

**TOWN OF WATERTOWN  
WATERTOWN, CONNECTICUT**

**NOTICE OF BID**

**Watertown Fire Department  
Fire Apparatus - Custom Class A Pumper**

Sealed bids are invited and will be received by the Purchasing Agent of the Town of Watertown at the office of the Purchasing Agent, Town Hall Annex, 424 Main Street, Watertown, Connecticut, until **11:00 a.m. Tuesday, September 29, 2015** at which time and place they will be publicly opened and read aloud for furnishing one new current model fire pumper to the Town of Watertown.

The Information for Bidders, Form of Bid, Specifications, Form of Bid Bond, Performance and Payment Bonds, and other contract documents may be obtained or examined at the office of the Purchasing Agent, Town Hall Annex, 424 Main Street, Watertown, Connecticut 06795 or by accessing the Town of Watertown's website at <http://www.watertownct.org>. Proposals must be submitted on the forms provided and in a sealed envelope plainly marked "**Bid - Fire Apparatus**".

To receive consideration bids must be in the hands of the Purchasing Agent or his authorized representative no later than the day and hour mentioned above.

The Purchasing Agent reserves the right to accept or reject any or all bids; to waive any informality; or to accept any bid deemed in the best interests of the Town of Watertown.

The Town of Watertown reserves the right to take into account the residency of bidders within the Town of Watertown and/or the location of the bidder's business within the Town of Watertown in awarding this bid.

All bids will be considered valid for a period of sixty (60) days.

Jason Warner  
Purchasing Agent  
Town of Watertown

## **INFORMATION FOR BIDDERS**

**TOWN OF WATERTOWN  
WATERTOWN, CONNECTICUT 06795**

**Watertown Fire Department  
Fire Apparatus – Custom Class A Pumper**

**BID OPENING: 11:00 a.m., Tuesday, September 29, 2015**

### **PROPOSALS RECEIVED**

All bids must be in a sealed envelope and received prior to **11:00 a.m., Tuesday, September 29, 2015** at the office of the Purchasing Agent, 424 Main Street, Watertown, Connecticut 06795.

### **PREPARATION OF PROPOSALS**

Proposals must be made upon forms contained herein. The blank spaces in the Proposal must be filled in correctly where indicated. The Bidder must state the prices for which he proposes to do each item of the work contemplated. In case of discrepancy where both words and the numerals are requested, the words shall govern. Ditto marks are not considered writing or printing and shall not be used. The Bidder shall sign his Proposal correctly. If the Proposal is made by an individual, his name, post office address and telephone number must be shown. If made by a firm, partnership, or corporation, the Proposal must be signed by an official of the firm, partnership, or corporation authorized to sign contracts, and must show the post office address and telephone number of the firm, partnership, or corporation. Failure to do so may disqualify the bid.

Each bid must be submitted in a sealed envelope bearing on the outside the name of the Bidder, post office address, and name of the project for which the bid is submitted. If forwarded by mail, the sealed envelope containing the bid must be enclosed in another envelope addressed to: The Purchasing Agent, Town Hall Annex, 424 Main Street, Watertown, CT 06795.

All information shall be entered in ink or by typewriter. Mistakes may be crossed out and corrections inserted before submission of your bid. The person signing the bid shall initial corrections in ink.

Corrections and/or modifications received after the closing time specified will not be accepted.

### **SUBMISSION OF PROPOSALS**

All proposals and literature shall be submitted **IN DUPLICATE** on the proposal form, which is a part of these specifications.

Descriptive literature containing complete specifications must accompany each bid. If a bidder wishes to furnish additional information, more sheets may be added.

Adobe Acrobat® Reader is required to view electronic documents on-line. If you do not have Adobe Acrobat® Reader, you may download it for free from Adobe at <http://www.adobe.com/products/acrobat/readstep.html>.

Response summaries will be available online at <http://www.watertownct.org> on the day of the bid opening.

Responses delivered via fax are received subject to the following qualifications and limitations:

1. The Town is not responsible for the confidentiality of the information transmitted.
2. The Town cannot guarantee that its fax equipment will be operational and able to receive transmittals by a particular time and date. It is the Bidder's responsibility to ensure that quotations are received in their entirety and on time at the required location. It is recommended that vendors be advised to call immediately after transmitting a document electronically to confirm complete and accurate receipt by the Town. The Town assumes no liability in the event that a bidder's electronic transmission is not received by the Town in a timely fashion, or is not received either in its entirety or error-free.
3. Bids transmitted electronically which have a bond requirement are subject to the same submittal requirements as those responses delivered via traditional means, such as mail or hand delivery, or as otherwise stipulated by appropriate authority.

### **INCURRING COSTS**

The Town of Watertown is not liable for any cost incurred for the preparation of proposals or submission of samples by the firms submitting proposals for the work requested in this bid document or request for proposals.

### **FAMILIARITY WITH THE WORK**

Each bidder is considered to have examined the work to fully acquaint himself with the exact existing conditions relating to the work and has fully informed himself as to the work involved and the difficulties and restrictions attending the performance of this bid. Failure to do so will not relieve a bidder of his obligation to furnish the vehicle as specified herein for the consideration set forth in this bid. The submission of a bid will be considered as conclusive evidence that the bidder has made such examination.

### **CONSIDERATION OF PRIOR SERVICE**

Previous performance, quality of service and merchandise will be considered.

### **ADDENDA AND INTERPRETATIONS & ALTERNATE PROPOSALS**

Addenda information will be available online at <http://www.watertownct.org>. Adobe Acrobat® Reader may be required to view this document. We strongly suggest that you check for any addenda a minimum of forty eight hours in advance of the bid deadline.

At the time of the opening of bids each bidder will be presumed to have inspected the work and to have read and to be thoroughly familiar with all of the Contract Documents (including all addenda). The failure or omission of any bidder to receive or examine any form, instruction or document shall in no way relieve any bidder from any obligation in respect to his bid.

If any person contemplating submitting a proposal is in doubt as to the true meaning of any part of these specifications, he may submit a written request for an interpretation to the Purchasing Agent. No interpretations as to the meaning of the plans, specifications or other Contract Documents will be made to any bidder orally.

Every request for such interpretation should be in writing addressed (duplicate copy) to the Town of Watertown, Purchasing Agent, 424 Main Street, Watertown, Connecticut 06795, and to be given consideration, must be received at least five (5) days prior to the date fixed for the opening of Bids. Any and all such interpretations and any supplementary instructions will be in the form of written Addenda to the Specifications which, if issued, will be mailed by Registered Mail with Return Receipt Requested to all prospective bidders at the respective addresses furnished for such purposes, not later than three (3) days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such Addendum or interpretations shall not relieve any bidder from any obligations under his bid as submitted. All Addenda so issued shall become part of the Contract Documents. Oral explanations will not be binding on the Town.

The specifications listed are to be interpreted as meaning the minimum acceptable by the Town of Watertown. Bidders are requested to submit quotations on the basis of these specifications. Alternative bids providing a broader scope and/or services than requested in these specifications may receive consideration providing such equipment and/or service is clearly explained. Any exceptions to the specifications requested herein must be clearly noted in writing and are to be included as a part of your bid proposal. If none are included it will be assumed that there are none.

Definition of the word "complete" means that each unit of the equipment proposed shall include all appurtenances, fasteners, parts, accessories, and services ordinarily catalogued.

An item equal to that named or described in the specifications may be furnished by the Bidder, except where expressly noted as "no substitutions." The naming of any commercial name, trademark, or other identification shall not be construed to exclude any item of any manufacturer not mentioned by name, nor limit competition, but shall establish a standard of equality only. An item shall be considered equal to the item so named or described if:

- A. It is at least equal in quality, durability, appearance, strength and design.
- B. It will perform at least equally the function imposed by the design for the work being contracted for or the material being purchased.
- C. It conforms substantially, even with deviations, to the detailed requirements for the item in the specifications.

The Bidder shall hold the Town of Watertown, its officers, agents, servants, and employees, harmless from liability of any nature or kind because of use of any copyrighted or uncopyrighted compositions, secret process, patented or unpatented inventions, articles or appliances furnished or used under this bid, and agrees to defend, at his own expense, any and all actions brought against the Town of Watertown or himself because of the unauthorized use of such articles.

### **QUOTATION LIMITATION**

Bidders shall offer only **ONE ITEM AND PRICE** for each line item bid. If an or equal item is to be bid, the bidder is to select the brand and model that meets or exceeds the specified item, and submit his bid for that item.

### **ESTIMATE OF WORK**

For bidding purposes, the work has been subdivided into unit price items. The quantities shown are to be considered as approximate only. The Purchasing Agent does not expressly or by implication agree that the actual quantity will correspond therewith, but reserves the right to increase or decrease the amount of any item or portion of the work as deemed necessary.

### **WITHDRAWAL OF BID**

Bidders may withdraw their proposals at any time prior to the bid date. No agent/broker shall withdraw or cancel their proposal for a period of sixty (60) days after the bid closing date of **11:00 a.m., Tuesday, September 29, 2015**. The successful agent/broker shall not withdraw, cancel or modify their proposal.

### **POWER OF ATTORNEY**

Attorneys-in-fact who sign contract bonds must file, with each bond, a certified and effectively dated copy of their power of attorney.

### **SUBCONTRACTORS**

- A. Each bidder contemplating the use of any subcontractor shall submit a list of subcontractors as listed on the Bid Form.
- B. The apparent low bidder shall file with the Town of Watertown, within five (5) days after the date of bid opening, a complete list of the names and addresses of competent, responsible and qualified subcontractors who are actually to perform major portions of the work. This in no way restricts or limits the requirement that all subcontractors must be approved by the Town.
- C. Subcontractors listed on the Bid Form or those previously approved may not be changed without the approval of the Town of Watertown.

Local subcontractors, material suppliers, and labor in the Town of Watertown should be considered and sought insofar, as is practical in the performance of this project.

### **QUALIFICATION OF BIDDER**

In determining the qualifications of a bidder, the Town may consider his record in the performance of any contracts for similar work into which he may have previously entered; and the Town expressly

reserves the right to reject the bid of such bidder if such record discloses that such bidder, in the opinion of the Town, has not properly performed such contracts or has habitually, and without just cause, neglected the payment of bills or has otherwise disregarded his obligations to subcontractors, suppliers, state or local codes, men or employees of subcontractors.

The Town may make such investigation as he deems necessary to determine the ability of the bidder to perform the work and the bidder shall furnish to the Town all such information and data for this purpose as the Town may request. The Town reserves the right to reject any bid if the evidence submitted by or the investigation of such bidder fails to satisfy the Town that such bidder is properly qualified, or that such bidder misrepresented material facts in the bid documents.

### **DISQUALIFICATION OF BIDDERS**

More than one proposal from an individual, firm, partnership, corporation, or an association under the same or different names will not be considered. Reasonable grounds for believing that any Bidder is interested in more than one proposal for the work contemplated will cause the rejection of all proposals in which such Bidder is interested. Any or all proposals in which such Bidder is interested will be rejected if there is reason for believing that collusion exists among the Bidders and all participants in such collusion will not be considered in future proposals for the same work. Proposals in which the prices are obviously unbalanced may be rejected. No Contract will be awarded except to competent Bidders capable of performing the class of work contemplated.

### **SERVICE CENTER REQUIREMENTS**

Bidders must state the location of the nearest available factory authorized service center for all components of the equipment specified.

### **DELIVERY**

Inasmuch as this work concerns a needed public improvement, the provisions of this bid relating to the time of delivery, performance and completion of the work are of the essence of this bid. Accordingly, the successful bidder shall commence work **upon receipt of the signed Purchase Order** unless the Town shall authorize or direct a further delay.

Time of delivery shall be stated as the number of calendar days following receipt of the Purchase Order by the Bidder to receipt of the goods or services by the Town of Watertown.

Prices quoted must include delivery to the Town of Watertown as specified on the Purchase Order. No charges will be allowed for parking, crating, freight, express or cartage unless specifically stated and included in this bid.

Time of delivery may be considered in the award.

## **PAYMENT**

The Town of Watertown is anticipating purchasing these vehicles utilizing a Tax Free Municipal purchase outright.

Each proposal shall contain all accessories and appurtenances for each vehicle as specified.

The Town of Watertown shall bear all risk of loss and provide insurance coverage for the replacement value.

The Town of Watertown shall have the benefit of all warranties on the equipment purchased.

Time, in connection with any discount offered, will be computed from the date of delivery to the Town or from the date a correct invoice is received by the Town's Finance Department, if the latter date is later than the date of delivery.

Prices will be considered as **NET**, if no cash payment discount is shown.

The successful bidder shall submit invoices to the following address:

Town of Watertown  
Watertown Fire Department  
935 Main Street  
Watertown, CT 06795

**IT IS UNDERSTOOD AND AGREED THAT SHOULD A BID BE ACCEPTED, IT WILL AUTOMATICALLY BECOME THE CONTRACT OR AN ADDENDUM TO ANY CONTRACT AGREED UPON.**

Notification of the bid award will be made by issuance of a purchase order. Bidders are to list their bids on the appropriate attached sheets. Bidders may attach a letter of explanation. A clear notification should be made on the standard bid sheets at the appropriate point of explanation that there is a letter of explanation attached. All bids must be NET prices.

The successful bidder shall submit an itemized invoice to the Town of Watertown for the work as described herein.

The bidder shall be required to submit a Mechanics Lien Waiver, acceptable to the Town of Watertown, with each progress payment and at time of final payment prior to any payment being made.

At the time of award the successful bidder shall be required to supply the Town of Watertown a Certificate of Good Standing, certifying that the corporation is in fact a valid corporation and

presently licensed to conduct business in the State of Connecticut.

### **SALES TAX**

Certain materials and supplies incorporated in the work of this project are exempt from Connecticut Sales Tax. The Bidder shall familiarize himself with current regulations of the State Tax Department. The tax on materials or supplies exempted by such regulations shall not be included as part of the bid. The Town will furnish the successful Bidder sales tax exemption authorization.

### **CARE AND PROTECTION OF PROPERTY**

The Bidder shall take particular care to avoid damages to all private and public property and to private or public improvements within the Town's right of way. He shall make good any damages to the satisfaction of the Town. There shall be no additional compensation for the repair or restoration of private or public property improvements.

### **COMPLIANCE WITH FEDERAL, STATE AND LOCAL CODES**

The Bidder shall be responsible for full compliance with any Federal, State and/or Local codes, laws, regulations and standards, as applicable.

### **AWARD**

The Town of Watertown reserves the right to accept or reject any bid to best serve its interests, or to hold the bids for ninety (90) days before decision.

The Town reserves the right to reject any and all bids (or any part thereof), to waive defects in proposals, or to accept any proposal deemed to be in its best interest.

**Exceptions will be considered to the specification provided, providing they are listed and fully explained on a separate page entitled "EXCEPTIONS TO SPECIFICATIONS"**

Each exception will be considered as to its degree of impact and total effect on the bid. The purchaser shall determine which (if any taken) exceptions are acceptable, and this determination shall be final.

The Town of Watertown reserves the right:

- 1) To award bids received on the basis of individual items, or groups of items, or on the entire list of items.
- 2) To reject any or all bids, or any part thereof.
- 3) To waive any informality in the bids.
- 4) The Town of Watertown reserves the right to take into account the residency of bidders within the Town of Watertown and/or the location of the bidders business within the Town of Watertown in awarding this bid.
- 5) To accept the bid that is in the best interest of the Town of Watertown. The Purchasing Agent's decision shall be final.

### **NONDISCRIMINATION IN EMPLOYMENT**

The successful bidder shall agree and warrant that, in the performance of this contract, he will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, sex, religion, or national origin in any manner prohibited by State, Federal, County, or Municipal law. A certification of Nonsegregated Facilities and a Certification Regarding Equal Employment Opportunity shall be considered a part of this contract.

