be controlled at the multiplex display(s) in the cab.

SIDE LED SCENE LIGHTS

There shall be two (2) Whelen Pioneer Plus model PCP2 dual combination floodlight, and 8 degree spotlight on the upper body sides. Light quantity shall be divided equally per side. Light(s) shall be 12 VDC, 12 amp, 150 watt, with 8,000 spot/8,000 flood useable lumens.

Each light shall be mounted in a PBA0130, 3” adjustment radius with either a straight out, 0 degree or a 15 degree downward angle.

The lights shall be controlled at the multiplex display(s) in the cab.

REAR LED SCENE LIGHTS

Two (2) Whelen M6 Series Model M6ZC, 6" x 4" surface mounted scene light(s) shall be provided on the upper rear body to light the work area immediately behind the vehicle. The M6ZC configuration shall consist of 12 clear Super-LEDs and a clear gradien optic polycarbonate lens with chrome flange. The scene light is covered by a five year factory warranty.

The above scene lights shall light to a level of at least 3 fc (30 lx), measured at 25 equally spaced points on a 2.5 ft (750 mm) grid with in a 10 ft x 10 ft (3 m x 3m) square to the rear of vehicle.

The lights shall be controlled at the multiplex display(s) in the cab.

The rear scene lights shall also be activated when the apparatus is in reverse.

TRAFFIC ADVISOR LIGHTS

Traffic advisor lights shall be comprised of eight (8) Whelen ION series amber Wide Angle Super-LED lights with clear lens. Lights shall be individually mounted with chrome bezels to the rear face of the vehicle and evenly distributed, if split by a hose bed, or walkway.

The lights shall be controlled by the multiplexing system and provide; Left Arrow, Right Arrow, Center Out, and Wig-Wag patterns. The wig-wag light pattern shall be activated with the E-Master and can be switched to the other patterns at any time through the "TRAFFIC ADVISOR" menu on the Multiplex display.

SIGTRONICS INTERCOM SYSTEM

The following Sigtronics intercom system shall be provided and installed to improve the safety of firefighters and rescue professionals through enhanced communication and hearing protection. System shall have the following major components as minimum;

The US67S intercom system will interface with the apparatus mobile radio to allow for radio transmit from designated PTT (push to talk) locations.

- Driver: Intercom/PTT
- Officer: Intercom/PTT
- Pump Panel: Intercom/PTT
- Three Crew: Intercom Only

Intercom:

- Four (4) Sigtronics model SE-48 intercom headsets included with the intercom system.
- One (1) Sigtronics model SE-8S intercom headsets will be included with the intercom system (located at pump panel).

A Sigtronics headset extension cable, part number 900106 will be provided. The cable will have a 15' coiled cord, a belt mounted push to talk button for mobile radio communication, and will be compatible with Sigtronics headsets.

- A Sigtronics headset plug-in jack, part number 800120 will be installed.
- A Sigtronics headset plug-in jack, part number 800121, with a spring loaded cover provided. The headset jack will allow for exterior mounting and will be compatible with Sigtronics headsets.
- A Sigtronics push to talk switch, part number 800122, provided.

INTERCOM SYSTEM INSTALLATION

The above listed intercom system shall be installed in the cab locations as follows;

Front of Cab

- Driver's – Mounted above the right shoulder position on ceiling.
- Officer's – Mounted above the left shoulder position on ceiling.

Rear Crew Area

- Driver's side rear facing – Above the right shoulder on the wall or ceiling.
- Driver's side rear facing center – Above the left shoulder on the ceiling.
- Officer's side rear facing – Above the left shoulder on the wall or ceiling.
- Officer's side rear facing center – Above the right shoulder on the ceiling.
- Driver's side forward facing – Above the right shoulder on the rear wall or ceiling.
- Driver's side forward facing center – Above the left shoulder on the rear wall or ceiling.
- Officer's side forward facing – Above the left shoulder on the rear wall or ceiling.
- Officer's side forward facing center – Above the right shoulder on the rear wall or ceiling.

WARNING LIGHT PACKAGE

Each apparatus shall have a system of optical warning devices that meets or exceeds the requirements of this section.

The optical warning system shall consist of an upper and a lower warning level. The requirements for each level shall be met by the warning devices in that particular level without consideration of the warning devices in the other level.

For the purposes of defining and measuring the required optical performance, the upper and lower warning levels shall be divided into four (4) warning zones. The four zones shall be determined by lines drawn through the geometric center of the apparatus at 45 degrees to a line drawn lengthwise through the geometric center of the apparatus. The four (4) zones shall be designated A, B, C, and D in a clockwise direction, with zone A to the front of the apparatus.

Each optical warning device shall be installed on the apparatus and connected to the apparatus's electrical system in accordance with the requirements of this standard and the requirements of the manufacturer of the device.

A master optical warning system switch that energizes all the optical warning devices shall be provided.

The optical warning system on the fire apparatus shall be capable of two (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One (1) mode shall signal that the apparatus is stopped and is blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

A switching system shall be provided that senses the position of the parking brake or the park position of an automatic transmission. When the master optical warning system switch is closed and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for the right-of-way shall be energized. When the master optical warning system switch is closed and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized. The system shall be permitted to have a method of modifying the two (2) signaling modes.

The optical warning devices shall be constructed or arranged so as to avoid the projection of light, either directly or through mirrors, into any driving or crew compartment(s). The front optical warning devices shall be placed so as to maintain the maximum possible separation from the headlights.

Steadily burning, non flashing optical sources shall be permitted to be used.

UPPER LEVEL OPTICAL WARNING DEVICES

The upper-level optical warning devices shall be mounted as high and as close to the corner points of the apparatus as is practical to define the clearance lines of the apparatus. The upper-level optical warning devices shall not be mounted above the maximum height, specified by the device manufacturer.

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen Freedom F4N0VLED LED 60" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

SECTION	INTERNAL COMPONENTS	LENS COLOR
1	Red Rear Corner LED	Clear
2	Red Front Corner LED	Clear
3	Red Long Super-LED	Clear
4	Red Long Super-LED	Clear
5	White Long Super-LED	Clear
6	Red Long Super-LED	Clear
7	Red Long Super-LED (Opticom if specified)	Clear
8	Red Long Super-LED (Opticom if specified)	Clear
9	Red Long Super-LED	Clear
10	White Long Super-LED	Clear
11	Red Long Super-LED	Clear
12	Red Long Super-LED	Clear
13	Red Front Corner LED	Clear
14	Red Rear Corner LED	Clear

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.
SHOP NOTES
Add MK8H lightbar mount on Wecad program if there is a brow light on cab

The lightbar(s) shall be separately controlled at multiplex display in the cab.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be controlled at the multiplex display(s) in the cab.

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen M6 series red linear Super-LED lights (M6RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be controlled at the multiplex display(s) in the cab.

LOWER LEVEL OPTICAL WARNING DEVICES

To define the clearance lines of the apparatus, the optical center of the lower-level optical warning devices in the front of the vehicle shall be mounted on or forward of the front axle centerline and as close to the front corner points of the apparatus as is practical.

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1600 mm) above level ground.

A midship optical warning device shall be mounted right and the left sides of the apparatus if the distance between the front and rear lower-level optical devices exceeds 25 ft (7.6 m) at the optical center. Additional midship optical warning devices shall be required, where necessary, to maintain a horizontal distance between the centers of adjacent lower-level optical warning devices of 25 ft (7.6 m) or less. The optical center of any midship mounted optical warning device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground.

ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen TIR6 4" round, Super-LED lights (2FR00ZCR) red lights with clear lens provided, one (1) each side of cab front (in grill headlight location). Each light shall have a chrome flange (2FLANGEC)

The lights shall be controlled at the multiplex display(s) in the cab.

There shall be two (2) Whelen ION V-Series Super-LED surface mount lights (IONSV3RC) with combination 180° warning and puddle lights provided, one (1) each side. Puddle lights will be turned on with specified scene lighting. Each light shall have a clear lens and chrome die cast flange.

The lights shall be controlled at the multiplex display(s) in the cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

There shall be two (2) Whelen M6 series Red Linear Super-LED lights (M6RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be controlled at the multiplex display(s) in the cab.

ZONES B AND D - BODY LIGHT (BODY WHEELWELL AREA)

There shall be four (4) Whelen ION V-Series Super-LED surface mount lights (IONSV3RC) with combination 180° warning and puddle lights provided, two (2) each side. Puddle lights will be turned on with specified scene lighting. Each light shall have a clear lens and chrome die cast flange.

The lights shall be controlled at the multiplex display(s) in the cab.

ZONES B AND D - BODY INTERSECTOR LIGHT (BODY REAR CORNERS)

There shall be two (2) Whelen ION V-Series Super-LED surface mount lights (IONSV3RC) with combination 180° warning and puddle lights provided, one (1) each side. Puddle lights will be turned on with specified scene lighting. Each light shall have a clear lens and chrome die cast flange.