### **MECHANICS LIEN WAIVERS**

The successful Bidder shall be required to submit a Mechanics Lien Waiver, acceptable to the Town of Watertown, with each progress payment, and/or at time of final payment, prior to any payment made.

For further technical or administrative information contact Jason Warner, Purchasing Agent at (860) 945-5260 or via email at [warner@watertownct.org](mailto:warner@watertownct.org).

# WATERTOWN FIRE DEPARTMENT - INSTRUCTIONS TO BIDDERS

## **INTRODUCTION:**

The Town of Watertown will receive sealed bids for the furnishing of One (1) Custom Class A Pumper and equipment as specified until **September 29, 2015**.

Bids must be clearly marked or stamped "PROPOSAL - FIRE APPARATUS" on both sides of an enclosed envelope along with opening date and time. The Town of Watertown will not be responsible for accidental opening and will immediately reject bids with improper identification.

Bid Opening will be at the Town of Watertown, Town Hall Annex, 424 Main St. in Watertown, CT.

The purchaser reserves the right to reject any or all bids and to accept the bid which they deem to be in their best interest and will not necessarily be bound to accept the lowest bid. All bids shall be signed by an authorized official of the company that will build the apparatus. Authority granted by the corporations board of directors that the person signing the bid can commit the corporation to a lawful binding contract shall be furnished with the bid. **BIDS SUBMITTED IN THE NAME OF AND/OR SIGNED BY A SALES REPRESENTATIVE WILL IMMEDIATELY BE REJECTED.**

Bidders must have in operation a factory adequate for the production of the apparatus as specified herein. All bidders shall have been in business for a minimum of twenty (20) years. Bidders must state in their bids the time that will be required to make delivery of the items they propose to furnish. This time must be stated in calendar days, not working days, and must not exceed 360 days. Any proposal stating a longer time will be deemed as unresponsive and will not be considered.

The time limit shall be subject to adjustment after award due to delays caused by strikes, riots, acts of God, or other causes beyond the control of the contractor, including orders, limitations or restrictions by any governmental agency having jurisdiction over the subject matter of the contract.

## **PREREQUISITE BIDDING REQUIREMENTS**

Any manufacturer submitting a proposal or bid, to these specifications, must meet the following conditions:

1. The manufacturer of the apparatus herein specified shall be wholly owned (100%) and managed by a Company, Corporation, and/or Parent Company that is wholly based, and permanently resides in the United States of America.

## WATERTOWN FIRE DEPARTMENT - INSTRUCTIONS TO BIDDERS

2. The Company, Corporation, and/or Parent Company, and all assets belonging to such shall be wholly owned and managed (100%) by the entities specified above.
3. Any proposal ,bid or response to these specifications by any foreign based, owned, or managed (in part or in whole) Company, Corporation, and/or Parent Company, shall be cause for immediate rejection.
4. Any proposal ,bid or response to these specifications by any Company, Corporation, and/or Parent Company, that is owned, operated, managed, or held in contract in part or wholly by a partnership or other agreement, shall be cause for immediate rejection.

**THERE SHALL BE NO EXCEPTIONS TO THIS SECTION AS THIS VEHICLE IS BEING PURCHASED WITH LOCAL TAX REVENUE. THE TOWN OF WATERTOWN IS COMMITTED TO PURCHASING FROM "US" OWNED COMPANIES TO KEEP JOBS IN AMERICA.**

### **NFPA REQUIREMENT:**

The apparatus shall be built and meet all current NFPA 1901, 2009 Edition Standards.  
**NO EXCEPTIONS**

### **HEIGHT:**

The vehicle height is not to exceed 126 inches (10 Feet, 6 Inches).

### **LENGTH:**

The vehicle length is not to exceed 336 inches (27 Feet) **NO EXCEPTIONS**

### **GENERAL INSTRUCTIONS AND REQUIREMENTS:**

It is the intent of these specifications to cover the furnishing and delivery of a completed and soundly engineered fire apparatus as hereinafter specified. These specifications cover the requirements as to the type of construction and tests to which the apparatus must conform, together with certain details as to finish, equipment and appliances with which the successful bidder must conform.

Minor details of construction and materials where not otherwise specified are left to the discretion of the contractor, who shall be solely responsible for the design and construction of all non-specified features.

The apparatus shall be the manufacturer's latest design and model, all welded module construction and custom built per our specifications. They shall have been building this type and model of apparatus for a minimum of Ten (10) Years. Units with less

## WATERTOWN FIRE DEPARTMENT - INSTRUCTIONS TO BIDDERS

than Ten (10) years of field service **WILL NOT BE CONSIDERED.**

Apparatus will be weighed after delivery with all equipment installed and the number of personnel that there are seats for. Apparatus will not be accepted or paid for until this has been done.

Each bidder shall furnish satisfactory evidence of his ability to construct the apparatus as specified, and shall state the location of the factory where the apparatus is to be built. The manufacturer shall also show that he is in a position to render prompt service and to furnish replacement parts for apparatus.

### **SERVICE CENTER:**

The dealership supplying the apparatus must maintain a full service, repair and warranty center. The service center is desired to be located within 30 miles of the Watertown Fire Department. The service center must be owned and operated by the dealership, which must be an established business entity. Third party service or repair service shall not be allowed

It is the intent of the Watertown Fire Department to inspect each bidder's service center, personnel and mobile service units. Service of this vehicle is of the utmost importance to the purchaser and the ability to provide quality and timely service will weigh heavily in the award.

To insure the purchaser of a source for service and parts over the anticipated 30 year life of the apparatus, apparatus manufacturer shall maintain a factory service, fabrication/manufacturing, painting, and testing facility within 50 Miles of the Town of Watertown.

To insure that each bidder has the ability to properly and expeditiously service units, the Watertown Fire Department will conduct the following inspection:

1. Each bidder shall bring their mobile service unit to the Watertown Fire Department for inspection.
2. The vehicle must be brought to the Department by an EVT and ASE certified mechanic employed full time by the local dealership supplying the apparatus.
3. The mobile service unit shall have with it the registration for the vehicle, the dealership insurance certificate showing workers compensation and garage liability coverage and the State of Connecticut Dealer License & State of Connecticut Repair License. Dealer will also be registered with the Secretary of the State of Connecticut. All documents shall be in the name of the dealership  
**(NO EXCEPTIONS)**

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3. The dealer will also provide written proof that their DOT inspector(s) meet 49 CFR, part 396.19 & 396.25 for DOT inspections  
**(NO EXCEPTIONS)**

The service center shall have the following minimum qualifications;

1. Full CAD computer system for the design of apparatus
2. Minimum of ten (10) years of continuous operation.
3. Certified EVT and ASE mechanics
4. Certified in house body painter and fabricator.
5. Certified warranty center for the chassis being supplied
6. One (1) fully equipped and staffed in-house mobile service unit.
7. Facility must include heated indoor storage/repair area.
8. The facility must have a monitored security alarm system.
9. MIG welder and cutting torches.
10. PPG certified service center
11. Digital camera for warranty repairs
12. Capability of servicing several large fire apparatus (aerials, tankers and pumpers), simultaneously indoors with cabs fully tilted and aerial devices removed from their beds.
13. Plasma Cutter
14. 24 hour – 365 days per year emergency on site service
15. Hydraulic hose coupling system with fittings and hose in house
16. Building protected by a modern sprinkler system.

A data plate shall be installed in the cab. This plate shall contain the following information:

- Engine oil type and quantity
- Engine coolant, type and quantity
- Transmission fluid, type and quantity
- Pump transmission fluid, type and quantity
- Pump primer fluid, type and quantity
- Drive axle lubrication fluid, type and quantity

An accident prevention sign that states the number of personnel the apparatus is designed to carry shall be mounted in the cab in an area visible to the driver. Signs stating "OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION" shall be provided and shall be visible at all seating positions. Accident prevention signs shall be located at the rear step areas to warn personnel that standing on the steps while the apparatus is in motion is prohibited.

### **QUALITY AND WORKMANSHIP:**

The design of the apparatus shall embody the latest automotive engineering practices. Workmanship shall be of the highest quality in its respective field. Special consideration

## WATERTOWN FIRE DEPARTMENT - INSTRUCTIONS TO BIDDERS

will be given to the following points; accessibility of the various components which require periodic maintenance, symmetrical proportions, ease of handling, operation and proper distribution of load.

The construction shall be rugged and ample safety factors provided to carry loads as specified and to meet the required road, speed and stationary conditions and tests. Welding shall not be employed in the assembly of the apparatus in a manner to prevent the ready removal of any component part for service and/or repairs.

### **GENERAL CONSTRUCTION:**

The complete apparatus shall be designed and constructed with due consideration to the nature and distribution of the load to be sustained and to the general character of the service to which the apparatus is to be subjected when placed in service. All parts of the apparatus shall be so designed that the various parts are readily accessible for lubrication, inspection, adjustment and repair.

The apparatus shall be designed and constructed and the equipment so mounted, with due consideration to distribution of the load between front and rear axle that all specified equipment, loose equipment, full water tank, and men will be carried without overloading or injuring the apparatus.

### **DELIVERY:**

Apparatus, to insure proper break-in of all components while still under warranty, shall be delivered under its own power. Rail or truck freight is not acceptable.

A qualified delivery engineer representing the company building the apparatus shall deliver the apparatus and remain in the community a sufficient length of time to instruct the fire department personnel in the proper operation, care and maintenance of the equipment delivered.

Two (2) Copies of a complete operation and maintenance manual covering the apparatus as delivered, including but not limited to the chassis, aerial ladder, lubrication charts and fire fighting equipment, shall be available. One (1) copy will be delivered with the apparatus and the other may be held at the service center facility.

### **PERFORMANCE TESTS AND REQUIREMENTS:**

A road test will be conducted with the apparatus fully loaded and a continuous run of Twenty (20) miles or more will be made under all driving conditions. During this time, the apparatus shall show no loss of power or overheating. The transmission, drive shafts and axles shall run quietly and be free from abnormal noise or vibration throughout the operating range of the apparatus.

The apparatus must be capable of accelerating to 35 MPH from a dead stop within 25 seconds on a level concrete highway without exceeding the maximum governed RPM

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of the engine.

The service brakes shall be capable of stopping the fully loaded unit within 30 feet from 20 MPH on level concrete highway.

The fully loaded unit shall be capable of obtaining a speed of 60 MPH on a level concrete highway with the engine not exceeding its governed full load RPM.

From a steady speed of 15 MPH, the apparatus shall accelerate to a true speed of 35 MPH within 30 seconds. This shall be accomplished without moving the gear selector.

### **FAILURE TO MEET TESTS:**

In the event the apparatus fails to meet the test requirement of these specifications on the first trials, second trials may be made at the option of the bidder within Thirty (30) days from the date of the first trials. Such trials shall be final and conclusive and failure to comply with these requirements shall be cause for rejection.

Failure to comply with changes necessary to conform to any clause of the specifications within Thirty (30) Days shall also be cause for rejection of the apparatus. Permission to keep or store the unit in any building owned or occupied by the purchaser during the above specified time period with the permission of the builder shall not constitute acceptance.

Each bid shall be accompanied by a set of "Contractor's Specifications", consisting of a detailed description of the apparatus and equipment proposed and to which the apparatus furnished under contract must conform.

Computer run-off sheets are not acceptable as Contractor Specifications.

All bidders must submit a proposal. Returning a copy of our specifications indicating compliance is not acceptable.

### **EXCEPTIONS TO SPECIFICATIONS:**

The following specifications shall be strictly adhered to. Exceptions will be allowed if they are equal to or superior to that specified, and provided that they are listed and fully explained on a separate page entitled "EXCEPTIONS TO SPECIFICATIONS". Each exception shall specifically reference the page and paragraph to which exception is being taken. PROPOSALS TAKING TOTAL EXCEPTION TO SPECIFICATIONS WILL NOT BE ACCEPTABLE. Apparatus shall be inspected upon delivery for compliance with specification. Deviations will not be tolerated and will be cause for rejection of apparatus unless such deviations were originally listed in the bidder's proposal and specifically indicated on the "EXCEPTIONS" Page.

No exceptions will be allowed relating to the make and model of and specified equipment when referred to by brand and/or model, gauge, and types of materials, size of

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compartments, methods of construction, and overall design features of the apparatus.

Bids will be rejected which substitute less substantial materials and/or methods of body construction than those specified. Since all manufacturers have the ability to purchase the materials described as well as to shear, fabricate and assemble body panels as specified, these areas are considered a strict requirement of the specifications.

Purchaser does not, in any way, obligate itself to accept the lowest bid.

Bid proposals must be submitted in the same sequence as specifications for ease of checking compliance to same.

### **WARRANTY:**

The complete apparatus will have a 5 year Bumper to Bumper warranty. During the warranty period it will be the repair facilities responsibility to pick up and deliver the apparatus for ALL repairs. (The warranty does not include normal wears items)

### **PAYMENT:**

Bidder is to supply their payment terms and discount/cost structure for their different terms.

### **INSPECTION TRIPS:**

During the course of construction, the builder will be required to make arrangements for Three (3) inspection trips to his factory by Three (3) people. The cost of these trips shall be born by the builder. If nothing is mentioned in the bid pertaining to the inspection trips, it will be assumed that the bidder is taking exception and will be rejected.

### **CONTRACT AWARD:**

When analyzing the bid proposals, and in recommending a successful bidder, superior design, workmanship, materials, operating costs, location of factory, past experience, length of incorporation, compliance with specifications, price and completion time will be taken into consideration.

Final payment for the apparatus shall be made at time of delivery of the completed vehicle. Due to insurance liability, the apparatus will not be left at the purchasers location without full acceptance and payment or prior agreement between the Purchaser and bidder.

Final delivery price shall not include any Local, State or Federal taxes. The Bidder shall not be liable for any State or Federal mandated tax or program after sale or delivery of the apparatus.

### **PRE-CONSTRUCTION CONFERENCE:**

A pre-construction conference shall be conducted at which time all final designs and equipment

## WATERTOWN FIRE DEPARTMENT - INSTRUCTIONS TO BIDDERS

mounting locations will be approved, prior to any sheet metal being cut. All expenses for travel, meals and lodging shall be the responsibility of the successful Bidder.

Bidder shall indicate the intention to provide the required pre-construction conference in the proposal packet.

### **FINAL DELIVERY AND TRAINING:**

Final delivery of the completed apparatus shall be made via drive-a-way, FOB Fire Department Headquarters, at which time Fire Department personnel shall be properly instructed as to the proper use of the entire apparatus including, but not limited to, chassis, ladder system, the apparatus and all equipment. Delivery shall be made by a factory employed Delivery Engineer who shall be responsible for complete instruction as to operation and maintenance of the chassis, and the completed vehicle.

Delivery engineer shall remain at the Fire Department for a sufficient time to provide thorough training of all personnel and this must include at least one weekend day, or as instructed by the Chief of the Department. All meals, motel and travel costs shall be the responsibility of successful bidder.

### **BLUEPRINTS:**

All bidders are required to include with their bid detailed CAD Blueprints of the specified unit they propose; showing the left, right and rear exterior; the left, right front and top views of interior. (**No exceptions**) Bids not containing these blueprints will be rejected. These Blueprints must be provided by the manufacturer to insure full compliance understanding of the complexity of this vehicle.

## *Chassis Specification*

### **MODEL**

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

### **MODEL YEAR**

The chassis shall have a vehicle identification number that reflects a 2016 model year.

### **COUNTRY OF SERVICE**

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

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

### **APPARATUS TYPE**

The apparatus shall be a pumper vehicle designed for emergency service use which shall be equipped with a permanently mounted fire pump which has a rated capacity of 1500 gallons per minute (6000 L/min). The apparatus shall include a water tank and hose body whose primary purpose is to combat structural and associated fires.

### **VEHICLE TYPE**

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

### **AXLE CONFIGURATION**

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

### **GROSS AXLE WEIGHT RATINGS FRONT**

The front gross axle weight rating (GAWR) of the chassis shall be 20,000 pounds.

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

**GROSS AXLE WEIGHT RATINGS REAR**

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

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

**PUMP PROVISION**

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

**CAB STYLE**

The cab shall be a custom, fully enclosed, MFD model with a 10.00 inch raised roof over the driver, officer, and crew area, designed and built specifically for use as an emergency response vehicle by a company specializing in cab and chassis design for all emergency response applications. The cab shall be designed for heavy-duty service utilizing superior strength and capacity for the application of protecting the occupants of the vehicle. This style of cab shall offer up to six (6) seating positions.

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

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

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

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

The exterior width of the cab shall be 94.00 inches wide with a minimum interior width of 88.00 inches. The overall cab length shall be 131.10 inches with 54.00 inches from the centerline of the front of the axle to the back of the cab.

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

The cab shall offer an interior height of 57.50 inches from the front floor to the headliner in the non-raised roof area and a rear floor to headliner height of 65.00 inches in the raised roof area, at a minimum. The cab shall offer an interior measurement at the floor level from the rear of the engine tunnel to the rear wall of the cab of 51.88 inches. All interior measurements shall include the area within the interior trimmed surfaces and not to any unfinished surface.

The cab shall include a driver and officer area with two (2) cab doors large enough for personnel in full firefighting gear. The front doors shall offer a clear opening of 40.25 inches wide X 53.50 inches high, from the cab floor to the top of the door opening. The cab shall also include a crew area with up to two (2) cab doors, also large enough for personnel in full firefighting gear. The rear doors shall offer a clear opening of 32.25 inches wide X 61.00 inches high, from the cab floor to the top of the door opening.

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

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

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

### **OCCUPANT PROTECTION**

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

The system components shall include:

- Driver steering wheel airbag
- Driver dual knee air bags (patent pending) with energy management mounting (patent pending) and officer knee airbag.
- Large driver, officer, and crew area side curtain airbags
- APS advanced seat belt system - retractor pre-tensioners tighten the seat belts around the occupants, securing the occupants in seats and load limiters play out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries

## WATERTOWN FIRE DEPARTMENT

- Heavy truck Restraints Control Module (RCM) - receives inputs from the outboard sensors, selectively deploys APS systems, and records sensory inputs immediately before and during a detected qualifying event
- Integrated outboard crash sensors mounted at the perimeter of the vehicle - detects a qualifying front or side impact event and monitors and communicates vehicle status and real time diagnostics of all critical subsystems to the RCM
- Fault-indicating Supplemental Restraint System (SRS) light on the driver's instrument panel

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

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

Rollover, side impact, and ejection mitigation shall be provided by the outboard sensors and the RCM. In qualifying rollover or side impact events the outboard sensors provide inputs to the RCM. The RCM activates the side curtain airbags and advanced seat belts for each occupant in the cab. The RCM measures roll angle, lateral acceleration, and roll rate to determine if a rollover event or side impact event is imminent or occurring.

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

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

### **CAB FRONT FASCIA**

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

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

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

**FRONT GRILLE**

The front fascia shall include a box style, 304 stainless steel front grille 44.45 inches wide X 33.50 inches high X 1.50 inches deep. The grille shall include a minimum free air intake of 732.00 square inches. The upper portion of the grille shall be hinged to provide service access behind the grille.

**CAB UNDERCOAT**

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

**CAB SIDE DRIP RAIL**

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

**CAB PAINT EXTERIOR**

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

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

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

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

**CAB PAINT MANUFACTURER**

The cab shall be painted with PPG Industries paint.

**CAB PAINT PRIMARY/LOWER COLOR**

The lower paint color shall be PPG FBCH 72704 ALT red.

**CAB PAINT SECONDARY/UPPER COLOR**

The secondary/upper paint color shall be PPG FBCH 2185 white.

**CAB PAINT EXTERIOR BREAKLINE**

The upper and lower paint shall meet at a breakline on the cab which shall be located approximately 1.00 inch below the door windows on each side of the cab. The breakline shall curve down at the front cab corners to approximately 1.00 inches below the windshields on the front of the cab.

**CAB PAINT PINSTRIPE**

Where the upper and lower paint colors meet a temporary 0.50 inch wide black pinstripe shall be applied over this break line to offer a more finished look prior to the final pinstripe being installed by the OEM.

**CAB EXTERIOR ROLL-UP DOOR FINISH**

The roll-up doors on the exterior of the cab shall have a two-tone painted finish the same as the primary and secondary colors of the cab. The trim along the side of the door shall be painted to match the door. The painting of the primary color shall be provided by the roll-up door manufacturer and the painting of the upper color shall be provided by the chassis manufacturer. The painting shall be complete prior to the doors being installed into the compartment.

**CAB PAINT WARRANTY**

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

**CAB PAINT INTERIOR**

The visible interior cab structure surfaces shall be painted with a Zolatone #20-72 silver gray texture finish.

**CAB ENTRY DOORS**

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

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

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

**CAB ENTRY DOOR TYPE**

All cab entry doors shall be barrier clear design resulting in exposed lower cab steps. The doors shall provide approximately 32.00 inches of clearance from the ground to the bottom of the door so cab doors may be opened un-hindered by most obstacles encountered, such as guard rails along interstate highways.

**CAB INSULATION**

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

**LH EXTERIOR MID EMS COMPARTMENT**

The cab shall include a compartment located in the middle of the wall above the left side wheel well. This compartment shall measure 17.00 inches wide X 43.00 inches high X 23.00 inches deep. The compartment shall be accessible from the outside of the cab through an Amdor roll up door. The compartment shall have a clear door opening of 14.50 inches wide X 37.50 inches high. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in the event the door is left ajar. The compartment shall include four (4) pieces of aluminum Unistrut. Two (2) pieces of aluminum Unistrut shall be welded to both the forward and rearward compartment walls.

**LH EXTERIOR MID EMS COMPARTMENT INTERIOR ACCESS**

The left hand exterior EMS compartment shall include access from inside the cab. The compartment shall be accessible from the inside of the cab via an aluminum hinged door painted cab interior color with one (1) non-locking latch. The interior access door shall face the rear of the cab and shall feature a clear door opening of 14.50 inches wide X 32.00 inches high.

**LH EXTERIOR MID EMS COMPARTMENT LIGHTING**

There shall be one (1) Amdor Luma-Bar™ LED strip light installed to illuminate the exterior mid EMS compartment on the left side of the cab above the wheel well. The strip light shall be approximately 31.50 inches long.

**LH EXTERIOR MID EMS COMPARTMENT INTERIOR SHELVING**

The left hand mid EMS compartment located in crew area of the cab shall include one (1) aluminum shelf which shall be secured using Unistrut channel on two (2) sides of the interior walls of the compartment. The shelf shall include a 1.00 inch lip around the edges. The shelf shall be finished the same as the interior of the compartment.

**RH EXTERIOR MID EMS COMPARTMENT**

The cab shall include a compartment located in the middle of the wall above the right side wheel well. This compartment shall measure 17.00 inches wide X 43.00 inches high X 23.00 inches deep. The compartment shall be accessible from the outside of the cab through an Amdor roll up door. The compartment shall have a clear door opening of 15.00 inches wide X 41.00 inches high. There shall be a switch to activate a light inside the compartment and the open compartment warning light in the cab in

the event the door is left ajar. The compartment shall include four (4) pieces of aluminum Unistrut. Two (2) pieces of aluminum Unistrut shall be welded to both the forward and rearward compartment walls.

**RH EXTERIOR MID EMS COMPARTMENT INTERIOR ACCESS**

The right hand exterior EMS compartment shall include access from inside the cab. The compartment shall be accessible from the inside of the cab via an aluminum hinged door painted cab interior color with one (1) non-locking latch. The interior access door shall face the rear of the cab and shall feature a clear door opening of 14.50 inches wide X 32.00 inches high.

**RH EXTERIOR MID EMS COMPARTMENT LIGHTING**

There shall be one (1) Amdor Luma-Bar™ LED strip light installed to illuminate the exterior mid EMS compartment on the right side of the cab above the wheel well. The strip light shall be approximately 31.50 inches long.

**RH EXTERIOR MID EMS COMPARTMENT INTERIOR SHELVING**

The right hand mid EMS compartment located in crew area of the cab shall include one (1) aluminum shelf which shall be secured using Unistrut channel on two (2) sides of the interior walls of the compartment. The shelf shall include a 1.00 inch lip around the edges. The shelf shall be finished the same as the interior of the compartment.

**EXTERIOR MID EMS COMPARTMENT EXTERIOR FINISH**

The mid EMS compartment surfaces that are exposed to the interior of the cab shall be painted with a Zolatone #20-72 silver gray texture finish.

**EXTERIOR MID EMS COMPARTMENT INTERIOR FINISH**

The EMS compartment interior shall feature a DA sanded finish.

**CAB STRUCTURAL WARRANTY**

Summary of Warranty Terms:

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

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

### **CAB TEST INFORMATION**

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

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

### **ELECTRICAL SYSTEM**

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

### **OEM WIRING**

The wiring system shall include a custom interface harness provided by the chassis manufacturer designed to meet the requirements provided by the OEM. The harness shall include eight (8) 14 gauge wires which shall be routed from under the center dash area to the frame area behind the cab. There shall be a coil provided at the back of the cab with a minimum of 15.00 feet of additional wire provided.

### **APPARATUS WIRING PROVISION**

An apparatus wiring panel shall be installed in the center dash area behind the rocker switch panel which shall include eight (8) open circuits consisting of three (3) 20 amp, one (1) 30 amp, three (3) 10 amp, and one (1) 15 amp circuit, with relays and breakers with trigger wires which shall be routed to the rocker switch panel.

### **MULTIPLEX DISPLAY**

The multiplex electrical system shall include (2) Weldon Vista IV displays which shall be located one (1) on the right side of the dash in the switch panel and one (1) on the left side of the dash in the switch panel. The Vista IV displays shall feature full color LCD display screens which include a message bar displaying the time of day and important messages requiring acknowledgement by the user which shall all be displayed on the top of the screen in the order they are received. There shall be eight (8) push button virtual controls, four (4) on each side of the display for the on-board diagnostics. The display screens shall be video ready for back-up cameras, thermal cameras, and DVD.

The Vista IV displays shall offer varying fonts and background colors. The displays shall be fully programmable to the needs of the customer and shall offer virtually infinite flexibility for screen configuration options.

### **DATA RECORDING SYSTEM**

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

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

Each portion of the data shall be recorded at the specified intervals and stored for the specified length of time to meet NFPA 1901 guidelines and shall be retrievable by connecting a laptop computer to the VDR system.

### **ACCESSORY POWER**

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

### **AUXILIARY ACCESSORY POWER**

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

### **ADDITIONAL ACCESSORY POWER**

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

**EXTRA ACCESSORY POWER**

One (1) extra set of power and ground studs shall be provided and installed behind the MDT cut out with a 40 amp breaker. The studs shall be 0.38 inch diameter capable of carrying up to a 40 amp battery direct load.

**ANCILLARY ACCESSORY POWER**

One (1) auxiliary set of power and ground studs shall be provided and installed behind the driver seat with a 40 amp breaker. The studs shall be 0.38 inch diameter capable of carrying up to a 40 amp load and shall be wired battery direct. The studs shall include an additional 2.00 feet of wire.

**EXTERIOR ELECTRICAL TERMINAL COATING**

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

**ENGINE**

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

The ISL9 engine shall feature a VGT™ Turbocharger, a high pressure common rail fuel system, fully integrated electronic controls with an electronic governor, and shall be EPA certified to meet the 2013 emissions standards using cooled exhaust gas recirculation and selective catalytic reduction technology.

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

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

**CAB ENGINE TUNNEL**

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

**DIESEL PARTICULATE FILTER CONTROLS**

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

### **ENGINE PROGRAMMING HIGH IDLE SPEED**

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

### **ENGINE HIGH IDLE CONTROL**

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

### **ENGINE PROGRAMMING ROAD SPEED GOVERNOR**

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

### **AUXILIARY ENGINE BRAKE**

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

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

### **AUXILIARY ENGINE BRAKE CONTROL**

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

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

The compression brake shall be controlled via an off/low/medium/high virtual button on the Vista display and control screen. The virtual button will default to high setting when vehicle power is switched from off to on.

### **ELECTRONIC ENGINE OIL LEVEL INDICATOR**

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

**FLUID FILLS**

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

**ENGINE DRAIN PLUG**

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

**ENGINE WARRANTY**

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

**REMOTE THROTTLE CONTROL**

A Fire Research In Control 400 pressure sensor governor shall be provided for the electronic engine. It shall include a remote mountable control head.

The In Control shall regulate the pump pressure and monitor all essential engine parameters.

LED readouts shall display RPM, PSI, pump discharge and intake pressure, engine oil pressure, engine temperature, transmission temperature and battery voltage. An audible alarm output shall also be part of the system.

The rpm increase and decrease will be controlled by control knob on the face of the In Control 400.

**REMOTE THROTTLE HARNESS**

An apparatus interface wiring harness for the engine shall be supplied with the chassis. The harness shall include a connector for connection to the chassis harness which shall terminate in the left frame rail behind the cab for reconnection by the apparatus builder. The harness shall contain connectors for a Fire Research In Control 300/400 pressure governor and a multiplexed gauge. Separate circuits shall be included for pump controls, "Pump Engaged" and "OK to Pump" indicator lights, open compartment ground, start signal, park brake ground, ignition signal, master power, customer ignition, air horn solenoid switch, high idle switch and high idle indication light. The harness shall be designed for a side mount pump panel.

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

### **ENGINE PROGRAMMING REMOTE THROTTLE**

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

### **ENGINE PROGRAMMING IDLE SPEED**

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

### **ENGINE FAN DRIVE**

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

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

### **ENGINE COOLING SYSTEM**

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

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

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

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

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

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

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

### **ENGINE COOLING SYSTEM PROTECTION**

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

### **ENGINE COOLANT**

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

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

### **ELECTRONIC COOLANT LEVEL INDICATOR**

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

### **ENGINE PUMP HEAT EXCHANGER**

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

### **COOLANT HOSES**

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

### **ENGINE AIR INTAKE**

The engine air intake system shall include an ember separator air intake filter which shall be located in the front of the cab behind the right hand side fascia. This filter shall protect the downstream air filter from embers using a combination of unique flat and crimped metal screens constructed into a corrosion resistant steel frame. This multilayered screen shall be designed to trap embers or allow them to burn out before passing through the pack, while creating only minimal air flow restriction through the system. Periodic cleaning or replacement of the screen shall be all that is required after installation.

The engine shall also include an air intake filter which shall be bolted to the frame and located under the front of the cab on the right hand side. The system shall utilize a replaceable dry type filter which ensures dust and debris remains safely contained inside the housing during operation via leak-tight seals. The service cover shall be located on the bottom of the housing, eliminating the chance of contaminating the air intake system during air filter service.

The air flow distribution and dust loading shall be uniform throughout the high-performance filter element, which shall result in pressure differential for improved horsepower and fuel economy. The air intake ember separator shall be mounted within easy access via a hinged panel behind the right hand side headlight module. The air intake system shall include a restriction indicator light in the warning light cluster on the instrument panel, which shall activate when the air cleaner element requires replacement.