The lights shall be controlled at the multiplex display(s) in the cab.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen M6 series Red Linear Super-LED lights (M6RC) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be controlled at the multiplex display(s) in the cab.

LIGHT PROTECTION

All lower side mounted warning lights shall be mounted on surface of a formed aluminum “U” shaped bracket. Legs on bracket shall project outward further than lights to protect from brush and branches. Bracket shall be powdercoat painted black.

WILDLAND SIDE MOUNT PUMP MODULE

The 74" (measured laterally across vehicle width) x 29" wide side mount pump enclosure shall be removable and supported from the chassis frame rails with spring type body mounts. This enclosure shall allow independent flexing of the pump enclosure from the body and allow for quick removal. The support structure shall be constructed of extruded aluminum tubing and angle.

All pump suction and discharge controls are to be mounted on the driver side pump operator's panel so as to permit operation of the pump from a central location. The fire pump, valves and controls shall be accessible for service and maintenance as required by applicable sections of NFPA standards.

The "master" gauges shall be suitably enclosed and mounted on a full pump compartment width "hinged" gauge panel constructed of the same material as the pump operators control panel, allowing access to the backside of all gauges and gauge lines. The individual gauges shall be mounted inline with the control handle or adjacent to the control handle. Panel is to include a stainless steel piano hinge, flush mounted chrome plated trigger latch, and stainless steel cable end stops. Electrical wiring and all gauge lines shall be properly tie wrapped to prevent kinking or cutting of the lines when the panel is opened.

The following controls and equipment shall be provided on the pump panel or within the pump enclosure:

1) Electric primer.
2) Pump and plumbing area service lights.
3) Pressure control device and throttle control.
4) Fire pump and engine instruments.
5) Pump intakes and discharge controls.
6) Master intake and discharge gauges.
7) Tank fill control.
8) Tank suction control.
9) Water tank level gauge.
10) Pump panel lights.

PUMP COMPARTMENT SERVICE ACCESS

The front portion of the pump compartment structure (directly behind the chassis cab) shall not be overlaid to provide an opening for access to the midship fire pump.

PUMP PANEL - SIDE MOUNT

The pump operator's panel, along with the lower streetside and curbside pump panels shall be constructed of smooth plate aluminum with powder coated paint finish, fastened to the pump enclosure with 1/4" stainless steel bolts.

The instrument area shall have a stainless steel continuous hinge that shall swing towards the front of the module for easy access to gauges.

STREETSIDE PUMP PANEL - BOLTED

The streetside pump panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts and nutserts.

LOWER CURBSIDE PUMP PANEL - BOLTED

The curbside pump panel shall be fastened to the pump enclosure with 1/4" stainless steel bolts and nutserts.

PUMP MODULE EQUIPMENT STORAGE COMPARTMENT

There shall be one (1) equipment compartment located on the upper curbside of the pump module. It shall have dimensions of 22" wide x 26" high. The clear door compartment dimensions shall be 20.5" wide x 23" high x 12" deep with the door closed. An OnScene LED light shall illuminate the interior of the compartment when the door is open.

The equipment compartment shall be provided with a flush style hinged door. The doors shall be provided with a high quality, continuous double seal type weather stripping to prevent moisture and dust from entering the exterior compartment. The door shall be double pan design with the outer door material being 1/8" aluminum door with a 1/8" aluminum removable inner liner that shall have a natural finish to provide reflective qualities during night operations. The vertically hinged door shall have a gas shock and polished stainless steel 1/4" piano hinge.

The door latch shall be an Eberhard locking slam latch, with a chrome "D" ring with a 5-degree bend for easier grasping of each door handle with gloved hands. The door shall be provided with a keyed lock.

The exterior of the door shall be painted to match the lower job color. The interior shall be painted to match the compartment interior paint specified.

There shall be two (2) large removable panels with lift and turn type latches for quick removal provided on the inside of the compartment. These panels shall provide an opening for service access to the right side of the interior of the pump module and to the bottom side of the diesel pump.

WHEEL CHOCK COMPARTMENT

Below the equipment storage compartment shall be a wheel chock compartment. This compartment shall be equipped with a plate lap style 1/8" aluminum door mounted on a piano hinge with a push latch. The compartment shall have clear door dimensions of 8.3" wide x 13.5" high x 13-.5" deep with the door closed.

PUMP COMPARTMENT TOP OVERLAY

The top of the pump compartment shall be overlaid with materials of a non slip 1/8" NFPA compliant aluminum treadplate.

DUNNAGE AREA

A single wall 3/16" aluminum diamond plate dunnage area shall be provided above the pump house compartment for equipment mounting and storage space. The dunnage area shall be as wide as possible from side to side, and as deep as allowed with the available space.

STREETSIDE RUNNING BOARD - SIDE MOUNT PANEL

The streetside pump panel shall be equipped with a side running board. The running board shall extend along the width of the pump module.

The running board stepping surface shall be constructed of aluminum NFPA compliant tread plate, bolted in place with stainless steel fasteners.

- One (1) OnScene 8" Access LED ground light(s) shall be provided below the body.

CURBSIDE RUNNING BOARD - SIDE MOUNT PANEL

The curbside pump panel shall be equipped with a side running board. The running board shall extend along the width of the pump module.

The running board stepping surface shall be constructed of aluminum NFPA compliant tread plate, bolted in place with stainless steel fasteners.

- One (1) OnScene 8" Access LED ground light(s) shall be provided below the body.

PUMP MODULE FINISH

The upper exterior sides above pump panels shall be constructed of 1/8" smooth plate aluminum and painted body color. The upper exterior front and rear of pump module shall be constructed of 1/8" treadplate aluminum.

PUMP MODULE HEATER

The pump module shall be provided with one (1) Red Dot 35,000 BTU hot water type heater(s). The heater(s) shall be connected to the chassis engine cooling system and have three-speed, 12 volt blower. The cooling system lines shall be insulated and be provided with 1/4 turn shut-off valves to isolate system, if required.

The pump operator's panel shall have an Innovative Controls switch panel for heat control switch with indicator light. Switch shall be constantly illuminated and labeled.

CROSS LAY

The specified pump module shall have one (1) cross lay(s). The cross lay hose bed(s) shall be located in the upper portion of the pump module.

The cross lay area shall be located at the front of side pump module and at the rear of top control module. The cross lay area shall span the entire width of the pump module.

CROSS LAY TRIM

Brushed stainless steel trim shall be installed at the openings on each side of the cross lay hose bed area. The trim shall reduce the chaffing of the hose jacket on the edges of the bay area.

The divider(s) between the hose bed areas shall be fabricated from 3/16" smooth aluminum and mounted in a channel on each end for adjustability.

Removable slotted aluminum flooring shall be provided for the hose bed area.

The pump module cross lay(s) shall have two (2) OnScene Rough Service 9" LED lights provided, one (1) each end to light the interior cross lay hose bed area.

Each end of hose bed shall have a red vinyl cover. The covers will be mechanically fastened with fiberglass rod on sides the hose bed.

A safety sign FAMA22, which warns of the need to secure hose, shall be visible to personnel at each hose storage area.

CROSS LAY BED COVER

A 1/8" aluminum tread plate hinged cover shall be provided over the lay beds complete with full length stainless steel piano hinge. Stops shall be provided to protect cab or other adjacent body components. The hinge shall be located on the forward section of the cover, closest to the chassis cab.

WATEROUS CPK 500 GPM TWO-STAGE FIRE PUMP

A Waterous Model CPK-3 fire pump shall be midship mounted and shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association, NFPA 1901, and shall have a rated capacity of 500 GPM.

The CPK-3 is capable of supplying volumes of 500 GPM (2000 L/min) @ 150 psi (10.3 bar) or pressures of 800 psi (55 bar) @ 60 GPM (227 L/min). When installed in vehicle, complete with proper intake piping, CPK meets NFPA 1901 for a 500 GPM rating.

Casing
One-piece, high-tensile, close-grained iron body.

Impeller
Bronze, hydraulic and mechanically balanced rotation.

Wear Rings
Bronze replaceable wear rings.

Separable Impeller Shaft
Allows separation of pump from transmission for ease of serviceability.

Intake
4.0” (10.1 cm) NPT tee adapter.

Discharge
(2) 2.0” (5 cm) NPT or 2.5" (6.3 cm) NPT tee adapter.

Discharge Positions
Available in either rotation with four discharge positions; gear case can be mounted horizontally, vertically, or inverted.

Bearings
All bearings are oil or grease lubricated, ball type, located outside the pump casting to accurately align and support the impeller shaft assembly. Ball bearings are deep-grooved type designed to carry both radial and axial thrust.

Transmission
K Series, close-grained, gray iron with the proper gear ratio to provide required impeller speeds at available input speeds, whether pumping from tank, draft, or in relay operation.

Transmission Gears
Helical, precision cut, crown shaved for proper load distribution and quiet operation.

Pump Anodes
There shall be two (2) anodes provided to protect the components that come in contact with the water system from corrosion and deterioration. One (1) anode shall be installed in the inlet (suction) side of system, and one (1) shall be installed in the pressure (outlet) side of the PTO pump.

PAINT FINISH

The paint finish will be black finish paint.

PUMP DRIVE SYSTEM

The water system pump shall be driven by a Chelsea "Hot-Shift" transmission PTO and mounted directly to the transmission of the chassis. The drive line shall be hollow tube type, with heavy duty universals and splined shaft to allow movement of the chassis components and pump.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO.

The power supply to the PTO engagement control shall be wired to a neutral position transmission switch to prevent engagement unless the vehicle is in neutral with the parking brake set.

Two (2) green indicator lights shall be supplied in the chassis cab. One (1) light shall be energized when the chassis transmission is in neutral and shall be labeled "OK TO PUMP", the second light shall engage when the pump drive (PTO) has been engaged and shall be labeled "PUMP ENGAGED".

One (1) green indicator light shall be supplied at the Pump Operator's panel adjacent to the engine hand throttle. The green light shall be energized when both the chassis transmission is in neutral and the pump drive (PTO) has been engaged. Green light shall be labeled "OK TO PUMP".

Model part number shall be Chelsea 280 series.

MECHANICAL SEALS

The pump shall be equipped with self-adjusting, maintenance free mechanical shaft seals that shall not require manual adjustment. These seals shall be designed in a manner such that they shall remain functional enough to permit continued use of the pump in the unlikely event of a seal failure.

TWO-STAGE FIRE PUMP

The pump shall be a Waterous CPK-3 two-stage centrifugal fire pump, designed specifically for the fire service.

TWO-STAGE TRANSFER VALVE

The transfer valve shall be of the latest ball type design. The valve shall be all bronze construction and incorporate a hydraulically balanced seal to minimize leakage around the ball and assure maximum pump efficiency. The transfer valve shall operate smoothly without sticking, even when it is exposed to sandy or dirty water.

The transfer valve shall be operated by a push-pull actuator that will be controlled on the pump operator's panel. There shall be two (2) indicator lights to show when the pump is operating in pressure or volume mode.

THERMAL PROTECTION

A Waterous Overheat Protection Manager (OPM) shall be supplied on pump to act as a safety device by releasing water from the discharge side of the pump to the ground or back to a water tank once the internal pump water temperature reaches 140°F (60°C).

System Components:

Thermal Relief Valve: Opens and releases water from the pump when the water temperature reaches 140°F (60°C).
Thermal Switch: Activates a flashing red light on the control panel when the water temperature reaches 180°F (82°C). This is an additional safety function to alert the operator that the water temperature is continuing to rise.
Optional Audible Alarm: Will sound in conjunction with the flashing red light and provide an additional warning that the water temperature is rising.
Control Panel: Contains the red flashing light as well as a test circuit for the light.

1/2" PUMP COOLER LINE

There shall be a 1/2" line installed from the discharge side of the pump to the water tank. The line shall be used to cool the pump during long periods of pumping when water is not being discharged. The pump cooler shall be controlled with a quarter-turn ball valve on main pump panel, and shall be clearly labeled "Pump Cooler".

PUMP COOLER CHECK VALVE

There shall be a check valve installed in the pump cooler line to prevent tank water from back flowing into the pump when it is not in use.

WATEROUS FIVE YEAR PUMP WARRANTY

The fire pump shall be warranted by Waterous for a period of five (5) years from the date of delivery to the Grand Prairie Fire Department.

MANUFACTURER FIRE PUMP TEST

The pump shall undergo a manufacturer's test per applicable sections of NFPA 1901 standards, prior to delivery of the completed apparatus.

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

The entire pump, both suction and discharge passages, shall be hydrostatically tested to a pressure of 500 psi (3400 kPa) for a minimum for 10 min. The pump shall be fully tested at the pump manufacturer's factory to the performance specifications as outlined by applicable NFPA 1901 standards.

The results of this test shall be furnished with the vehicle on delivery.

FIRE PUMP TEST LABEL

A test plate shall be provided at the pump operator's panel that gives the rated discharges and pressures together with the speed of the engine as determined by the certification test for each unit, the position of the parallel/series pump as used, and the governed speed of the engine as stated by the engine manufacturer on a certified brake horsepower curve

The pump shall comply with the applicable requirements of "Standard for Fire Apparatus 1901, latest edition.

The pump shall be capable of producing fire streams that are free from objectionable pulsation under all normal operating conditions.

SAFETY SIGN

A safety sign FAMA25, which warns of the need for training prior to operating the apparatus, shall be located on the pump operators panel.

ALTITUDE REQUIREMENT

The apparatus shall be designed to meet the specified rating at 3,000 feet (915 meters) altitude.

PUMP DRAIN VALVE

A manifold drain valve assembly shall be supplied to drain the entire pump and manifold. The valve assembly shall consist of a stainless steel plunger in a bronze body with multiple ports.

PUMP DRAIN CONTROL

The pump drain shall be controlled at the pump operator's panel and identified as "Pump Drain". The control shall be a "T" handle control that is easily actuated with a gloved hand.

ELECTRIC PRIMING PUMP CONTROL AT PUMP PANEL

The Waterous priming system shall include an oil-free rotary vane priming pump rigidly attached to the pump transmission and activated by a vacuum-activated priming (VAP) valve. Valve actuation may be accomplished while the main pump is in operation, if necessary to assure a complete prime.

The primer shall be capable of priming the pump through a 20' section of suction hose with a 10' lift within 30 seconds for pumps less than 1,500 gpm, and 45 seconds for pumps 1,500 gpm and larger.

PRIMER CONTROL

The priming system shall be controlled at the pump operator's panel. The control shall be provided in the form of a momentary push button that is easily actuated with a gloved hand.

DISCHARGE RELIEF VALVE

The discharge pressure relief shall be controlled by the electronic engine controlled device as specified.

4" SUCTION INLET - STREETSIDE

One (1) 4" (100 mm) un-gated suction intake shall be installed on the streetside pump panel to supply the fire pump from an external water supply. The threads shall be 4" NH male threads.

The intake shall be provided with a removable screen.

HEAT EXCHANGER

A heat exchanger shall be provided on the pump driving engine cooling system that uses water from the discharge side of the pump to cool the engine coolant through the use of a closed heat exchanger. The water from the pump and the engine coolant shall not be intermixed. This cooling system shall be controlled by a 1/4 turn valve on the pump operator's panel.

INTAKE RELIEF VALVE

There shall be an Akron model 59 intake relief valve factory set to 125 PSI installed on the suction side of the pump. The system shall be controlled by an adjustable valve and designed to prevent vibration from altering the setting of the valve. Provisions for adjusting or servicing the valve {will/shall} be provided. The relief outlet shall be directed below the pump with the discharge terminating in a 2-1/2" NSTM connection. The discharge shall be away from the pump operator and labeled "DO NOT CAP".

AUXILIARY DIESEL PUMP

There shall be a Darley 1-1/2 AGE diesel engine auxiliary pump provided in upper pump module. The auxiliary pump shall only provide pressure to all 2" discharge valves including the hose reel and be capable of re-circulating tank water through the 2" tank filler valve.

The pump shall be plumbed in common with that of the main pump for pump and roll applications. The pump shall have a minimum rated capacity of 160 GPM @ 245 PSI.

The pump shall be mounted above the main fire pump and its engine fuel and electrical system shall be common with the truck chassis. The oil drain will be extended below the chassis frame rail.

ENGINE

Kubota V1505 Diesel, 39 HP naturally aspirated, 4 cylinders, liquid-cooled, 12-volt, electric start, 40 amp alternator, pressure lubed, oil and fuel pump filters. The pump power unit shall be furnished as follows:

Dry element, direct mounted air filter with stainless steel air intake ember screen.

Exhaust system equipped with USDA approved spark arrestor and appropriate heat shields to protect various components and personnel from heat related damage/injuries from high exhaust pipe temperatures. The exhaust system shall be routed vertically above the fire apparatus discharged away from any working surfaces and be manufactured from heavy duty aluminized steel exhaust pipe to meet the manufacturer's specifications.

Spin on automotive type fuel and oil filters that meet the engine manufacturer specifications.

Fuel system shall be designed to draw fuel from the apparatus fuel tank thru the use of an inline 12 volt automotive electric fuel pump, Stewart Warner #235A-D, or equal. The fuel tank pick-up tube shall be designed so as to assure the auxiliary engine will not exhaust the fuel supply of the vehicle. (minimum 10 gallon reserve). A marine grade one way check valve shall be installed in the fuel line to eliminate the possibility of air locks in the fuel line.