### **AIR INTAKE PROTECTION**

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

### **ENGINE EXHAUST SYSTEM**

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

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

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

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

### **DIESEL EXHAUST FLUID TANK**

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

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

## WATERTOWN FIRE DEPARTMENT

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

### **ENGINE EXHAUST ACCESSORIES**

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

### **ENGINE EXHAUST WRAP**

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

### **TRANSMISSION**

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

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

The transmission gear ratios shall be:

|     |                        |
|-----|------------------------|
| 1st | 3.49:1                 |
| 2nd | 1.86:1                 |
| 3rd | 1.41:1                 |
| 4th | 1.00:1                 |
| 5th | 0.75:1                 |
| 6th | 0.65:1 (if applicable) |
| Rev | 5.03:1                 |

### **TRANSMISSION MODE PROGRAMMING**

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

### **TRANSMISSION FEATURE PROGRAMMING**

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

This package shall be coupled with the use of a split shaft PTO and incorporate pumping circuits. These circuits shall be used allowing the vehicle to operate in the fourth range lockup while operating the

## WATERTOWN FIRE DEPARTMENT

pump mode due to the 1 to 1 ratio through the transmission, therefore the output speed of the engine is the input speed to the pump. The pump output can be easily calculated by using this input speed and the drive ratio of the pump itself to rate the gallons of water the pump can provide.

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

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

### **ELECTRONIC TRANSMISSION OIL LEVEL INDICATOR**

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

### **TRANSMISSION SHIFT SELECTOR**

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

### **TRANSMISSION PRE-SELECT WITH AUXILIARY BRAKE**

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

### **TRANSMISSION COOLING SYSTEM**

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

### **TRANSMISSION DRAIN PLUG**

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

### **TRANSMISSION WARRANTY**

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

### **LH PTO**

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

### **LH PTO MODEL**

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

### **PTO LOCATION**

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

### **PTO PROGRAMMING**

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

### **PTO CONTROL**

The left hand power take off shall be controlled by the transmission. It will use a virtual button on the Vista display and control screen with text messages. Disable is displayed when switch is off. Enable is displayed when the switch is turned on. Active is displayed when the switch is on with positive engagement of the power take off.

Required operating conditions for enabling this function are:

- Throttle position is low
- Engine speed is within customer modifiable constant limits
- Output speed is within customer modifiable constant limits
- Park brake set

### **DRIVELINE**

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

**DRIVELINE GUARDS**

One (1) driveline guard loop shall be provided and installed to support the driveline shaft for routine maintenance and in the event of a driveline component failure.

**MIDSHIP PUMP / GEARBOX**

A pump as specified shall be supplied by the apparatus manufacturer and installed by the cab and chassis manufacturer.

**MIDSHIP PUMP / GEARBOX MODEL**

The midship pump/gearbox provisions shall be for a Hale Q TWO pump.

**MIDSHIP PUMP GEARBOX DROP**

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

**MIDSHIP PUMP RATIO**

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

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

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

**PUMP YOKES PROVIDER**

The Hale pump yokes shall be provided by Spartan Chassis. The yokes shall be 1710 companion type to match the pump and the driveline series.

**PUMP SHIFT CONTROLS**

One (1) air pump shift control panel shall be located on the left hand side of the engine tunnel, integrated with the shifter pod. The following shall be provided on the panel: a three (3) position control lever; an engraved PUMP ENGAGED identification light; and an engraved OK TO PUMP identification light. The pump shift control panel shall be black with a yellow border outline and shall include pump instructions. An instruction plate describing the transmission shift selector position used for pumping shall be provided and located so it can be read from the driver's position per NFPA 16.10.1.3. The road mode shall be selected when the control lever is in the forward position and pump mode shall be selected when the control lever is in the rearward position.

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

### **PUMP SHIFT CONTROL PLUMBING**

Air connections shall be provided from the air supply tank to the pump shift control valve and from the pump shift control valve to the frame mounted bracket. The frame mounted bracket shall include labeling identifying the pump and road connection points. Wire braid air lines shall complete the plumbing to the pump and the "Pump Engaged" switch shall be connected. The air supply shall be pressure protected from service brake system.

### **FUEL FILTER/WATER SEPARATOR**

The fuel system shall have a Fleetguard FS1003 fuel filter/water separator with a thermostatically controlled integral heater as a primary filter. The fuel filter shall have a drain valve.

An instrument panel lamp and audible alarm which indicates when water is present in the fuel-water separator shall also be included.

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

### **FUEL LINES**

The fuel system supply and return lines installed from the fuel tank to the engine shall be black textile braided lines which are reinforced with braided high tensile steel wire. The fuel lines shall be connected with reusable steel fittings.

### **FUEL SHUTOFF VALVE**

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

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

### **ELECTRIC FUEL PRIMER**

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

### **FUEL TANK**

The fuel tank shall have a capacity of fifty (50) gallons and shall measure 35.00 inches in width X 15.00 inches in height X 24.00 inches in length. The baffled tank shall be made of 14 stainless steel. The exterior of the tank shall be painted with a PRP Corsol™ black anti-corrosive exterior metal treatment finish. This results in a tank which offers the internal and external corrosion resistance.

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

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

## WATERTOWN FIRE DEPARTMENT

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

### **FUEL TANK MATERIAL AND FINISH**

The fuel tank shall be constructed of 14 gauge stainless steel. The exterior of the fuel tank shall be painted to match the frame color.

### **FUEL TANK STRAP MATERIAL**

The fuel tank straps shall be constructed of #304 stainless steel.

### **FUEL TANK FILL PORT**

The fuel tank fill ports shall be offset with the left fill port located in the rearward position and the right fill port located in the middle position on the fuel tank.

### **FUEL TANK SERVICEABILITY PROVISIONS**

The chassis fuel lines shall have additional length provided so the tank can be easily lowered and removed for service purposes. The additional 3.00 feet of length shall be located above the fuel tank and shall be coiled and secured. The fuel line fittings shall be pointed towards the right side (curbside) of the chassis.

### **FUEL TANK DRAIN PLUG**

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

### **FRONT AXLE**

The front axle shall be a Meritor Easy Steer Non drive front axle, model number MFS-20. The axle shall include a 3.74 inch drop and a 71.00 inch king pin intersection (KPI). The axle shall include a conventional style hub with a standard knuckle.

### **FRONT AXLE WARRANTY**

The front axle shall be warranted by Meritor for two (2) years with unlimited miles under the general service application. Details of the Meritor warranty are provided on the PDF document attached to this option. An additional three (3) years of warranty will be provided by Spartan Motors, Inc, to match the five (5) year bumper to bumper.

### **FRONT WHEEL BEARING LUBRICATION**

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

**FRONT SHOCK ABSORBERS**

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

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

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

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

**FRONT SUSPENSION**

The front suspension shall include a nine (9) leaf spring pack in which the longest leaf measures 54.00 inch long and 4.00 inches wide and shall include a military double wrapped front eye. Both spring eyes shall have a case hardened threaded bushing installed with lubrication counter bore and lubrication land off cross bore with grease fitting. The spring capacity shall be rated at 21,500 pounds.

**STEERING COLUMN/ WHEEL**

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

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

**ELECTRONIC POWER STEERING FLUID LEVEL INDICATOR**

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

**POWER STEERING PUMP**

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

**FRONT AXLE CRAMP ANGLE**

## WATERTOWN FIRE DEPARTMENT

The chassis shall have a front axle crank angle of 48-degrees to the left and 44-degrees to the right.

### **POWER STEERING GEAR**

The power steering gear shall be a TRW model TAS 65 with an assist cylinder.

### **CHASSIS ALIGNMENT**

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

### **REAR AXLE**

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

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

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

### **REAR AXLE DIFFERENTIAL LUBRICATION**

The rear axle differential shall be lubricated with synthetic oil.

### **REAR AXLE WARRANTY**

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

### **REAR WHEEL BEARING LUBRICATION**

The rear axle wheel bearings shall be lubricated with synthetic oil.

### **REAR AXLE DIFFERENTIAL CONTROL**

A driver controlled differential lock shall be installed on the rear axle. This feature shall allow the main differential to be locked and unlocked when encountering poor road or highway conditions, where maximum traction is needed, for use at speeds no greater than 25 MPH. The differential lock shall be controlled by a locking rocker switch on the switch panel. The light on the switch shall illuminate with positive engagement of the differential control.

**VEHICLE TOP SPEED**

The top speed of the vehicle shall be approximately 65 MPH +/-2 MPH at governed engine RPM.

**REAR SUSPENSION**

The single rear axle shall feature a Reyco 102AR air suspension with a single air bag on each side attached to a tapered forged drop leaf spring with one adjustable and one fixed torque rod.

The suspension shall feature dual air height control valves which shall be installed to ensure equal frame height on both sides of the vehicle regardless of the load. The suspension shall also include two premium shock absorbers, one each side.

The rear suspension capacity shall be rated at 21,000 to 27,000 pounds to meet the rear axle rating selected.

**REAR SHOCK ABSORBERS**

Shock absorbers shall be supplied by the suspension manufacturer and installed on the rear axle suspension.

**FRONT TIRE**

The front tires shall be Goodyear 315/80R-22.5 20PR "L" tubeless radial G289 WHA highway tread.

The front tire stamped load capacity shall be 20,400 pounds per axle with a speed rating of 68 miles per hour when properly inflated to 130 pounds per square inch.

**REAR TIRE**

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

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

The Goodyear Intermittent Service Rating load capacity shall be 29,020 pounds per axle with a speed rating of 75 miles per hour when properly inflated to 120 pounds per square inch. The Goodyear Intermittent Service Rating limits the operation of the emergency vehicle to no more than fifty (50) miles of continuous operation under maximum recommended payload, or without stopping for at least twenty (20) minutes. The emergency vehicle must reduce its speed to no more than 50 MPH after the first fifty (50) miles of travel.

**REAR AXLE RATIO**

The rear axle ratio shall be 5.38:1.

### **TIRE PRESSURE EQUALIZATION SYSTEM**

There shall be a voucher provided with the chassis for Crossfire dual tire equalization system provided on both sets of dual tires on the rear axle. The Crossfire pressure system shall equalize and monitor tire pressure through the valve which is mounted between the dual tires. This shall bolt easily to the drive axle end allowing air to flow freely from one tire to the other, maintaining equal tire pressure and load distribution. The Crossfire system shall maximize tire life, decrease rolling resistance for increased fuel mileage and improve stability braking and overall safety.

The Crossfire dual tire equalization system shall be redeemed upon the vehicle manufacturer's receipt of the voucher along with the vehicle in-service weight for each axle.

### **TIRE PRESSURE INDICATOR**

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

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

### **FRONT WHEEL**

The front wheels shall be Alcoa hub piloted, 22.50 inch X 9.00 inch LvL One™ polished aluminum wheels. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts. The wheels shall feature one-piece forged strength and shall include Alcoa's Dura-Bright® finish with XBR technology as an integral part of the wheel surface. Alcoa Dura-Bright® wheels keep their shine without polishing. Brake dust, grime and road debris are easily removed by simply cleaning the wheels with soap and water.

### **REAR WHEEL**

The rear wheels shall be Alcoa hub piloted, 22.50 inch X 8.25 inch LvL One™ aluminum wheels with a polished outer surface and Alcoa Dura-Bright® wheel treatment with XBR® technology as an integral part of the wheel. The hub piloted mounting system shall provide easy installation and shall include two-piece flange nuts.

### **BALANCE WHEELS AND TIRES**

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

### **WHEEL TRIM**

The front wheels shall include stainless steel lug nut covers and stainless steel baby moons shipped loose with the chassis for installation by the apparatus builder. The baby moons shall have cutouts for oil seal viewing when applicable.

## WATERTOWN FIRE DEPARTMENT

The rear wheels shall include stainless steel lug nut covers and band mounted spring clip stainless steel high hats shipped loose with the chassis for installation by the apparatus builder.

The lug nut covers, baby moons, and high hats shall be RealWheels® brand constructed of 304L grade, non-corrosive stainless steel with a mirror finish. Each wheel trim component shall meet D.O.T. certification.

### **WHEEL GUARDS**

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

### **TIRE CHAINS**

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

### **TIRE CHAINS ACTIVATION**

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

### **BRAKE SYSTEM**

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

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

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

Additional safety shall be accommodated through Automatic Traction Control (ATC) which shall be installed on the single rear axle. The ATC system shall apply the ABS when the drive wheels loose

traction. The system shall scale the electronic engine throttle back to prevent wheel spin while accelerating on ice or wet surfaces.

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

The Electronic Stability Control (ESC) unit is a functional extension of the electronic braking system. It is able to detect any skidding of the vehicle about its vertical axis as well as any rollover tendency. The control unit comprises an angular-speed sensor that measures the vehicle's motion about the vertical axis, caused, for instance, by cornering or by skidding on a slippery road surface. An acceleration sensor measures the vehicle's lateral acceleration. The Controller Area Network (CAN) bus provides information on the steering angle. On the basis of lateral acceleration and steering angle, an integrated microcontroller calculates a theoretical angular speed for the stable vehicle condition.

### **FRONT BRAKES**

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

### **REAR BRAKES**

The rear brakes shall be Meritor 16.50 inch X 8.63 inch S-cam drum type. The brakes shall feature a cast iron shoe.

### **PARK BRAKE**

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

In addition to the mechanical rear brake engagement, the front service brakes will also engage via air pressure, providing additional braking capability.

### **PARK BRAKE CONTROL**

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

The parking brake actuation valve shall be mounted to the left side of the engine tunnel integrated into the transmission shift pod console within easy access of the driver.

### **REAR BRAKE SLACK ADJUSTERS**

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

**REAR BRAKE DUST SHIELDS**

The rear brakes shall be equipped with brake dust shields.

**AIR DRYER**

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

**FRONT BRAKE CHAMBERS**

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

**REAR BRAKE CHAMBERS**

The rear axle shall include TSE 30/30 H.O.T. (High Output Technology) brake chambers shall convert the energy of compressed air into mechanical force and motion. This shall actuate the brake camshaft, which in turn shall operate the foundational brake mechanism forcing the brake shoes against the brake drum. The TSE 30/30 H.O.T. chambers are designed to provide the same performance as 30/36 chambers in a smaller package.

**AIR COMPRESSOR**

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

**AIR GOVERNOR**

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

**AUXILIARY AIR RESERVOIR**

One (1) auxiliary air reservoir with a 1200 cubic inch capacity shall be installed on the chassis to act as an additional reserve supply to the air system for air horn, air tool, or other non-service brake use. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

**MOISTURE EJECTORS**

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

**AIR SUPPLY LINES**

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

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

**AIR TANK SPACERS**

There shall be spacers included with the air tank mounting. The spacers shall move the air tanks 1.50 inches inward towards the center of the chassis. This shall provide clearance between the air tanks and the frame for body U-bolt clearance.

**REAR AIR TANK MOUNTING**

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

**WHEELBASE**

The chassis wheelbase shall be approx.170.50 inches.

**REAR OVERHANG**

The chassis rear overhang shall be 47.00 inches.

**FRAME**

The frame shall consist of double rails running parallel to each other with cross members forming a ladder style frame. The frame rails shall be formed in the shape of a "C" channel, with the outer rail measuring 10.25 inches high X 3.50 inches deep upper and lower flanges X 0.38 inches thick with an inner channel of 9.44 inches high X 3.13 inches deep and 0.38 inches thick. Each rail shall be constructed of 110,000 psi minimum yield high strength low alloy steel. Each double rail section shall be rated by a Resistance Bending Moment (RBM) minimum of 3,213,100 inch pounds and have a minimum section modulus of 29.21 cubic inches. The frame shall measure 35.00 inches in width.