A 1/2" crankcase oil drain extension line routed below the frame to facilitate oil changes, with Aeroquip style hose, threaded fittings and drain plug.

12 volt electric start.

Removal of the auxiliary engine alternator is acceptable if an OEM fan belt idler is available and installed.

1-1/2 AGE PUMP FEATURES

Aluminum alloy casing and discharge valve. Sulfuric anodized aluminum alloy gear case. Bronze impeller and wear rings. Stainless steel impeller shaft. Heat treated alloy steel helical gears. Ball bearing construction. Adjustable throttle. 2” NPT suction. 2-1½” or 1-2½” NPT discharge.

DIMENSIONS

41" L x 24" W x 42 1/2" H, 523 lbs. (237 kg)

PUMP PERFORMANCE

160 GPM (605 L/M) @ 245 PSI (16.9 bar)
80 GPM (303 L/M) @ 310 PSI (21.4 bar)
25 GPM (94 L/M) @ 300 PSI (20.7 bar)

REMOTE START IN CAB

There shall be a remote start assembly provided in cab area for the portable pump. This panel shall contain the following:

- Auxiliary pump water pressure gauge (Class 1 dry type, 0-400 psi, white face with black numerals, LED back lighted (red in color).
- Vernier throttle cable
- Pump ignition on/off/start switch
- Low Oil Pressure indicator light
- Engine Overheat indicator light
- Glow Plug operational light
- Primer

AUXILIARY PUMP PRESSURE GAUGES

All auxiliary pump pressure gauges shall be 0/400 lbs. liquid less style, stainless steel case, chrome bezel with a white face and black numerals. Two (2) gauges shall be supplied; one (1) 2" mounted on the pump operator's panel, and one (1) 2-1/2" mounted inside the cab within clear view of the vehicle operator's position and labeled as to their function. The in-cab gauge shall be an LED back lighted style gauge, red in color. The light shall be controlled by the auxiliary pump ignition switch and both gauges shall be properly labeled as to their function.

AUXILIARY PUMP CONTROLS

An auxiliary pump control panel and a back lighted pressure gauge shall be provided inside the apparatus cab located in an area readily accessible to the vehicle operator. A second set of controls and pressure gauges shall be located on the left exterior main pump operator's panel.

The auxiliary pump engine control switches shall be marine grade weather proof toggle type switches. Key type ignition switches will not be provided. The apparatus electrical system (Master Switch) shall provide the power for the operation of the auxiliary pump assembly.

The wiring for the auxiliary pump assembly shall be run in a separate loom isolated from the main apparatus wiring loom. The pump engine ignition circuit shall be wired so that the pump may be started from either control panel without regard to the position of the same switch at the other location. The mounting locations for the pump controls and pressure gauges shall be in cab and left pump panel controls shall each consist of the following:

- Vernier cable type adjustable throttle controls on both pump panels (lockable type). Electronic throttle controls shall not be provided.
- Ignition and Kill switch.
- Ignition "on" green panel light.
- Starter button.
- Low oil pressure indicator lamp.
- Coolant overheat indicator lamp.
- Pump pressure gauges, shall be located in the cab and on the left pump panel.

The in-cab pressure gauge shall be back-lighted Red and the light shall be controlled by the auxiliary pump ignition switch. Note: Glow plugs (if necessary) shall be automatically controlled by the ignition switch.

An electric hour meter shall be provided for the auxiliary pump for the recording of pump operating hours. The hour meter shall be remote mounted on either pump panel and must be labeled "Auxiliary Pump Hours" and in a location where it can be easily read.

AUXILIARY PUMP PLUMBING

The auxiliary pump shall be plumbed in common with the main pump and shall only provide discharge pressure and foam concentrate to all 1" and 2" discharge valves. Plumbing between the tank sump or main manifold and the auxiliary pump suction eye shall be 2" schedule 10 stainless steel with Victaulic couplings, Gates 4684CF 2" flexible wire reinforced suction hose with threaded fittings or combination of both.

A 2" one way full flow check valve shall be installed in the auxiliary pump suction hose as close to the tank sump as possible to ensure that the auxiliary pump remains primed at all times.

PORTABLE PUMP PIPING

The inlet to the diesel pump shall be connected to the 4" intake manifold for the PTO pump with 2" stainless steel pipe and wire reinforced high pressure hose coupled with stainless steel fittings. There shall be a 2" check valve at the connection to the 4" intake manifold to prevent back flow from the 2" line with the 4" line under vacuum.

The discharge of the diesel pump shall be piped with 2" stainless steel pipe and wire reinforced high pressure hose coupled with stainless steel fittings to a double check valve. The other inlet to the double check valve shall be connected to the PTO pump pressure side. The double check valve shall prevent water from the PTO pump and the diesel pump from back feeding under pressure. The check valve outlet shall feed the foam manifold upstream of the foam system check valve.

PUMP PANEL CONTROL

The auxiliary pump shall have a control panel located on the midship pump module operator's position. This panel shall contain the following:

- Auxiliary pump water pressure gauge (Class 1 dry type, 0-400 psi, white face with black numerals).
- Vernier throttle cable
- Pump ignition on / off / start switch
- Low Oil Pressure indicator light
- Engine Overheat indicator light
- Glow Plug operational light
- Primer

AUXILIARY PUMP MOUNTING

The pump and water cooled diesel power unit assembly shall be mounted on a sub frame on the upper right side of the apparatus above the main pump module and in such a manner so as to eliminate vibration while operating and will provide suitable access for performing routine maintenance. The pump and power unit assembly shall be designed so the entire assembly may be easily removed as a unit to gain access to plumbing or components below.

A slotted hinged cover with suitable latches shall be provided over the pump and power unit assembly. The area around the assembly shall remain open for maintenance and air circulation and the radiator shall be located behind a removable or swing-away expanded metal screen. All parts (e.g. auxiliary pump, power unit and bracketing) shall be commercially available.

Unit shall run off the chassis fuel tank (provisions will need to be made on tank) with a 1-way check valve for fuel feed to pump must be accessible.

FOAM SYSTEMS

There shall be a FoamPro 1601 foam system with a 12 Volt, 1/3 hp electric motor driven positive displacement piston type foam concentrate pump with a rated capacity of .01 to 1.0 gpm @ 200 psi, with operating pressures up to 400 psi. The system will draw a maximum of 30 amps @ 12 VDC.

The apparatus shall be equipped with an electronic, fully automatic, variable speed, direct injection, discharge side foam proportioning system. The system shall be capable of handling Class A foam concentrate. The foam proportioning operation shall be based on direct measurement of water flows, and remain consistent within the specified flows and pressures. System must be capable of delivering accuracy to within 5% of calibrated settings over the advertised operation range when installed according to factory standards. The system shall be equipped with a control module suitable for installation on the pump panel. Incorporated within the motor driver shall be a microprocessor that receives input from the system flowmeter, while also monitoring foam concentrate pump output, comparing values to ensure that the operator preset proportional amount of foam concentrate is injected into the discharge side of the fire pump.

A paddlewheel-type flowmeter shall be installed in the discharge system specified to be “foam capable.” A simulated flow feature shall be incorporated into the motor driver to simulate an approximate flow value of 100 gpm. This feature is to be engaged or disengaged with a momentary switch and will automatically disengage when the main system switch is turned off.

The control module shall enable the pump operator to:

- Activate the foam proportioning system
- Select proportioning rates from 0.1% to 1.0%
- See a “low concentrate” warning light flash when the foam tank runs low and in two minutes, if foam concentrate is not added to the tank, shut the foam concentrate pump down

A 12-volt electric motor driven positive displacement plunger pump shall be provided. The pump capacity shall be from 0.1 gpm (0.38 L/min) to 1.0 gpm (3.8 L/min) at 200 psi (13.8 BAR) with a maximum operating pressure up to 400 psi (27.6 BAR). The pump shall have the capability to draw 3 foot of lift. The system will draw a maximum of 30 amps @ 12 VDC or 15 amps @ 24 VDC. The motor shall be controlled by the microprocessor (mounted to the base of the pump). It shall receive signals from the control module and power the 1/3 hp (.25 kW) electric motor in a variable speed duty cycle to ensure that the correct proportion of concentrate is injected into the water stream. A full flow check valve shall be provided in the discharge piping to prevent foam contamination of fire pump and water tank. A 12 psi (.83 BAR) opening pressure check valve shall be provided in concentrate line.

Components of the complete proportioning system as described above shall include:

- Operator control module
- Paddlewheel flowmeter
- Pump and electric motor/motor driver
- Wiring harnesses
- Low level tank switch
- Foam tank
- Foam injection check valve
- Main waterway check valve

An installation and operation manual shall be provided for the unit, along with a one-year limited warranty by the manufacturer. The system must be installed and calibrated by a Certified FoamPro Dealer. The system design shall have passed environmental testing which simulates heavy use on off-road mobile apparatus. Testing shall have been conducted in accordance to SAE standards.

A means shall be provided to prevent water back flow into the foam proportioning system and the foam concentrate storage tank.

A remote start/stop feature shall be available to be incorporated into the 1600 series proportioners. This option shall allow the operator to start and/or stop the operation of the proportioner from more than one location on the apparatus. Included in this option are a special control module, a local start/stop switch with LED lamp for mounting near the control module, a remote start/stop switch with LED lamp for remote mounting, and the 20 foot interface cable.

FOAM TANK REFILL SYSTEM

The apparatus shall be equipped with an electronic, automatic, concentrate refill system. System shall operate independently of the foam proportioner allowing simultaneous use. Refill operation shall not require apparatus or fire pump to be running. The system shall be capable of handling Class A or Class B foam concentrates, emulsifiers, gels and decontamination concentrates. The apparatus shall be plumbed from the externally accessed intake/flush ports to the concentrate cell following manufacturer's recommendations. External fill and flush connections to be quick-connect, cam-lock type. Internal piping to incorporate check valves to prevent back flow. Concentrate tank inlet shall be positioned to minimize agitation per manufacturer's recommendations. The refill operation shall be based on direct measurement of concentrate level in tank. System must be capable of automatically stopping when cell is full and include a manual override feature. The system shall be equipped with an electronic control suitable for installation on the pump panel. Incorporated within the control shall be a microprocessor that receives input from the system while controlling foam concentrate pump output. An all bronze three-way valve shall be included to allow the operator to flush system after use. Valve control, intake and flush ports shall be located within corresponding panel plate.

The system shall enable the operator to perform the following control/operation functions and status indicators for the refill operation:

- Provide push-button start/stop control of foam refill
- Solid green light advises operator concentrate cell is full
- Flashing green indicates system is running
- Green light off, system off
- Allow override of "full tank" condition
- Provide a means to flush the pump and intake piping

System shall include a 12 volt electric motor driven, positive displacement concentrate pump. Pump shall deliver minimum flow of 10 gpm (37.8 L/min) @ 20 psi with all concentrates currently utilized in fire apparatus. Pump body to be of all bronze construction and other wetted components and piping to be constructed of non-corrosive materials. The system will draw a maximum of 38 amps @ 12 VDC. A pump/motor solenoid (mounted to the base of the pump) shall receive signals from the computer control display and power the 1/2 hp (0.4 kW) electric motor directly coupled to the concentrate pump. The system shall receive readings when the concentrate tank is full and stop operation to prevent overfill.

Components of the complete refill system shall include:

- Operator control and display with Weather-Pac connectors
- Refill/flush quick-connect cam-lock fittings and cap
- Check valves
- Pump/motor assembly and solenoid
- Strainer
- Tank level switch
- Three-way fill/flush valve
- Stainless steel pick-up wand and 6' of reinforced suction hose, 1" diameter to allow maximum flow
- Panel placards

An installation and operation manual shall be provided, along with a one-year limited warranty by the manufacturer. The system must be installed and plumbed by a Certified FoamPro Dealer. When two types of concentrates are to be used, a separate refill system must be specified for each.

PLUMBING SPECIFICATIONS

The fire pump plumbing system shall be fabricated with rigid stainless steel and or flexible piping with stainless steel fittings. Victaulic couplings shall be installed to permit flexing of the plumbing system and allow for quick removal of piping or valves for service. Flexible hose couplings shall be threaded stainless steel or Victaulic connections.

The fire pump and plumbing shall be hydrostatically tested in compliance to applicable sections of NFPA standards, with test results submit with the delivery documentation.

STAINLESS STEEL INTAKE MANIFOLD

The suction manifold assembly shall be fabricated with Schedule #10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The suction manifold assembly shall have radiused sweep elbows to minimize water turbulence into the suction volute.

The suction manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The entire intake piping system, valves, bleeder valves, and intake closures, excluding the tank-to-pump line on the tank side of the valve, shall be capable of withstanding a hydrostatic pressure of 250 psi (1700 kPa).

STAINLESS STEEL DISCHARGE MANIFOLD

The discharge manifold assembly shall be fabricated with Schedule #10 type 304 stainless steel. All threaded fittings shall be a minimum of Schedule 10 stainless steel. The discharge manifold assembly shall have radiused sweep elbows to minimize water turbulence into the discharge header.

The manifold shall be welded and pressure tested prior to installation. The stainless steel manifold assembly shall be attached to the pump intake volute with a heavy-duty, flexible Victaulic coupling.

The entire discharge piping system; valves; drain cocks; and outlet closures, excluding the tank fill line on the tank side of the valve and CAF system piping and components that include valves that permit isolation from discharge pressure, shall be capable of withstanding a hydrodynamic discharge pressure of 500 psi (3400 kPa) or 100 psi (700 kPa) over the maximum discharge pressure capability rating of the pump, whichever is greater.

STAINLESS STEEL PLUMBING WARRANTY

The stainless steel plumbing shall be free of defects in material and workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

The contractor shall supply details of their warranty information with their bid submission.

STREETSIDE INTAKE - 2-1/2"

There shall be one (1) 2-1/2" (65 mm) gated intake(s) located on pump panel. Each intake shall include:

- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- Each intake shall have a 2-1/2" (65 mm) AMAF chrome swivel adapter with strainer provided.
  - The specified adapter shall be provided with a 2-1/2" (65 mm) AMAM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

CURBSIDE INTAKE - 2-1/2"

There shall be one (1) 2-1/2" (65 mm) gated intake(s) located on pump panel. Each intake shall include:

- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- Each intake shall have a 2-1/2" (65 mm) AMAF chrome swivel adapter with strainer provided.
  - The specified adapter shall be provided with a 2-1/2" (65 mm) AMAM chrome plated plug with chain.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

DIRECT TANK FILL

One (1) 2-1/2" (65 mm) direct tank fill(s) shall be located on rear body panel with check valve.

- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- Each intake shall have a 2-1/2" (65 mm) AMAF chrome swivel adapter with strainer provided.
  - The specified adapter shall be provided with a 2-1/2" (65 mm) AMAM chrome plated plug with chain.

TANK TO PUMP CHECK VALVE

There shall be a check valve between the pump suction and the booster tank valve. The check valve shall eliminate back flow into the water tank when the pump is connected to a pressurized source.

TANK TO PUMP VALVE

A 3" (75 mm) full flow ball valve shall be installed between the fire pump and the water tank. The connection between the tank and the pump shall be capable of the flow recommendations as set forth in the latest edition of NFPA 1901. The valve shall be flanged to bolt directly to the pump and shall incorporate a chromium plated bronze ball. The remaining internal moving parts shall be stainless steel for years of dependable service. A non collapsible flexible hose shall be incorporated into the tank to pump plumbing to allow movement in the line as the chassis flexes to avoid damage during normal road operation.

The tank to pump valve shall be controlled from the pump operator's panel.

- Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The valve handle will be pulled for the open valve position. The control handle shall be located adjacent to the plumbing connection.

FRONT DISCHARGE

There shall be two (2) 2" (52 mm) gated discharge(s) with control located on valve. Each discharge shall include:

- Two (2) of the discharge(s) shall flow water and foam.
- Two (2) Akron Brass 8900 series Gen II, manual type 2" (52 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- There shall be a 2" (52 mm) VFC x 1-1/2" (38 mm) NPSHM brass or chrome plated 90 degree swivel elbow provided for each discharge.
- Two (2) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.
- A discharge pressure gauge is not required with the remote valve control.

REMOTE CONTROL MONITOR

An Akron model 3462, 300 GPM rated monitor with all electric single waterway constructed of lightweight Pyrolite shall be provided on completed unit. The monitor shall have cast-in turning vanes in each elbow, and fully enclosed motors and gears with manual overrides for both horizontal and vertical rotation and may be operated simultaneously.

This compact forestry monitor features a fully sealed integrated electrical control system with waterproof locking connectors from all motors, power and control connections to withstand harsh environments often seen in Wildland fire fighting conditions. The high speed motors of this monitor provide proportional speed control for pinpoint stream positioning and accuracy and ideal for use in water, foam and CAFS applications.

Standard Features:

- CAN proportional speed joystick control
- Lightweight Pyrolite construction, 23 lbs. without nozzle
- Integrated and sealed electronics
- Waterproof (IP 67 rated) locking connectors
- Simple "plug and play" installation
- 320° maximum rotation range with stops at ± 90°
- 135° maximum elevation range with stops at ± 45° and -20°
- Style 3293 low flow adjustable electric fog nozzle with flush 30-60-95-125 gpm (115-230-360-475 lpm)

The control system electronics shall be integrated with the monitor wiring harness. The control system shall use sealed, locking connectors for the monitor and nozzle motors. Two additional sealed, locking connectors shall be supplied for input power/electric valve control and J1939 CAN bus interface. A sealed USB connector shall be provided for updating control system firmware. All electrical connectors shall be minimum IP65 rated.