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

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

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

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

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

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

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

### **FRAME WARRANTY**

Summary of Warranty Terms:

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

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

### **REAR TOW DEVICE**

Two (2) heavy duty painted tow eyes shall be installed extending rearward from the frame at the rear of the chassis. The tow eyes shall be fabricated from 0.75 inch thick #1020 ASTM-36 hot rolled steel. The inside diameter of the tow eye shall be 2.00 inches and shall have a chamfered edge. The tow eyes shall be bolted one (1) on each side to the outside of the chassis frame with grade 8 bolts. The tow eyes shall be painted to match the chassis frame.

### **FRAME PAINT**

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

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

## WATERTOWN FIRE DEPARTMENT

2H. The direct impact resistance test per ASTM D2794 shall have an impact resistance of 120.00 inches per pound at 2 mils.

There shall be an RTV type sealant applied to the seams between the frame rail and the frame liner(s) to help prevent water intrusion between the frame rails. The sealant shall be applied to all seams along the length of the frame and at the front and rear ends of the liner(s). The sealant shall be applied after the frame rails have been assembled and painted.

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

The chassis under carriage consisting of frame, axles, driveline running gear, air tanks and other chassis mounted components shall be painted the primary/lower cab color. Paint shall be applied prior to airline and electrical wiring installation.

### **FRONT BUMPER**

A one piece, two (2) rib wrap-around style, polished stainless steel front bumper shall be provided. The material shall be 10 gauge 304 stainless steel, 12.00 inches high and 99.00 inches wide.

### **FRONT BUMPER EXTENSION LENGTH**

The front bumper shall be extended approximately 6.00 inches ahead of the cab.

### **FRONT BUMPER EXTENSION FRAME WIDTH**

The front bumper extension frame shall feature an overall width of 48.25 inches.

### **FRONT BUMPER APRON**

The 6.00 inch extended front bumper shall include an apron constructed of 14 gauge embossed stainless steel tread plate.

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

### **MECHANICAL SIREN**

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

**MECHANICAL SIREN LOCATION**

The siren shall be recess mounted on the right side of the front fascia of the bumper centered between the radius and frame rail.

**AIR HORN**

The front bumper shall include two (2) Hadley brand E-Tone air horns which shall measure 21.00 inches long with a 6.00 inch round flare. The air horns shall be trumpet style with a chrome finish on the exterior and a painted finish deep inside the trumpet.

**AIR HORN LOCATION**

The air horns shall be recess mounted in the front bumper face on the left side of the bumper in the inboard and outboard positions relative to the left hand frame rail.

**AIR HORN RESERVOIR**

One (1) air reservoir, with a 1200 cubic inch capacity, shall be installed on the chassis to act as a supply tank for operating air horns. The reservoir shall be isolated with a 90 PSI pressure protection valve on the reservoir supply side to prevent depletion of the air to the air brake system.

**ELECTRONIC SIREN SPEAKER**

There shall be two (2) Cast Products Inc. model SA4301, 100 watt speakers provided. Each speaker shall measure 6.20 inches tall X 7.36 inches wide X 3.06 inches deep. Each speaker shall include a flat mounting flange which shall be polished aluminum.

**ELECTRONIC SIREN SPEAKER LOCATION**

The two (2) electronic siren speakers shall be located on the front bumper face between the frame rails in the right and left side outboard positions.

**FRONT BUMPER TOW HOOKS**

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

**CAB TILT SYSTEM**

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

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

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

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

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

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

### **CAB TILT CONTROL RECEPTACLE**

A six (6) pin Deutsch receptacle that includes a cap shall be installed in the front bumper tail on the right hand side to provide a place to plug in the cab tilt remote control pendant.

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

### **CAB TILT LOCK DOWN INDICATOR**

The cab dash shall include a message located within the dual air pressure gauge which shall alert the driver when the cab is unlocked and ajar. The alert message shall cease to be displayed when the cab is in the fully lowered position and the hold down hooks are secured and locked to the cab mounts.

In addition to the alert message an audible alarm shall sound when the cab is unlocked and ajar with the parking brake released.

### **CAB WINDSHIELD**

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

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

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

### **GLASS FRONT DOOR**

The front cab doors shall include a window which is 27.00 inches in width X 26.00 inches in height. These windows shall have the capability to roll down completely into the door housing. This shall be

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accomplished manually utilizing a crank style handle on the inside of the door. A reinforced window regulator assembly shall be provided for severe duty use.

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

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

### **GLASS TINT FRONT DOOR**

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

### **GLASS REAR DOOR RH**

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

### **GLASS TINT REAR DOOR RIGHT HAND**

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

### **GLASS REAR DOOR LH**

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

### **GLASS TINT REAR DOOR LEFT HAND**

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

### **CLIMATE CONTROL**

A ceiling mounted combination defroster and cabin heating and air conditioning system shall be located above the engine tunnel area. The system covers and plenums shall be of severe duty design made of aluminum which shall be coated with a customer specified interior paint. The design of the system's covers shall provide quick access to washable air intake filters as well as easy access to other serviceable items.

The air delivery plenums provide targeted airflow directly to the vehicle occupants. Six (6) adjustable louvers will provide comfort for the front seat occupants and ten (10) adjustable louvers will provide comfort for the rear crew occupants.

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The system shall be capable of producing up to 12 FPM of air velocity at all occupant seating positions. Separate front and rear blower motors shall be of brushless design and shall be controlled independently. It shall be capable of reducing the interior cabin air temperature from 122° F (+/- 3° F) to 80° F in thirty minutes with 50% relative humidity and full solar load as described in SAE J2646.

The system shall also provide heater pull up performance which meets or exceeds the performance requirements of SAE J1612 as well as defrost performance that meets or exceeds the performance requirements of SAE J381.

A gravity drain system shall be provided that is capable of evacuating condensate from the vehicle while on a slope of up to a 13% grade in any direction.

The air conditioning system plumbing shall be a mixture of custom bent zinc coated steel fittings and Aero-quip GH134 flexible hose with Aeroquip EZ-Clip fittings.

The overhead heater/defroster plumbing shall include an electronic flow control valve that re-directs hot coolant away from the evaporator, via a bypass loop, as the temperature control is moved toward the cold position.

Any component which needs to be accessed to perform system troubleshooting shall be accessible by one person using basic hand tools. Regularly serviced items shall be replaceable by one person using basic hand tools.

*\*\*Performance data is based on testing performed by an independent third party test facility.*

### **CLIMATE CONTROL DRAIN**

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

### **CLIMATE CONTROL ACTIVATION**

The heating, defrosting and air conditioning controls shall be located on the Vista display and control screen.

### **HVAC OVERHEAD COVER PAINT**

The overhead HVAC cover shall be painted with a Zolatone #20-72 silver gray texture finish.

### **HEATER HOSE INSULATION**

The heater hoses leading from the engine to the cab shall include a foam insulation wrap which runs the length of the hose improving heating in extreme cold climates. The heater hoses which shall be routed inside the cab shall not be insulated.

**A/C CONDENSER LOCATION**

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

**A/C COMPRESSOR**

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

**CAB CIRCULATION FANS FRONT**

The cab shall include two (2) all metal 6.00 inch air circulation fans installed overhead in the center of the cab rearward of the windshield. Each fan shall be controlled by an individual virtual button on the Vista control panel. The fans can be used to help defog the windshield or to increase air circulation for passenger comfort.

**UNDER CAB INSULATION**

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

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

The engine tunnel insulation shall measure approximately 0.75 inch thick including a vertically lapped polyester fiber layer, a 1.0 lb/ft<sup>2</sup> PVC barrier layer, an open cell foam layer, and a moisture and heat reflective foil facing reinforced with a woven fiberglass layer. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed FMVSS 302 flammability test.

The cab floor insulation shall measure .56 inch thick including a 1.0#/sf PVC barrier and a moisture and heat reflective foil facing, reinforced with fiberglass strands. The foil surface acts as protection against moisture and other contaminants. The insulation shall meet or exceed MVSS 302 flammability test.

The insulation shall be cut precisely to fit each section and sealed for additional heat and sound deflection. The insulation shall be held in place by 3 mils of acrylic pressure sensitive adhesive and aluminum pins with hard hat, hold in place fastening heads. In addition, the insulation on the underside of the cab floor shall have an expanded metal overlay to assist in retaining the insulation tight against the cab.

**INTERIOR TRIM FLOOR**

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

**INTERIOR TRIM**

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

**REAR WALL INTERIOR TRIM**

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

**HEADER TRIM**

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

**TRIM CENTER DASH**

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

**TRIM LH DASH**

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

**TRIM RH DASH**

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

**ENGINE TUNNEL TRIM**

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

**STEP TRIM**

Each cab entry door shall include a three step entry. The first step closest to the ground shall be constructed of 14 gauge 304 stainless steel with indented perforations. The perforations shall allow water and other debris to flow through rather than becoming trapped within the stepping surface. The

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stainless steel material shall have a number 7 mirror finish. The lower step shall be mounted to a frame which is integral with the construction of the cab for rigidity and strength. The middle step shall be integral with the cab construction and shall be trimmed in 0.08 inch thick 3003-H22 embossed aluminum tread plate.

### **STEP TRIM KICKPLATE**

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

### **UNDER CAB ACCESS DOOR**

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

### **INTERIOR DOOR TRIM**

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

### **DOOR TRIM KICKPLATE**

The inner door panels shall include an aluminum tread kick plate which shall be fastened to the lower portion of the door panels.

### **DOOR TRIM SCUFF PLATE**

There shall be stainless steel scuff plate along the door jamb to protect the painted surface from damage should the seat belt buckle come in contact with the door jamb.

In addition, the painted surface rear of the front door windows on the inside of the door shall include a stainless steel scuff plate to protect the painted surface from damage caused by the seat belt buckle.

### **DOOR TRIM CUSTOMER NAMEPLATE**

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

### **CAB DOOR TRIM REFLECTIVE**

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

### **INTERIOR GRAB HANDLE "A" PILLAR**

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

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the door window opening and the right handle shall be located 2.88 inches above the bottom of the door window opening. The handles shall assist personnel in entering and exiting the cab.

### **INTERIOR GRAB HANDLE FRONT DOOR**

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

### **INTERIOR GRAB HANDLE REAR DOOR**

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

### **INTERIOR SOFT TRIM COLOR**

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

### **INTERIOR TRIM SUNVISOR**

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

### **INTERIOR FLOOR MAT COLOR**

The cab interior floor mat shall be gray in color.

### **CAB PAINT INTERIOR DOOR TRIM**

The inner door panel surfaces shall be painted with Zolatone #20-72 silver gray texture finish.

### **HEADER TRIM INTERIOR PAINT**

The metal surfaces in the header area shall be coated with Zolatone #20-72 silver gray texture finish.

### **TRIM CENTER DASH INTERIOR PAINT**

The entire center dash shall be coated with Zolatone #20-72 silver gray texture finish. Any accessory pods attached to the dash shall also be painted this color.

### **TRIM LH DASH INTERIOR PAINT**

The left hand dash shall be painted with a Zolatone #20-72 silver gray texture finish.

### **TRIM RIGHT HAND DASH INTERIOR PAINT**

The right hand dash shall be painted with Zolatone #20-72 silver gray texture finish.

**DASH PANEL GROUP**

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

**SWITCHES CENTER PANEL**

The center dash panel shall include six (6) rocker switch positions in a single row configuration in the lower left portion of the panel.

A rocker switch with a blank legend installed directly above shall be provided for any position without a switch and legend designated by a specific option. The non-specified switches shall be two-position, black switches with a green indicator light. Each blank switch legend can be custom engraved by the body manufacturer. All switch legends shall have backlighting provided.

**SWITCHES LEFT PANEL**

The left dash panel shall include three (3) switches. There shall be one (1) headlight switch over one (1) windshield wiper/washer control switch and one (1) instrument lamp dimmer switch on the left hand portion of the panel. All switches shall have backlighting provided.

**SWITCHES RIGHT PANEL**

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

**SEAT BELT WARNING**

A Weldon seat belt warning system, integrated with the Vehicle Data Recorder system, shall be installed for each seat within the cab. The system shall provide a visual warning indicator in the Vista display and control screen(s) and a fast tone audible alarm.

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

**SEAT MATERIAL**

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

**SEAT COLOR**

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

**SEAT BACK LOGO**

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

**SEAT DRIVER**

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

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

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

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

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

**SEAT BACK DRIVER**

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

**SEAT MOUNTING DRIVER**

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

**OCCUPANT PROTECTION DRIVER**

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

The driver's seating area APS shall include:

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- Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the driver, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.
- Large side curtain airbag - protects the driver's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the driver in a qualifying event by covering the window and the upper portion of the door.
- Dual knee airbags (patent pending) with energy management mounting (patent pending) - protects the driver's lower body from dangerous surface contact injuries, acceleration injuries, and from intrusion as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.

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

### **SEAT OFFICER**

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

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

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

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

### **SEAT BACK OFFICER**

The officer's seat back shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

## WATERTOWN FIRE DEPARTMENT

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

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

### **SEAT MOUNTING OFFICER**

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

### **OCCUPANT PROTECTION OFFICER**

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

The officer's seating area APS shall include:

- Advanced seat belt system - retractor pre-tensioner tightens the seat belt around the officer, securing the occupant in the seat and the load limiter plays out some of the seat belt webbing to reduce seat belt to chest and torso force upon impact as well as mitigate head and neck injuries.
- Large side curtain airbag - protects the officer's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to the officer in a qualifying event by covering the window and the upper portion of the door.

Knee airbags - protects the officer's lower body from dangerous surface contact injuries, acceleration injuries, and from contact points with intrusive surfaces as a result of a collision as well as locks the lower body in place so the upper body shall be slowed by the load limiting seat belt.

### **POWER SEAT WIRING**

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

### **SEAT BELT ORIENTATION CREW**

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

### **SEAT FORWARD FACING OUTER LOCATION**

The crew area shall include two (2) forward facing outboard seats, which include one (1) located next to the outer wall of the cab on the left side of the cab and one (1) located next to the outer wall on the right side of the cab.

**SEAT CREW FORWARD FACING OUTER**

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

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

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

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

**SEAT BACK FORWARD FACING OUTER**

The crew area seat backs shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

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

**SEAT MOUNTING FORWARD FACING OUTER**

The forward facing outer seat frame mounting holes shall be mounted 1.00 inch inboard from the outer edge of the forward facing seat frame.

## **OCCUPANT PROTECTION FFO**

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

Each forward facing outer seating position APS shall include:

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

Side curtain airbag - protects each occupant's head, neck, and upper body from dangerous cab side surfaces and contact points with intrusive surfaces as a result of a collision as well as provides ejection mitigation protection to each occupant in a qualifying event by covering the windows and walls adjacent to each seating position with an airbag custom designed for each cab configuration.

## **SEAT FORWARD FACING CENTER LOCATION**

The crew area shall include one (1) forward facing center crew seat located directly behind the engine tunnel in the center of the cab.

## **SEAT CREW FORWARD FACING CENTER**

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

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

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

This model of seat shall have successfully completed the static load tests by FMVSS 207/210. This testing shall include a simultaneous forward load of 3,000 pounds each on the lap and shoulder belts and twenty (20) times the weight through the center of gravity. This model of seat installed in the cab model, as specified, shall have successfully completed the dynamic sled testing using FMVSS 208 as a guide with the following accommodations. In order to reflect the larger size outfitted firefighters, the test dummy used shall be a 95<sup>th</sup> percentile hybrid III male weighing 225 pounds rather than the 50<sup>th</sup> percentile male dummy weighing 165 pounds as referenced in FMVSS 208. The model of seats shall also have successfully completed the flammability of materials used in the occupant compartments of motor vehicles as outlined in FMVSS 302, of which decides the burning rate of materials in the occupant compartments of motor vehicles.