The operator interface shall be located in cab easily accessible to driver and consist of a CAN bus compatible joystick which will provide up, down, right, left, fog, and stream control of the monitor. The joystick shall have a trigger switch to control an optional electric discharge valve. The monitor shall include a 5’ long power/valve harness and 20’ long CAN joystick harness.

A Class 1 high pressure flexible hose with stainless steel Victaulic couplers shall connect the discharge valve and monitor. Hose shall be secured to body and chassis frame with bolted "P" style clamps and protected from abrasion, sharp edges, or high heat.

- One (1) of the discharge(s) shall flow water and foam.

- Specified deck gun shall be controlled by an Akron Brass 9600 series Gen II, 12 VDC electric actuated type 2" (52 mm) valve(s) with Fusion CF composite ball. Valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.

- One (1) Innovative Controls model 3003000, ¾” brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.

- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with red (foam) LED backlighting activated with pump engagement.
  - Gauge(s) shall have a white background with black text and blue (water) or red (foam) pie indicator.
  - Gauge(s) shall have a range from 0 to 2,750 kPa.
  - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.

CAB MOUNTED WATER TANK INDICATOR

There shall be one (1) Fire Research TankVision model WLA205-A00 miniature tank indicator provided and installed in cab. The indicator shall show the volume of water in the tank on five (5) easy to see super bright LEDs. A wide view lens over the LEDs shall provide for a viewing angle of 180 degrees. The indicator case shall be manufactured of aluminum and have a distinctive blue label.

The miniature indicator shall receive input information over a single wire from a Fire Research TankVision model WLA200-A00 tank primary indicator.

STREETSIDE DISCHARGE

There shall be one (1) 2-1/2" (65 mm) gated discharge(s) with control located on pump panel. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- Each discharge shall have a 2-1/2" (65 mm) NSTF x 2-1/2" (65 mm) AMAM chrome plated 30 degree downsweep elbow provided.
  - The specified elbow shall be provided with a 2-1/2" (65 mm) AMAF chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, ¾” brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.
- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with blue (water) LED backlighting activated with pump engagement.
  - Gauge(s) shall have a white background with black text and blue (water) or red (foam) pie indicator.
  - Gauge(s) shall have a range from 0 to 2,750 kPa.
  - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.

REAR STREETSIDE DISCHARGE

There shall be one (1) 2" (52 mm) gated discharge(s) with control located on valve. Each discharge shall include:

- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8900 series Gen II, manual type 2" (52 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a handle for direct valve operation through panel.
- There shall be a 2" (52 mm) VFC x 1-1/2" (38 mm) NPSHM brass or chrome plated 90 degree swivel elbow provided for each discharge.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.
- A discharge pressure gauge is not required with the remote valve control.

REAR CURBSIDE DISCHARGE

There shall be one (1) 2-1/2" (65 mm) gated discharge(s) with control located on valve. Each discharge shall include:

- One (1) of the discharge(s) shall flow water only.
- One (1) Akron Brass 8900 series Gen II, manual type 2-1/2" (65 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- Each discharge shall have a 2-1/2" (65 mm) AMAF x 2-1/2" (65 mm) AMAM chrome plated 30 degree downsweep elbow provided.
  - The specified elbow shall be provided with a 2-1/2" (65 mm) AMAF chrome plated cap with chain.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.
- A discharge pressure gauge is not required with the remote valve control.

MISCELLANEOUS DISCHARGE

2" CROSS LAY(S)

There shall be one (1) 2" cross lay(s) located in pump module, or per the itemized compartment list. The crosslay(s) shall be transverse of the pump module or body with access from either side.

Each cross lay shall have a minimum storage capacity of 200' of 1-3/4" double jacket hose and nozzle.

- One (1) of the discharge(s) shall flow water and foam.
- One (1) Akron Brass 8900 series Gen II, manual type 2" (52 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- There shall be a 2" (52 mm) VFC x 1-1/2" (38 mm) NPSHM brass or chrome plated 90 degree swivel elbow provided for each discharge.
- One (1) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.
- One (1) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with red (foam) LED backlighting activated with pump engagement.
  - Gauge(s) shall have a white background with black text and blue (water) or red (foam) pie indicator.
  - Gauge(s) shall have a range from 0 to 2,750 kPa.
  - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.

BOOSTER REEL

There shall be two (2) Hannay SBEF24-23-24-12 (26" wide x 23.5" high x 20.5" deep) polished aluminum booster hose reel discharge(s) with electric rewind motor located in upper pump module or lower compartment per itemized compartment layout. Reel shall be capable of holding 100' of 1" or 150' of 3/4" booster hose.

- Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and not be more than 72 in. (1830 mm) above the operator's standing position, and shall be marked with a label indicating its function.
- Each booster hose reel shall be equipped with a Hannay FH-3 hose guide rollers.
- Each booster hose reel shall be supplied with 150' x 3/4" diameter, 800 PSI rubber booster hose with 3/4" NST hardcoat aluminum couplings. Color of hose shall be red.
- No nozzle is required with specified booster hose reel(s).
- Two (2) of the discharge(s) shall flow water and foam.

- Two (2) Akron Brass 8900 series Gen II, manual type 1-1/2" (38 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a Class 1 stainless steel weld type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.
- Two (2) Innovative Controls model 3003000, ¾" brass 90 degree ball type drain valve(s) with lift type handle which can be opened under pressure, with color coded label shall be provided. Valve(s) shall be located on bottom of pump panel and drain the lowest point in the plumbing.
- Two (2) Innovative Controls/NoShok 2-1/2" liquid filled gauge(s) with red (foam) LED backlighting activated with pump engagement.
  - Gauge(s) shall have a white background with black text and blue (water) or red (foam) pie indicator.
  - Gauge(s) shall have a range from 0 to 2,750 kPa.
  - The gauge shall have a die cast zinc, chrome plated bezel with color-coded labels insert and a color-coded gauge trim ring. Labels shall be UV and scratch resistant and meet SAE standards where applicable.

TANK FILL VALVE

There shall be one (1) 2" (52 mm) tank fill valve plumbed with 2" plumbing from the pump to the tank. Installation shall be completed with 2" rubber hose and stainless steel hose couplings. The tank fill valve shall be controlled from the operator's control panel.

- One (1) Akron Brass 8900 series Gen II, manual type 2" (52 mm) valve(s) with Fusion CF composite ball. Each valve shall be equipped with a brass type valve adapter on inlet side, and discharge side with drain port.
  - Valve(s) shall be controlled with a push/pull type chromed "T" handle with adjustable linkage connected to the valve. The control handle shall be located adjacent to the plumbing connection.

PUMP PANEL

The side mount pump control panel shall be hinged, or bolted in place allowing it to be easily removed to gain access to plumbing components.

The pump controls shall be mounted on an aluminum control panel with a black powdercoat painted finish.

PUMP PANEL LOCATION

The pump control panel shall be side mounted.

The pump panel shall include the following items;

PUMP PANEL ACCESS

The pump panel shall be open to the side of the truck. The Pump Operator shall NOT be required to open a compartment door to access the pump control panel.

ENGINE GAUGES

The cab/chassis engine gauges shall be provided with the specified pump pressure governor system.

PRESSURE GOVERNOR, MONITORING, and MASTER PRESSURE DISPLAY

A Fire Research InControl series TGA300-A00 pressure governor and monitoring display kit shall be installed. The kit shall include a control module, intake pressure sensor, discharge pressure sensor, and cables. The control module case shall be waterproof and have dimensions not to exceed 5 1/2" high by 10 1/2" wide by 2" deep. Inputs for monitored information shall be from a J1939 databus or independent sensors. Outputs for engine control shall be on the J1939 databus or engine specific wiring.

The following continuous displays shall be provided:

- Pump discharge; shown with four daylight bright LED digits more than 1/2" high
- Pump Intake; shown with four daylight bright LED digits more than 1/2" high
- Pump discharge and intake pressure gauge shall have an accuracy of ±3 percent over the full scale.
- Pressure / RPM setting; shown on a dot matrix message display
- Pressure and RPM operating mode LEDs
- Throttle ready LED
- Engine RPM; shown with four daylight bright LED digits more than 1/2" high
- Check engine and stop engine warning LEDs
- Oil pressure; shown on a dual color (green/red) LED bar graph display
- Engine coolant temperature; shown on a dual color (green/red) LED bar graph display
- Transmission Temperature: shown on a dual color (green/red) LED bar graph display
- Battery voltage; shown on a dual color (green/red) LED bar graph display.

The dot-matrix message display shall show diagnostic and warning messages as they occur. It shall show monitored apparatus information, stored data, and program options when selected by the operator. All LED intensity shall be automatically adjusted for day and night time operation.

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

• High Battery Voltage	• Low Engine Oil Pressure
• Low Battery Voltage (Engine Off)	• High Engine Coolant Temperature
• Low Battery Voltage (Engine Running)	• Out of Water (visual alarm only)
• High Transmission Temperature	• No Engine Response (visual alarm only).

The program features shall be accessed via push buttons located on the front of the control panel. There shall be an USB port located at the rear of the control module to upload future firmware enhancements.

Inputs to the control panel from the pump discharge and intake pressure sensors shall be electrical. The discharge pressure display shall show pressures from 0 to 600 psi. The intake pressure display shall show pressures from -30 in. Hg to 600 psi.

The governor shall operate in two control modes, pressure and RPM. No discharge pressure or engine RPM variation shall occur when switching between modes. A throttle ready LED shall light when the interlock signal is recognized. The governor shall start in pressure mode and set the engine RPM to idle. In pressure mode the governor sshall automatically regulate the discharge pressure at the level set by the operator. In RPM mode the governor shall maintain the engine RPM at the level set by the operator except in the event of a discharge pressure increase. The governor shall limit a discharge pressure increase in RPM mode to a maximum of 30 psi. Other safety features shall include recognition of no water conditions with an automatic programmed response and a push button to return the engine to idle.

The pressure governor, monitoring and master pressure display shall be programmed to interface with a specific engine.

MASTER INTAKE/PRESSURE GAUGES

There shall be one (1) Innovative Controls/NoShok 4" liquid filled gauge to display the Master Intake Pressure, and labeled "PUMP INTAKE".

There shall be one (1) Innovative Controls/NoShok 4" liquid filled gauge to display the Master Discharge Pressure. Gauge shall be labeled "PUMP DISCHARGE".

Both gauges shall have a die cast zinc, chrome plated bezel and color-coded. The left side (Pump Intake) bezel shall be color coded red, and the right side (Pump Discharge) bezel shall be colored black.

A test gauge port manifold shall be integrated into lower center bezel.

- Gauge(s) shall have a white background with black text.
- Gauge(s) shall have a range from -200 to 2,750 kPa.

PUMP SAFETY AND TEST LABELS

Safety, information, data, and instruction labels for apparatus shall be provided and installed at the operator's instrument panel.

The labels shall include rated capacities, pressure ratings, and engine speeds as determined by the certification tests. The no-load governed speed of the engine, as stated by the engine manufacturer, shall also be included.

The labels shall be provided with all information and be attached to the apparatus prior to delivery.

PUMP PANEL LIGHTING

All gauges and controls on the pump operator's panel shall be adequately illuminated by a full panel width shielded light assembly with full width OnScene Solutions LED light (each panel, if equipped). The light shall be activated by a weather-proof type switch on the pump operator's panel as well as automatically when pump is engaged. This switch shall also activate any area step lighting.

PUMP PANEL AIR HORN?SCENE LIGHT SWITCH

The pump operator's panel shall have an Innovative Controls switch panel to activate the cab/chassis air horn(s) and scene lights. Switch shall be constantly illuminated and labeled.

BACK PACK FILLER VALVE

A brass, 3/4", quarter turn ball valve with chrome T-handle shall be supplied and labeled "Back Pack Filler". The valve shall be installed on the streetside lower forward side of the pump panel with the discharge hose terminating at the outside of the apparatus body. The valve plumbing shall be 3/4" I.D. properly routed and clamped from the tank sump to the filler valve.
SHOP NOTES
The outlet will be located in the lower rearward corner of the pump operators panel.

POLY WATER TANK

The water tank capacity shall be approximately 500 US gallon or 416 Imperial gallons. Certification of the tank capacity shall be recorded on the manufacturer's record of construction and shall be provided to the purchaser upon delivery of the apparatus.

CONSTRUCTION

The tank must be designed and fabricated by a tank manufacturer that is ISO 9001:2008 certified. The ISO certification must be to the current standard in effect at the time of the design and fabrication of the tank.

The water tank shall be of a specific configuration and designed to be completely independent of the body and compartments. Joints and seams shall be fused using nitrogen gas as required and tested for maximum strength and integrity. The tank construction shall include PolyProSeal™ technology wherein a sealant shall be installed between the plastic components prior to being fusion welded. This sealing method will provide a liquid barrier offering leak protection in the event of a weld compromise. The top of the booster tank is fitted with removable lifting assembly designed to facilitate tank removal. The transverse and longitudinal swash partitions shall be manufactured of a minimum of 3/8" PT3™ polypropylene. All partitions shall be equipped with vent and air holes to permit movement of air and water between compartments. The partitions shall be designed to provide maximum water flow. All swash partitions interlock with one another and are completely fused to each other as well as to the walls of the tank. All partitions and spacing shall comply with NFPA 1901. The walls shall be welded to the floor of the tank providing maximum strength as part of the tank’s unique Full Floor Design™. Tolerances in design allow for a maximum variation of 1/8” on all dimensions.

WATER FILL TOWER AND COVER

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT3™ polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The fill tower shall be blue in color indicating that it is a water-only fill tower. The tower shall be located in the left front corner of the tank unless otherwise specified by the tank manufacturer to the purchaser. The tower shall have a 1/4" thick removable polypropylene screen and a PT3™ polypropylene hinged cover. The capacity of the tank shall be engraved on the top of the fill tower lid. Inside the fill tower there shall be a combination vent/overflow pipe. The vent overflow shall be a minimum of schedule 40 polypropylene pipe with a minimum I.D. of 4" that is designed to run through the tank, and shall be piped to discharge water behind the rear wheels as required in NFPA 1901 so as to not interfere with rear tire traction.

The tank cover shall be constructed of 1/2" thick PT3™ polypropylene and UV stabilized, to incorporate a multi-piece locking design, which allows for individual removal and inspection if necessary. The tank cover(s) shall be flush or recessed 3/8" from the top of the tank and shall be fused to the tank walls and longitudinal partitions for maximum integrity. Each one of the covers shall have hold downs consisting of 2" minimum polypropylene dowels spaced a maximum of 40” apart. These dowels shall extend through the covers and will assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall accommodate the necessary lifting hardware.

SUMP

There shall be one (1) sump standard per tank. The sump shall be constructed of a minimum of 1/2" PT3™ polypropylene and be located in the left front quarter of the tank, unless specified otherwise. On all tanks that require a front suction, a 3" schedule 40 polypropylene pipe shall be installed that will incorporate a dip tube from the front of the tank to the sump location. The sump shall have a minimum 3" N.P.T. threaded outlet on the bottom for a drain plug per NFPA. This shall be used as a combination clean-out and drain. All tanks shall have an anti-swirl plate located approximately 3” above the inside floor.

OUTLETS

There will be two (2) standard tank outlets: one for the tank-to-pump suction line, which shall be sized to provide adequate water flow to the pump; and, one for tank fill line, which shall be sized according to the NFPA minimum size chart for booster tanks. All tank fill couplings shall be backed with flow deflectors to break up the stream of water entering the tank, and be capable of withstanding sustained fill rates of up to 1000 G.P.M. The addition of rear suction fittings, nurse valve fittings, dump valve fittings, and through-the-tank sleeves to accommodate rear discharge piping must be specified. All auxiliary outlets and inlets must meet all NFPA guidelines in effect at the time of manufacture.

MOUNTING

The tank shall rest on the body cross members in conjunction with such additional cross members, spaced at a distance that would not allow for more than 530 square inches of unsupported area under the tank floor. In cases where overall height of the tank exceeds 40 inches, cross member spacing must be decreased to allow for not more than 400 square inches of unsupported area.

The tank must be isolated from the cross members through the use of hard rubber strips with a minimum thickness and width dimension of 1/4” x 1” and a Shore A Hardness of approximately 60 durometer. The rubber must be installed so it will not become dislodged during normal operation of the vehicle. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both in the front and rear as well as side to side to prevent tank from shifting during vehicle operation.

A picture frame type cradle mount with a minimum of 2" x 2" x 1/4” mild steel, stainless steel, or aluminum angle shall be provided or the use of corner angles having a minimum dimension of 4" x 4" x 1/4” by 6” high are permitted for the purpose of capturing the tank.