**SEAT BACK FORWARD FACING CENTER**

The crew area seat backs shall include an IMMI brand SmartDock® Gen 2 hands-free self contained breathing apparatus (SCBA) holder. The hands-free holder shall meet NFPA 1901-03 9G dynamic requirements for cylinder restraint systems for use in crew compartments of emergency response vehicles. The bracket shall accommodate and secure most types of self-contained breathing apparatus cylinders.

The hands-free holder shall consist of a back plate, bottom cradle, non-marring top claws, and claw height adjustment knob. The height adjustment knob shall allow for easy adjustment of the claws to the SCBA. The hands-free holder's claws shall lock from inertial forces to prevent the SCBA from becoming a projectile in the event of a crash to meet the NFPA 1901-03 standard for SCBA retention. The SCBA holder shall offer single-motion insertion into the claws and hands-free release when the SCBA fitted seat occupant rises.

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

**OCCUPANT PROTECTION FFC**

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

Each forward facing center seating position APS shall include:

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

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

**SEAT FRAME FORWARD FACING**

The forward facing center seating positions shall include an enclosed style seat frame located and installed at the rear wall. The seat frame shall measure 62.38 inches wide X 12.38 inches high X 22.00 inches deep. The seat frame shall be constructed of Marine Grade 5052-H32 0.19 inch thick aluminum plate. The seat box shall be painted with the same color as the remaining interior.

**SEAT FRAME FORWARD FACING STORAGE ACCESS**

There shall be two (2) access points to the seat frame storage area, one (1) on each side of the seat frame. Each access point shall be covered by a hinged door which measures 15.00 inches in width X 10.63 inches in height.

**SEAT MOUNTING FORWARD FACING CENTER**

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

**CAB FRONT UNDERSEAT STORAGE ACCESS**

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

**SEAT COMPARTMENT DOOR FINISH**

All underseat storage compartment access doors shall have a Zolatone #20-72 silver gray texture.

**HELMET STORAGE SHIPLOOSE QUANTITY**

The ship loose items shall include six (6) helmet storage brackets.

**HELMET STORAGE SHIPLOOSE**

The ship loose items shall include Ziamatic model UHH-1 helmet storage designed to meet current NFPA regulations. The UHH-1 shall securely fasten fire helmets to flat cab surfaces. The UHH-1 utilizes a helmet hook and an adjustable strap to accommodate nearly any helmet size or configuration.

**WINDSHIELD WIPER SYSTEM**

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

**ELECTRONIC WINDSHIELD FLUID LEVEL INDICATOR**

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

**CAB DOOR HARDWARE**

The cab entry doors shall be equipped with exterior pull handles, suitable for use while wearing firefighter gloves. The handles shall be made of a fiber reinforced plastic composite with a black matt finish.

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

## WATERTOWN FIRE DEPARTMENT

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

### **DOOR LOCKS**

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

### **DOOR LOCK LH EMS COMPARTMENT**

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

### **DOOR LOCK RH EMS COMPARTMENT**

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

### **GRAB HANDLES**

The cab shall include one (1) 18.00 inch knurled, anti-slip, one-piece exterior assist handle behind each cab door. The assist handle shall be made of 14 gauge 304- stainless steel and be 1.25 inch diameter to enable easy grabbing with the gloved hand. Each assist handle shall include a stainless steel plate which saves the cab from scuffs through continued use of the handle.

### **REARVIEW MIRRORS**

Retrac Aerodynamic West Coast style single vision mirror heads model 613285 shall be provided and installed on each of the front cab doors.

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

The mirrors shall measure 8.00 inches wide X 19.00 inches high and shall include an 8.00 inch convex mirrors with a stainless steel back, model 980-4, installed below the flat glass to provide a wider field of vision. The flat mirrors shall be motorized with remote horizontal and vertical adjustment. The control switches shall be mounted within easy reach of the driver. The convex mirrors shall be manually adjustable. The flat mirror glass shall be heated for defrosting in severe cold weather conditions.

The mirror backs shall be constructed of vacuum formed chrome plated ABS plastic housings that are corrosion resistant and shall include an amber marker light. The mirrors shall be manufactured with the finest quality non-glare glass.

### **REARVIEW MIRROR HEAT SWITCH**

The heat for the rearview mirrors shall be controlled through a virtual button on the Vista display and control screen.

**CAB FENDER**

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

**MUD FLAPS FRONT**

The front wheel wells shall have mud flaps installed on them.

**CAB EXTERIOR FRONT & SIDE EMBLEMS**

The cab shall include three (3) Spartan Chassis emblems. There shall be one (1) installed on the front air intake grille and one (1) emblem with an integrated model nameplate installed on the exterior of the cab on the lower forward portion of the front driver and officer side doors.

**CAB EXTERIOR MODEL NAMEPLATE**

The cab shall include custom "Metro Star Advanced Protection System" nameplates integrated into the side emblem.

**IGNITION**

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

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

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

**BATTERY**

The single start electrical system shall include six (6) Deka 1231MF 1125 CCA batteries with a 195 minute reserve capacity and 4/0 welding type dual path starter cables per SAE J541.

**BATTERY TRAY**

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

## WATERTOWN FIRE DEPARTMENT

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

### **BATTERY BOX COVER**

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

### **BATTERY CABLE**

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

### **BATTERY JUMPER STUD**

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

### **ALTERNATOR**

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

### **BATTERY CONDITIONER**

A Kussmaul 35/10 battery conditioner shall be supplied. The battery conditioner shall provide a 35 amp output for the chassis batteries and a 10 amp battery saver output. The battery conditioner shall be mounted in the cab in the LH rear facing outer seating position.

### **BATTERY CONDITIONER DISPLAY**

A Kussmaul battery conditioner display shall be supplied. The battery conditioner display shall be mounted in front of the left side door just below the windshield.

### **AUXILIARY AIR COMPRESSOR**

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

### **ELECTRICAL INLET**

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

## WATERTOWN FIRE DEPARTMENT

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

### **Amp Draw Reference List:**

*Kussmaul 1000 Charger - 3.5 Amps*

*Kussmaul 1200 Charger - 10 Amps*

*Kussmaul 35/10 Charger - 10 Amps*

*1000W Engine Heater - 8.33 Amps*

*1500W Engine Heater - 12.5 Amps*

*120V Air Compressor - 4.2 Amps*

### **ELECTRICAL INLET LOCATION**

An electrical inlet shall be installed on the left hand side of the cab ahead of the front door.

### **ELECTRICAL INLET CONNECTION**

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

### **ELECTRICAL INLET COLOR**

The electrical inlet connection shall include a yellow cover.

### **HEADLIGHTS**

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

### **FRONT TURN SIGNALS**

The front fascia shall include two (2) Whelen model M6 4.00 inch X 6.00 inch programmable LED amber turn signals which shall be installed above the headlights.

### **HEADLIGHT LOCATION**

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

### **SIDE TURN/MARKER LIGHTS**

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

### **MARKER AND ICC LIGHTS**

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

### **HEADLIGHT AND MARKER LIGHT ACTIVATION**

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

### **GROUND LIGHTS**

Each door shall include an NFPA compliant LED ground light mounted to the underside of the cab step below each door. The lights shall include a polycarbonate lens, a housing which is vibration welded and LEDs which shall be shock mounted for extended life. The ground lighting shall be activated by the opening of the door on the respective cab side, when the parking brake is set and through a virtual button on the Vista display and control screen.

### **LOWER CAB STEP LIGHTS**

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

### **INTERMEDIATE STEP LIGHTS**

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

### **UNDER BUMPER LIGHTS**

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

### **ENGINE COMPARTMENT LIGHT**

There shall be two (2) incandescent NFPA compliant lights mounted under the engine tunnel for area work lighting on the engine. The lights shall include a polycarbonate lens, a housing which is vibration welded and a bulb which shall be shock mounted for extended life. The lights shall activate automatically when the cab is tilted.

### **LIGHTBAR PROVISION**

There shall be one (1) light bar installed on the cab roof. The light bar shall be provided and installed by Spartan Chassis. The light bar installation shall include mounting and wiring to a control switch on the cab dash.

**CAB FRONT LIGHTBAR**

The lightbar provisions shall be for one (1) Whelen brand Freedom FN72QLED lightbar mounted centered on the front of the cab roof. The lightbar shall be 72.00 inches in length. The lightbar shall feature ten (10) red LED lights and two (2) clear LED lights. The lens shall be red in front of all red lights and corners, the lens shall be clear in all other locations. The light bar shall also include one (1) Opticom mounted center in the light bar. The clear lights shall be disabled with park brake engaged. The cable shall exit the light bar on the right side of the cab.

**LIGHTBAR SWITCH**

The light bar shall be controlled by a virtual button on the Vista display and control screen. This button shall be clearly labeled for identification.

**FRONT SCENE LIGHTS**

The front of the cab shall include a Whelen Pioneer model PCP2 contour roof mount scene light installed on the brow of the cab.

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

**FRONT SCENE LIGHTS ACTIVATION**

The front scene lighting shall be activated by a virtual button on the Vista display and control screen.

**FRONT SCENE LIGHT LOCATION**

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

**SIDE SCENE LIGHTS**

The cab shall include two (2) Whelen Pioneer model PCPSM2C LED surface mount lights installed one (1) on each side of the cab.

The PCPSM2C configuration shall consist of 24 white Super-LEDs for the spot light with a specialized spot reflector on the bottom, 48 white Super-LEDs in the flood light with a clear optic collimator/metalized reflector assembly on the top, and a clear non-optic polycarbonate lens. Each lamp head shall draw 12.0 amps and generate 7,800 lumens. Each lamp head shall measure 6.37 inches in height X 16.22 inches in width. Each lamp head housing shall be chrome plated.

**SIDE SCENE LIGHT LOCATION**

## WATERTOWN FIRE DEPARTMENT

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

### **SIDE SCENE ACTIVATION**

The scene lights shall be activated by two (2) virtual buttons on the Vista display and control screen(s), one (1) for each light, and by opening the respective side cab doors.

### **INTERIOR OVERHEAD LIGHTS**

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

An additional incandescent three (3) light module with dual map lights shall be located over the engine tunnel which can be activated by individual switches on the lamp.

### **INTERIOR UNDERDASH LIGHT**

The area under the dash shall include two (2) clear lights, one (1) under the left hand dash and one (1) under the right hand dash. The lights shall be activated by the opening of the respective side doors. If the truck is equipped with APS, the under dash light location will be outside of the APS airbag clear zone.

### **MAP LIGHTS**

A Sunnex swivel map light shall be provided. The light shall have a clear lens and a control switch on the base. The light shall be mounted on the overhead HVAC cover on the right hand side.

### **CAB SPOTLIGHTS**

The cab shall include a Golight model 30214 black remote controlled spotlight. The spotlight shall be mounted on the flat surface of the cab roof as far outboard as possible on the right side. The spotlight shall feature LED lamps technology with 320,000 candela output capable of 370-degree rotation and 135-degree vertical adjustment. The spotlight shall include a hard wired remote control installed in the center dash switch panels.

### **ROOF REINFORCEMENT**

The cab roof shall include reinforcement for a light tower. The reinforcement shall consist of four (4) aluminum pads mounted to the exterior of the cab roof and additional internal cab roof structure. The entire reinforcement shall be intergal with the roof for rigidity. The light tower shall be provided and install by the body manufacturer.

### **LIGHT TOWER MODEL**

The light tower provisions shall be for a Will-Burt Nightscan model 3.0 (NS-10) light tower with four (4) 240 volt, 325 watt LED Fire Research Spectra light heads.

**LIGHT TOWER ORIENTATION**

The roof reinforcement shall be installed perpendicular to the rear wall of the cab.

**LIGHT TOWER HORIZONTAL JUSTIFICATION**

The roof reinforcement shall be justified to the center of the cab left to right.

**LIGHT TOWER LIGHT HEAD ORIENTATION**

The roof reinforcement shall be oriented in order for the light head on the light tower to be towards the front of the cab while in the stored position.

**LIGHT TOWER FORE/AFT ORIENTATION**

The roof reinforcement shall be oriented on the roof of the cab towards the rear wall of the cab.

**DO NOT MOVE APPARATUS LIGHT**

The front headliner of the cab shall include two (2) flashing red Whelen 500 Series 5mm LED lights clearly labeled "Do Not Move Apparatus". In addition to the flashing red lights, an audible alarm shall be included which shall sound while either light is activated.

Each flashing red light shall be 5.40 inches long X 1.70 inches wide X 0.90 inches high and shall be located centered left to right for greatest visibility.

One (1) light shall be interlocked for activation when a cab door is not firmly closed and the parking brake is released and one (1) light shall be interlocked for activation when an apparatus compartment door is not closed and the parking brake is released.

**MASTER WARNING SWITCH**

A master switch shall be included, as a virtual button on the Vista display and control screen which shall be labeled "E Master" for identification. The button shall feature control over all devices wired through it. Any warning device switches left in the "ON" position when the master switch is activated shall automatically power up.

**INBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right inboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel

**INBOARD FRONT WARNING LIGHTS COLOR**

## WATERTOWN FIRE DEPARTMENT

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

### **OUTBOARD FRONT WARNING LIGHTS**

The cab front fascia shall include two (2) Whelen M6 Super LED front warning lights in the left and right outboard positions. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the front fascia of the cab within a chrome bezel.

### **OUTBOARD FRONT WARNING LIGHTS COLOR**

The warning lights mounted on the cab front fascia in the outboard position shall be red.

### **FRONT WARNING SWITCH**

The front warning lights shall be controlled through a virtual control on the Vista display and control screen. This switch shall be clearly labeled for identification.

### **INTERSECTION WARNING LIGHTS**

The chassis shall include two (2) Whelen M6 series Super LED intersection warning lights, one (1) each side. The lights shall feature multiple flash patterns including steady burn.

### **INTERSECTION WARNING LIGHTS COLOR**

The intersection lights shall be red.

### **INTERSECTION WARNING LIGHTS LOCATION**

The intersection lights shall be mounted on the side of the cab on the front radius.

### **SIDE WARNING LIGHTS**

The cab sides shall include two (2) Whelen M6 Super LED warning lights, one (1) on each side. The lights shall feature multiple flash patterns including steady burn for solid colors and multiple flash patterns for split colors. The lights shall be mounted to the sides of the cab within a chrome bezel.

### **SIDE WARNING LIGHTS COLOR**

The warning lights located on the side of the cab shall be red.

### **SIDE WARNING LIGHTS LOCATION**

The warning lights on the side of the cab shall be mounted over the front wheel well forward from the center of the front axle.

### **SIDE AND INTERSECTION WARNING SWITCH**

## WATERTOWN FIRE DEPARTMENT

The side warning lights shall be controlled through a virtual button on the Vista display and control screen. This button shall be clearly labeled for identification.

### **TANK LEVEL LIGHTS**

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

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

### **TRAFFIC CONTROL**

There shall be one (1) GTT (Global Traffic Technologies) Opticom model 795H traffic control optical emitter mounted in the lightbar on the front of the cab roof. The emitter shall be activated by a lighted rocker switch on dash and shall be deactivated when the parking brake is applied.

### **INTERIOR DOOR OPEN WARNING LIGHTS**

The interior of each door shall include one (1) red Whelen 500 Series TIR6™ Super-LED® warning light located on the door panel. Each light shall activate with a flashing pattern when the door is in the open position to serve as a warning to oncoming traffic.