Although the tank is designed on a free floating suspension principle, it is required that the tank have adequate vertical hold down restraints to minimize movement during vehicle operation. If proper retention has not been incorporated into the apparatus hose floor structure, an optional mounting restraint system shall be located on top of the tank, half way between the front and the rear on each side of the tank. These stops can be constructed of steel, stainless steel or aluminum angle having minimum dimensions of 3" x 3" x 1/4” and shall be approximately 6” to 12” long. These brackets must incorporate rubber isolating pads with a minimum thickness of 1/4” inch and a hardness of 60 durometer affixed on the underside of the angle. The angle should then be bolted to the body side walls of the vehicle while extending down to rest on the top outside edge of the upper side wall of the tank. Hose beds floors must be so designed that the floor slat supports extend full width from side wall to side wall and are not permitted to drop off the edge of the tank or in any way come in contact with the individual covers where a puncture could occur. Tank top must be capable of supporting loads up to 200 lbs per sq. foot when evenly distributed. Other equipment such as generators, portable pumps, etc. must not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank® III for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

CENTER OF GRAVITY

A center of gravity calculation shall be determined for each 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.

WATER TANK LEVEL GAUGE

There shall be two (2) Innovative Controls SL series 10-LED water tank level gauge(s) for indicating water tank level. The tank level gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

UPF POLY WATER TANK WARRANTY

The UPF poly water tank shall be provided with a lifetime material and workmanship limited warranty. The manufacturer shall supply details of their warranty information with their bid submission.

FILL TOWER PROTECTION

The fill tower(s) shall be boxed in with an aluminum panel for protection from damage.

CLASS A POLYPROPYLENE FOAM CELL

There shall be one (1) 20 US gallon or 16.6 Imperial gallons polypropylene foam cell incorporated into the polypropylene water tank. This foam tank capacity shall be deducted from water tank size specified.

There shall be one (1) pressure/vacuum vent installed on the foam tank.

A minimum 1 in. (25 mm) inside diameter full flow drain valve and piping shall be provided at the lowest point of any foam concentrate tank. The drain shall be piped to drain directly to the surface beneath the apparatus without contacting other body or chassis components.

A label shall be affixed to the foam tank fill indicating: "WARNING" Class A foam tank fill, do not mix brands or types of foam.

FOAM TANK LEVEL GAUGE

There shall be two (2) Innovative Controls SL series 10-LED foam tank level gauge(s) for indicating foam tank level. The gauge shall indicate the liquid level on an easy to read display.

Each tank level gauge system shall include:

- A pressure transducer that is mounted on the outside of the tank in an easily accessible area.
- A super bright LED bar graph display with a visual alarm at 1/4 of a tank. The display shall also provide an output to activate an audible alarm or secondary visual alarm at 1/4 of a tank.
- A set of weather resistant connectors to connect the digital display to the pressure transducer and to the apparatus power.

HOSE BED STORAGE AREA

Hose bed storage area shall be located over water tank and body, and shall exit at the rear of the apparatus. The interior of storage area shall be free from all projections such as nuts, sharp angles, or brackets that may damage equipment.

ALUMINUM HOSE BED DECKING

The hose bed deck shall be constructed from 3" x 3/4" hollow aluminum extrusions welded into a one-piece grid to allow ventilation and water drainage. The extrusions shall have a radiused ribbed top surface. The deck will be completely removable for easy access to the booster tank. The booster tank fill tower shall be protected as necessary to prevent damage from equipment located in the storage area.

WALKWAY/STEP LIGHTS

There shall be four (4) OnScene Solutions Rough-Service 9" LED lights provided to illuminate the walkway or step area. The lights shall be activated when the parking brake is set.

Each light shall be mounted in an extruded aluminum housing to protect against damage from personnel or equipment.

Lighting shall provide illumination at a minimum level of 2 fc (20 lx) on all work surfaces, steps, and walkways. Lighting shall be switchable but activated automatically when the vehicle park brake is set.

FILL TOWER PROTECTION

The fill tower(s) shall be boxed in with an aluminum panel for protection from damage.

HOSE BED DIVIDER(S)

Two (2) adjustable aluminum hose bed divider(s) shall be provided in the hose bed storage area. The dividers(s) shall be fabricated from 3/16" smooth aluminum with 1" round split aluminum tubing welded to the top and rear edges. A radiused hand-hold opening shall be provided on rear of divider to assist in access to hose bed area. Hose pay-out shall be unobstructed by the divider.

ALUMINUM HOSE BED COVER

A two-section hose bed cover shall be provided. Each door shall be fabricated from 1/8" NFPA aluminum treadplate with formed hat sections for bracing. Doors shall be hinged along each side of the hose body using stainless steel piano hinge. The top surface of each section shall slant down with the highest point in the center of the hose bed area and shall be supported from underneath by at least one (1) adjustable hose bed divider. Each section shall be constructed to support the weight of a person (300 lbs).

A flashing warning light signal shall be provided indicating when a hose bed door is not in a closed position as required by NFPA 1901.

There shall be one (1) 24" vertical handrail on each door to assist in raising and lowering hose bed door. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

Each door shall have a horizontally mounted On Scene LED light on the underside of the door that will be automatically activated when the door is opened and wired to the compartment door ajar warning light provided in cab.

A vinyl hose bed flap shall be provided attached to each door and extend downward to bottom of hose bed to protect hose and equipment from weather and dust. The center where both doors come together shall have a Velcro seam to join two-pieces of vinyl together. Bottom of each flap shall be weighted for quick deployment of hose. Vinyl color shall be color coordinated with upper vehicle colors unless specified otherwise.

HOSE BED FULL WIDTH EXTENSION

A full width, bolt-on type hose bed extension step shall be provided. Step shall be fabricated from 3/16" NFPA compliant treadplate aluminum with side gusset supports to body. The specified center rear marker lights shall be located on rear facing edge. The underside of step shall have a 36" OnScene LED light to light the bumper or compartment area below.

HOSEBED TOP LOADING EQUIPMENT COMPARTMENT

In the center of the hosebed area a top loading equipment compartment shall run the length of the hosebed. The compartment shall be constructed of 1/8" smooth aluminum with a total volume of 13.8 cubic feet. Inside dimensions shall be 78" long x 17" deep and 18" wide. The top of the compartment shall be open and covered by the hose bed doors.

A rear access door shall be provided and constructed of aluminum with smooth finished inside panels and painted to match job color on the exterior.

The compartment floor shall be formed with a recess ribbed design for strength and to create a depressed area that will allow any accumulated debris or moisture to collect without the equipment resting in the contaminant. The depressed area is to be covered with open grating material. There shall be large diameter drain holes with removable plugs placed in the depresses area of the compartment floor for cleaning out the compartment.

The compartment door shall be wired into the door open warning circuit. Inside the compartment there shall be lights activated when the door is open for low ambient light operating conditions. The compartment shall be bolted in place and removable for water tank service.

An OnScene LED light shall be provided that runs from front to back of the compartment.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA 1906 standards, the vehicle shall be designed for an equipment loading allowance of 500 lbs. of Grand Prairie Fire Department provided equipment based on the wildland body having at least 50 cu. ft. of storage space under 26,000 GVWR, and an equipment loading allowance of 750 lbs with 75 cu. ft. of storage space over 26,000 GVWR.

EQUIPMENT

The following equipment shall be furnished with the completed wildland vehicle;

- One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.
- There shall be two (2) Worden HW C7Y-WH yellow handled aluminum wheel chocks provided for 44" diameter tires that together will hold the vehicle when loaded to its GVWR or GCWR, on a hard surface with a 20% grade, with the transmission in neutral, and the parking brake released. The wheel chocks shall have a bright yellow powder coat finish for high visibility, safety and corrosion resistance.
  - The wheel chock(s) shall be mounted on the apparatus, location as per the Grand Prairie Fire Department.
- One (1) Duo-Safety 912 series 20' 3-section extension ladder(s) shall be provided with the completed unit.
  - The ladder(s) shall be located in specified ladder compartment.
- Two (2) Fire Hooks Unlimited 6' pike pole(s) model MPH-6 shall be provided with the completed unit.
  - The above specified pike pole will not have a D handle attached
  - The pike pole(s) shall be mounted on vehicle, per itemized compartment list.
- Three (3) Pelican 9410L LED flashlight(s) with shoulder strap shall be provided with 1,131/558 lumen output and 3.75/9 hour run time. Each flashlight shall be yellow in color and have a 12 volt DC charger and vehicle mount kit. The flashlight(s) shall be wired to battery direct unless otherwise specified by Grand Prairie Fire Department.
- Three (3) flashlight(s) shall be mounted in the cab, locations per pre-paint inspection meeting.
- Three (3) Kochek 4.0" x 8' Flexlite PVC flexible suction hose(s) shall be provided with completed unit. The hose shall have light weight NST couplings provided.
- One (1) 4" low level box type strainer(s) with screen shall be provided with completed unit. Low level strainer hard suction end shall match provided hard suction(s).
  - The suction hose(s) shall be mounted on streetside rear compartment in formed aluminum hard suction tray(s).

REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1906 for wildland vehicles, section 5.7 shall be supplied and mounted by Grand Prairie Fire Department before the unit is placed in emergency service.