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

### **SIREN CONTROL HEAD**

A Whelen 295HFS2 electronic siren control head with remote amplifier shall be provided and flush mounted in the switch panel with a location specific to the customer's needs. The siren shall feature 200-watt output, hands free mode and shall be in "standby" mode awaiting instruction. The siren shall offer radio broadcast, public address, wail, yelp, or piercer tones and hands free operation which shall allow the operator to turn the siren on and off from the horn ring if a horn/siren selector switch option is also selected.

### **HORN BUTTON SELECTOR SWITCH**

A virtual button on the Vista display and control screen shall be provided to allow control of either the electric horn or the air horn from the steering wheel horn button. The electric horn shall sound by default when the selector switch is in either position to meet FMCSA requirements.

### **AIR HORN ACTIVATION**

The air horn activation shall be accomplished by the steering wheel horn button for the driver and a right hand side Linemaster model SP491-S81 foot switch for the officer. An air horn activation circuit shall be provided to the chassis harness pump panel harness connector.

### **MECHANICAL SIREN ACTIVATION**

The mechanical siren shall be actuated by two (2) Linemaster model SP491-S81 foot switches mounted in the front section of the cab for use by the driver and officer. A red momentary siren brake rocker switch shall be provided in the switch panel on the dash.

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

### **BACK-UP ALARM**

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

### **INSTRUMENTATION**

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

The instrument panel shall contain the following gauges:

One (1) electronic speedometer shall be included. The primary scale on the speedometer shall read from 0 to 100 MPH, and the secondary scale on the speedometer shall read from 0 to 160 KM/H.

One (1) electronic tachometer shall be included. The scale on the tachometer shall read from 0 to 3000 RPM.

One (1) two-movement gauge displaying primary system, and secondary system air volumes and integral LCD odometer/trip odometer shall be included on the lower portion of the LCD. The scale on the air pressure gauges shall read from 0 to 150 pounds per square inch (PSI). The air pressure scales shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate a low air pressure, as well as a message on the LCD screen. The odometer shall display up to 9,999,999.9 miles. The trip odometer shall display 9,999.9 miles. The LCD shall display Transmission Temperature in degrees Fahrenheit on the upper portion of the LCD. The LCD screen shall also be capable of displaying certain diagnostic functions.

One (1) four-movement gauge displaying engine oil pressure, coolant temperature, fuel level, voltmeter, and an indicator bar displaying Diesel Exhaust Fluid (DEF) LED bar shall be included. The scale on the engine oil pressure gauge shall read from 0 to 120 pounds per square inch (PSI). The engine oil pressure scale shall be linear to operate with an accuracy of 1 degree of the measured. A red indicator light in the gauge shall indicate a low engine oil pressure, as well as a message on the LCD screen. The scale on the coolant temperature gauge shall read from 100 to 250 degrees Fahrenheit (F). The coolant temperature scale shall be linear to operate with an accuracy of 1 degree of the measured data with a red indication

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zone on the gauge showing critical levels of air pressure. A red indicator light in the gauge shall indicate high coolant temperature, as well as a message on the LCD screen. The scale on the fuel level gauge shall read from empty to full as a percentage of fuel remaining. An amber indicator light shall indicate low fuel at 25% tank level. The scale on the voltmeter shall read from 10 to 16 volts with a red indication zone on the gauge showing critical levels of battery voltage. A red indicator light shall indicate high or low system voltage, as well as a message on the LCD screen. The scale on the DEF LED bar will consist of four (4) LEDs displaying levels in increments of 25% of useable DEF in green. Upon decreasing levels, the indicator bar will change colors to notify the driver of decreasing levels of DEF and action will be required. An amber indicator light shall indicate low levels of DEF, as well as a message on the LCD screen and an audible alarm.

The instrument panel shall include a light bar that contains the following LED indicator lights and produce the following audible alarms in applicable configurations:

### **RED LAMPS**

Stop Engine-indicates critical engine fault  
Air Filter Restricted-indicates excessive engine air intake restriction  
Park Brake-indicates parking brake is set  
Low Coolant-indicates engine coolant is required

### **AMBER LAMPS**

MIL-indicates an engine emission control system fault  
Check Engine-indicates engine fault  
Check Trans-indicates transmission fault  
High Transmission Temperature-indicates excessive transmission oil temperature  
ABS-indicates anti-lock brake system fault  
HEST-indicates a high exhaust system temperature  
Water in Fuel-indicates presence of water in fuel filter  
\*DPF-indicates a restriction of the diesel particulate filter  
\*Regen Inhibit-indicates regeneration has been postponed due to user interaction  
Range Inhibit-indicates a transmission operation is prevented and requested shift request may not occur.  
\*SRS-indicates a problem in the RollTek supplemental restraint system  
Check Message-Turn Signal On  
Check Message-Door Ajar  
Check Message-Cab Ajar  
\*Check Message-ESC Active  
\*Check Message-DPF Regen Active  
Check Message-No Engine Data  
Check Message-No Transmission Data  
Check Message-No ABS Data  
Check Message-No Data All Communication With Vehicle Systems Has Been Lost  
Check Message-Check Engine Oil Level  
Check Message-Check Washer Fluid Level  
Check Message-Check Power Steering Fluid Level  
Check Message-Low Transmission Fluid Level  
Check Message-Check Coolant Level

### **GREEN LAMPS**

Left and Right turn signal indicators

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\*ATC-indicates low wheel traction for automatic traction control equipped vehicles, also indicates mud/snow mode is active for ATC system  
High Idle-indicates engine high idle is active.  
Cruise Control-indicates cruise control is active  
OK to Pump-indicates the pump engage conditions have been met  
Pump Engaged-indicates the pump is currently in use  
Auxiliary Brake-indicates secondary braking device is active

### **BLUE LAMPS**

High Beam Indicator

### **WHITE LAMP**

Wait to Start-indicates active engine air preheat cycle

### **AUDIBLE ALARMS FROM GAUGE PACKAGE**

High Trans Temp

High or Low Voltage

Check Engine

Check Transmission

Stop Engine

Low Air Pressure

Fuel Low

Water in Fuel

\*ESC

High Coolant Temperature

Low Engine Oil Pressure

Low Coolant Level

\*Low DEF Level

Air Filter Restricted

Extended Left and Right Turn Remaining On

Cab Ajar

Door Ajar

ABS System Fault

Seatbelt Indicator

### **EXTERNAL AUDIBLE ALARM**

Air Filter

Cab Ajar

Door Ajar

Check Engine

Stop Engine

Low Air Pressure

Low Oil Pressure

Water in Fuel

\*Low DEF

ABS System Fault

Seatbelt Indicator

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

**LCD MESSAGES**

Transmission Temperature  
Battery Voltage  
Engine Hours  
Vehicle Speed  
Engine RPMs  
Fuel Level  
DEF Level  
Engine Oil Pressure  
Ammeter (If quipped)  
Auxiliary Ammeter (If quipped)  
Engine Coolant Temp  
Primary System Air Pressure  
Secondary System Air Pressure  
Turbo Boost Pressure  
Exhaust Temperature  
Engine Load  
Engine Torque  
Instant Fuel Economy  
Average Fuel Economy

**BACKLIGHTING COLOR**

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

**AUXILIARY SPEEDOMETER**

The overhead area forward of the right hand front seating position shall include an auxiliary speedometer which shall feature a digital readout.

**APPARATUS PANEL INSTRUMENTATION**

A fuel level gauge and a diesel exhaust fluid (DEF) gauge shall be shipped loose with the cab and chassis for the body builder to install. The DEF gauge shall display the diesel exhaust fluid level as a bar graph which shall provide a yellow warning indication once the level has dropped below 12.5 percent and a red warning indication once the level has dropped below to 5 percent.

**RADIO**

A Jensen radio with weather band, AM/FM stereo receiver, compact disc (CD) player, and four (4) speakers shall be installed in the cab. The radio shall include rear RCA input pigtail connector, satellite radio capability, and a covered front auxiliary mini stereo input with iPod ready USB jack. The CD player shall be compatible with CD-R, CD-RW and MP3 format discs. The radio shall be installed in the left hand overhead position. The speakers shall be installed inside the cab with two (2) speakers recessed within the headliner of the front of the cab just behind the windshield and two (2) speakers on the upper rear wall of the cab.

**AM/FM ANTENNA**

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

### CAMERA

An Audiovox Voyager heavy duty rearview camera system shall be supplied. One (1) box shaped camera shall be shipped loose for OEM installation in the body to afford a clear view of the rear of the vehicle and two (2) cameras with a teardrop shaped chrome plated housings shall be mounted on the left and right side of the cab below the windshield ahead of the front door at approximately the same level as the cab door handle. The side cameras shall afford a clear view of the area each side of the vehicle.

The cameras shall be wired to dual Weldon Vista displays which shall be located on the left and right sides of the dash. The rear camera shall activate when the transmission is placed in reverse and the side cameras shall activate with the respective side turn signal. Each camera shall also be activated by a button on the Vista displays.

### COMMUNICATION ANTENNA

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

### COMMUNICATION ANTENNA CABLE ROUTING

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

### AUXILIARY COMMUNICATION ANTENNA

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

### AUXILIARY COMMUNICATION ANTENNA CABLE ROUTING

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

### CAB EXTERIOR PROTECTION

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

**FIRE EXTINGUISHER**

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

**DOOR KEYS**

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

**DIAGNOSTIC SOFTWARE OCCUPANT PROTECTION**

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

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

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

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

**WARRANTY**

Summary of Warranty Terms:

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

The chassis manufacturer shall provide a limited parts and labor warranty to the purchaser of the custom built cab and chassis for a period of sixty (60) months, or the first 75,000 miles, whichever occurs first. The warranty period shall commence on the date the vehicle is delivered to the first end user.

**CAB AND CHASSIS LABELING LANGUAGE**

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

**CHASSIS OPERATION MANUAL**

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

**ENGINE AND TRANSMISSION OPERATION MANUALS**

The following manuals specific to the engine and transmission models ordered will be included with the chassis in the ship loose items:

- (2) Hard copies of the Engine Operation and Maintenance manual with CD
- (2) Digital copies of the Transmission Operator's manual
- (2) Digital copies of the Engine Owner's manual

**CAB/CHASSIS AS BUILT WIRING DIAGRAMS**

The cab and chassis shall include three (3) complete sets of wiring schematics and option wiring diagrams. Two (2) sets shall be a printed hard copies and one (1) set shall be a digital copy.

**DRIVELINE LAYOUT CONFIRMATION**

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

**ADDITIONAL ITEMS TO BE INSTALLED IN THE CAB:**

**CAB 120-VAC OUTLET:**

One (1) 15-amp, 120-volt G.F.C.I. electrical outlets shall be furnished and installed in the rear crew area of the cab.

The outlets shall be installed on the rear of the engine enclosure. The outlet shall be wired directly to a Kussmaul Auto Eject shoreline.

**BINDER STORAGE COMPARTMENT:**

One (1) custom fabricated compartment shall be supplied for the storage of three (3) 3-ring notebook binders. The compartment shall be located in a location determined by the Watertown Fire Department.

**STREAMLIGHT HANDLIGHTS:**

Five (5) Streamlight model Fire Vulcan Hand LED lights shall be supplied. Each Hand light shall have a 12-VDC vehicle charging rack, and shoulder strap. The handlights shall be wired to the Kussmaul battery charger "Battery Saver Circuit" and shall be mounted in the cab in a location to be determined.

**HANDSET CHARGER RACKS:**

One (1) custom fabricated aluminum 2-way portable radio charger rack shall be provided and mounted in the cab. The racks shall be designed to hold a total of six (6) radios. The portable radio charger shall be wired to the Battery Saver Circuit. The charger racks shall be mounted in locations determined by the Fire Department.

**RADIO EQUIPMENT:**

Two (2) two-way radios supplied by the Fire Department shall be installed on the apparatus. Radio equipment installation shall include all required equipment such as antennas, outside microphone boxes, etc.

**I-PAD MOUNT:**

One (1) Havis model #DS-APP-102 docking station with case shall be supplied and installed in the apparatus in front of the officer position.

**GAS METER & TIC CHARGERS:**

One (1) customer supplied gas meter charger & one (1) customer supplied TIC charge shall be installed in a location to be determined.

## WATERTOWN FIRE DEPARTMENT

### **BODY DESIGN:**

This body shall be designed to meet all N.F.P.A. 1901 2009, requirements. Consideration shall be given to access for service, repair and maintenance of the apparatus.

### **PUMP MODULE:**

A separate pump house module shall be fabricated and attached to the chassis frame rails at four (4) points. The material shall be stainless steel tubing, angles and channels. Front and rear of the enclosure shall be 1/8" bright finished stainless steel treadplate, attached to the framing material with stainless steel bolts and nuts.

Two (2) service doors shall be located on the front of pump enclosure module. The doors shall be fabricated from 1/8" stainless steel treadplate with "D-ring" latch.

The pump module shall not be attached to the cab or the body.

### **BODY SUBFRAME**

A 3/16" stainless steel formed channel shall be installed on the frame to use as a base for the body sub-frame. It shall be fastened to the frame using spring loaded bolts in the front and grade 8 steel bolts in the rear. It shall have a 1/4" rubber isolator between the frame and the channel. All framing material shall be stainless steel, 3" x 3" x 1/4" wall tubing and shall be used for the main support rails and cross members and be welded to the stainless steel channel. All material for attachment brackets, running boards and compartments shall be stainless steel.

### **BODY FABRICATION AND ASSEMBLY**

The fabrication of the pumper body shall be entirely 12-gauge type #304L stainless steel. The compartments are fabricated as separate modules and welded to the stainless steel tubing cross members.

All lower side-mounted compartments are 25.5" deep.

No "stud welding" shall be used in the assembly of any of the parts of the body.

The compartments shall be formed from one (1) piece of material with the ends being welded on. This reduces welding to a minimum. All welding performed shall be done with the "TIG" or "MIG" process.

Each compartment door opening is flanged around the entire perimeter for strength. All seams in the compartments are welded continuously.

As a result of the full depth, exterior side compartments, special enclosures shall be fabricated around the chassis spring hangers and springs in the compartments located fore and aft by of the rear wheels. Provisions shall be made for access to grease fittings and the spring hanger pins and bushings.

## WATERTOWN FIRE DEPARTMENT

### **WHEEL WELL EXTERIOR PANEL:**

The 12-gauge stainless steel exterior panel shall be integral with the compartments and should be continuously welded where it meets the compartments. The wheel well opening shall be equipped with a round radius polished stainless steel fenderette bolted in place.

The fenderette shall have beaded silicon or welting between fenders and wheel well panel. Three (3) S.C.B.A. cylinder compartments manufactured by "Signature" that hold two (2) cylinders each shall be supplied in the wheel well panels of the body. Each compartment shall include an N.F.P.A. compliant brushed stainless steel doors, hardware and cylinder retainer straps.

### **WHEEL WELL FENDER LINER:**

The inner fender above the tires shall be an integral stainless steel liner bolted in place. Prior to installation, the complete wheel well area shall be undercoated.

### **RUB RAIL CONSTRUCTION:**

The protection of the apparatus body full length along the side of the vehicle is of critical importance. The rub rail assembly shall be of polished 1" x 1" x 16 gauge stainless steel tubing. Rails are spaced out from the body with nylon washers and fastened to the body with stainless steel bolts and nuts. Rails are polished to a mirror finish. This assembly shall blend into the front and rear corners of the body, and rolled radius of the wheel well assembly.

### **HOSE BODY:**

The 12 gauge Type #304 stainless steel body side panels shall be of one piece construction from front to rear of apparatus, with a triple channel break on upper section.

Hose bed floor shall be 3" X 1" aluminum channels with proper spacing for good air ventilation. The floors shall be made in two pieces for easy removal.

Two (2) hose body dividers shall be supplied using ¼" thick 5152 aluminum plate. These dividers shall be infinitely adjustable by means of a Unistrut channel welded in the hose body floor, front and rear. Rounded corners shall be furnished at rear.

Hose bed capacity shall be 1,000 feet of 5 hose, and 600 feet of 2½" hose.

### **HOSE BED COVER:**

The hose bed shall have a red vinyl cover attached at the front with rope cords along the sides and clips with chevrons in the rear to meet the NFPA Standard. It shall be manufactured by D & S Custom covers.

### **RUNNING BOARDS:**

These shall be fabricated using 1/8" polished stainless steel diamond plate, with a double break on

## WATERTOWN FIRE DEPARTMENT

the outer edge, "down and in".

Running boards shall be furnished on each side under the pump panels. These running boards shall be approximately 50" L x 10" D.

### **STAINLESS STEEL TREADPLATE OVERLAY:**

The stainless steel treadplate shall be 1/8" polished type.

The vertical surfaces of the front compartments and rear compartments shall be covered with polished stainless steel treadplate and held in place with stainless steel screws and nuts.

The walkways over the high side compartments shall be polished stainless steel treadplate both sides. The treadplate shall be bent-up on hose body sides and down over compartments to act as a drip rail, fastened with stainless steel bolts and nuts. Where the treadplate meets the body sides, beaded silicon caulking shall be applied.

The surfaces of the compartments, each side at the rear that extend out to rear of the step, shall be covered with stainless steel treadplate.

### **STEPS:**

Nine (9) N.F.P.A. compliant, folding steps shall be furnished, six (6) on the rear panel for access to hose bed and three (3) on front face of left side compartment. The folding steps will Signature #101953-2 NFPA compliant folding step with nonslip surface, chrome finish, and integrated top and bottom LED lights.

### **HAND RAILS:**

Rails shall be 1 1/4" O.D. aluminum rails mounted in bronze chrome plated stanchion brackets. Rails are furnished as follows on the body: one (1) each side on the rear of the compartments, one (1) full width across rear panel below hose bed floor and one (1) on top of the left pump panel.

### **COMPARTMENTS:**

Type 304 stainless steel sheet 12 gauge thick shall be used for the compartments. To insure maximum strength and durability each compartment shall be formed from a single piece of material, broken top and bottom with the sides being the only welded portion of the module. All compartment seams are continuously welded. Compartments shall be bolted to the tubing frame using 2" x 2" x 1/4" stainless steel angle gussets.

The bottom of all compartments shall be reinforced with stainless steel channels.

Compartments are located as follows:

### **DRIVER'S SIDE:**

One (1) compartment ahead of the wheel approximately 32" W x 72" H. Compartment depth shall

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be 25" up to a height of 40". The remaining 32" shall be 12" deep.

One (1) compartment over the rear wheel approximately 60" W x 40" H. Compartment depth shall be 25" up to a height of 8". The remaining 32" shall be 12" deep

One (1) compartment to the rear of the wheel approximately 40"W x 72"H. Compartment depth shall be 25" up to a height of 40". The remaining 32" shall be 12" deep.

### **PASSENGER'S SIDE:**

One (1) compartment ahead of the wheel approximately 32" W x 70" H. Compartment depth shall be 25" up to a height of 40". The remaining 20" shall be 12" deep.

One (1) compartment over the rear wheel approximately 40" W x 40" H. Compartment depth shall be 25" deep up to a height of 8". The remaining 32" shall be 12" deep

One (1) compartment to the rear of the wheel approximately 40" W x 70" H. Compartment depth shall be 25" up to a height of 40". The remaining 20" shall be 12" deep.

### **COMPARTMENT AHEAD OF THE REAR STEP**

One (1) compartment ahead of the rear step approximately 45"W x 23"D x 35"H.

### **COMPARTMENT – DOORS (ROLL-UP STYLE):**

All compartments shall have roll-up style doors.

All compartment doors (except for the rear) shall be manufactured by the Amdor or ROM, and include a wet paint to match the body paint color.

Replacement parts shall be available in two (2) to three (3) working days.

The slats shall be double wall box frame extrusion. The exterior surface shall be flat, interior surface shall be concave to prevent loose equipment from jamming the door.

Slats shall be anodized to eliminate oxidation and include inner locking end shoes on every slat secured by Punch-Dimple process.

The slats shall have interlocking joints with a folding locking flange.

Between each slat shall be a PVC/Vinyl inner seal to prevent metal to metal contact.

Door tracks shall be one-piece aluminum, which shall include an attaching flange and finishing flange incorporated into its design, which facilitates installation and provides a finished look to installation without additional trim and caulking. Track shall have replaceable side seal. The slide seal prohibits water and dust intrusion into the compartments.

Drip rail shall have built in replacement wiper seal. Drip rail shall be made of aluminum.

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Roll-up doors shall have a 4" diameter counter balance to assist in lifting and eliminate risk of accidental closing.

Doors shall be secured with a full width lift bar, to be operable by one hand, even with heavy gloves. Securing methods shall be a positive latch device.

Stainless steel covers with water drains will sit below every door to protect from damage when moving equipment and to keep the contents of the compartment.

These doors shall be provided on all compartments.

### **ADDITIONAL COMPARTMENT FEATURES:**

All compartments shall have sweep out style floors.

All compartments shall have two (2) LED light strips operated by a door switch.

All compartments shall have 6" x 6" louvered vents in the rear walls and the compartment floors shall be covered with black "Turtle Tile".

Stainless steel Unistrut shelf tracks shall be installed in the all compartments, including walls floors and ceilings; six (6) per compartment.

### **COMPARTMENT SHELVES:**

Four (4) compartment adjustable shelves shall be provided where specified and shall be fabricated of 12-gauge stainless steel. The shelf shall have a 2" flange around perimeter either up or down whichever is most practical.

These shelves shall be fitted accordingly and held in place on the shelf tracks with stainless steel bolts and spring loaded with cam-lock fasteners.

### **SLIDING TRAYS:**

Four (4) sliding trays shall be provided where specified and each shall be equipped with heavy duty triple track ball bearing slides that allow the tray to slide completely out of the compartment for easy access to equipment. Trays shall have a capacity of 500 lbs. Trays shall be equipped with a "lock in" and "lock out" device.

The tray shall be a box pan fabricated from 12-gauge stainless steel with a 2" flange up or down whichever is most practical. Size of pan shall vary with placement. Innovative Industries "Slide-Master" triple track slide shall be furnished with the trays.

Locations of all shelves & trays locations shall be determined at the preconstruction conference.

### **TOOL BOARDS:**

## WATERTOWN FIRE DEPARTMENT

There shall be two (2) tool boards fabricated and installed in the two center compartments for the purpose of mounting equipment.

### **REAR SLIDE OUT STEP:**

There shall be a slide out step located in the rear of the apparatus under the rear bumper. It shall be an NFPA complaint sized step. It shall be used for the purpose of gaining access to the rear hose bed. The stepping surface shall be illuminated.

### **HARD SUCTION HOSE:**

There shall be a compartment fabricated in the hose bed to carry two (2) lengths of 10-ft. suction hose.

Two (2) 10-ft. lengths of Kocheck lightweight 6" suction hose with N.S.T. long handle, lightweight couplings shall be supplied.

### **LADDERS AND STORAGE:**

One (1) 24-foot, 2-section Duo-Safety pumper style ladder, one (1) 14-ft. Duo-Safety pumper style roof ladder and one (1) Duo-Safety 10-foot, aluminum folding ladder to be supplied. All three-(3) ladders shall be mounted on a Zico Horizontal single arm hydraulic/electric ladder rack model # HLAS- 1200. It shall be switched from the right side pump panel. All necessary safety and warning devices shall be supplied. A stainless steel compartment door will be fabricated to cover the ladder rack support arm. The door will be hinged and painted to match the body color specified.

### **PIKE POLES:**

One (1) 10-foot and two (2) 6-foot pike poles with fiberglass handles shall be furnished. The 10-foot shall be mounted on the ladder rack and the two 6-foot pike poles shall be mounted in the hose bed hard suction compartment.

### **REAR STEP, BUMPER AND TOWING DEVICE:**

The rear step support assembly, which also contains the rear-towing device, shall consist of 6" x 1" thick steel flat bars that are bolted to the chassis rails and extend down to the rear step level. 3" x 3" x 3/8" steel tubing is welded to the flat bars to form a rigid support for the "step-bumper". In addition, two (2) tow eyes are welded to this framework. The tow eyes must be capable of flat towing the apparatus.

The rear step is approximately 3" deep. This shall have stainless steel diamond plate step surface.

### **WHEEL CHOCKS:**

Two (2) Ziamatic model #SAC-44-E wheel chocks with mounts shall be supplied and installed under the left front compartment.

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### **MUD FLAPS:**

Heavy-duty mud flaps shall be provided and installed to the rear of each front wheel and to the rear of each pair of dual rear wheels. All mud flaps shall be an adequate width to protect apparatus from wheel debris. Mud flaps shall be made of heavy duty, semi-flexible vinyl to prevent "sailing".

### **MOUNTING ALLOWANCE:**

There shall be a supplied list of items to be installed on the apparatus by the fire department. There shall be a \$5,000.00 allowance in the bid for the purpose of equipment mounting.

## WATERTOWN FIRE DEPARTMENT

### **FIRE PUMP – HALE “Q-TWO”:**

The pump shall be a mid-ship mounted, two-stage pump that complies with all applicable requirements of the latest "Standard for Automotive Fire Apparatus", NFPA Pamphlet 1901, and has a rated capacity of 1,500 GPM.

The pump shall be a Class "A" type and shall deliver the percentage of rated discharge at pressure indicated:

100% of rated capacity at 150 PSI

70% of rated capacity at 200 PSI

50% of rated capacity at 250 PSI

100% of rated capacity at 165 PSI

Pump shall be free from objectionable pulsation and vibration under all normal operating conditions.

### **PUMP CONSTRUCTION:**

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

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

### **PUMP BODY:**

The pump body and parts shall be of fine grain alloy cast iron, with a minimum tensile strength of 30,000 PSI. All moving metal parts in contact with water shall be of high quality bronze or stainless steel.

The pump body shall be horizontally split, on a single plane in tow sections for easy removal of the entire impeller assembly including wear rings and bearings from beneath the apparatus without disturbing piping or mounting of the pump in the chassis.

The pump shall have two (2) double suction impellers. The pump body shall have two opposed discharge volute cutwaters to eliminate radial unbalance.

The pump shaft shall be rigidly supported by three bearings for minimum deflection. One high lead bronze sleeve bearing shall be located immediately adjacent to the impeller (on side opposite the gearbox). The sleeve bearing shall be lubricated by a force fed, automatic oil lubricated design, pressure balanced to exclude foreign material. The remaining bearings shall be heavy-duty, deep groove ball bearings in the gearbox and they shall be splash lubricated.

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There shall be a mechanical seal in place of pump packing. The mechanical seal shall be two (2) inches in diameter and shall be spring loaded, maintenance free and self-adjusting. mechanical seal construction shall be a carbon sealing ring, stainless steel coil spring, Viton rubber cup, and a tungsten carbide seat with Teflon backup seal.

### **IMPELLERS:**

The pump impellers shall be hard, fine grain bronze of mixed flow design; accurately machined and individually balanced. The vanes of the impeller intake eyes shall be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

### **IMPELLER SHAFT:**

The pump shaft shall be heat-treated, electric furnace, corrosion resistant stainless steel to be super-finished. Pump shaft must be sealed with double-lip oil seal to keep road dirt and water out of gearbox. Impeller clearance rings shall be bronze, easily renewable without replacing impeller or pump volute body, and of wraparound double labyrinth design for maximum efficiency.

### **THERMAL RELIEF VALVE:**

A Hale model #TRV-120" thermal relief valve shall be supplied to protect the pump from overheating by automatically relieving water from the pump when water temperature exceeds 120 degrees F. The relief valve shall include a pump panel mounted indicator light.

### **PUMP GEARBOX "L" STYLE:**

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

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

The gearbox drive shafts shall be of heat-treated chrome nickel steel and shall be of at least 2-3/4 inches in diameter, on both the input and output drive shafts. They shall withstand the full torque of the engine. All gears, both drive and pump, shall be of highest quality electric furnace chrome nickel steel.

Bores shall be ground to size and teeth integrated and hardened, to give an extremely accurate gear for long life, smooth, quiet running, and higher load carrying capability. An accurate cut spur design shall be provided to eliminate all possible end thrust.

The pump ratio shall be selected by the apparatus manufacturer to given maximum performance with the engine and transmission.

The gearbox power shift, shifting mechanism shall be a heat treated, hard-anodized aluminum power cylinder, with stainless steel shaft. An in cab control, for rapid shift shall be provided that locks in road or pump.

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### **PUMP SHIFT:**

Pump shift engagement shall be made by a two-position free sliding collar, air controlled from the cab. An internal locking mechanism shall be provided that insures the collar shall be maintained in ROAD or PUMP position. A spring-loaded locking collar shall be mounted over the valve lever in the cab to prevent accidental shifting. Two (2) indicator lights shall be located in the cab adjacent to the pump shift switch. One (1) light, labeled "O.K. TO PUMP" and one to indicate "PUMP ENGAGED".

### **TRANSFER VALVE:**

The pump shall be equipped with an all bronze waterway transfer valve, capable of switching from one pumping mode to the other with two and one-half turns of the transfer valve control handwheel. The transfer valve shall be equipped with a positive mechanical indicator to register the position of the transfer valve at all times.

### **PRIMER:**

A Hale model "ESP" environmentally safe oil-less priming system shall be furnished. The "ESP" is an electric priming system that does not require lubrication. Nothing but water shall be dumped on the ground. The primer is rigidly attached to the pump transmission. All rotating parts of the pump are made of either corrosion resistant anodized aluminum, stainless steel or laminated phenolic. The pump cylinder is made of aluminum alloy, hard anodized and Teflon coated for corrosion resistance and long life.

A push button control located on the pump panel shall operate the combination manual/electric-priming valve.

The pump when dry, shall be capable of taking suction and discharge water with a lift of ten (10) feet in not more than 60 seconds, through forty (40) feet of hard suction hose.

### **ANODE SYSTEM:**

Two (2) Hale zinc anodes shall be installed on the pump to aid in the prevention of galvanic corrosion within the pump and associated plumbing. The Hale Anode System provides sacrificial, replaceable zinc anodes, which help to diminish, or prevent, pump and pump shaft galvanic corrosion. Two (2) anodes shall be supplied, one on the suction side, and one (1) on the discharge side of the pump.

### **PIPING:**

All suction and discharge lines over 2" in diameter shall be heavy duty Schedule 40 stainless steel pipe. Victaulic couplings shall be used wherever chassis flexing or vibration may loosen or damage piping, or where necessary to improve maintainability.

All suction and discharge valves shall be Elkhart quarter-turn ball type and be designed to seal for vacuum/pressure. All pump lines shall drain through either the master pump drain valve or

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be equipped with individual drain valves. All drain valve controls shall be extended to the pump panel and be located on the lower portion of the side panels. All individual drain lines shall be extended, with rubber hose, to drain below the chassis frame.

### 2 ½" SUCTION

One (1) 2 ½" auxiliary suction inlet shall be supplied on the left side pump panel. Piping shall be 2 ½" with a 2 ½" valve with nylon ball, chrome plated swivel, strainer and chrome plated plug. The valve shall be located behind the pump panel with an Elkhart electric valve. It shall be controlled by an Elkhart UBEC1 electric controller on the left side pump panel.

### "MIV" MASTER INTAKE VALVE:

Two (2) Hale Master Intake Valves "MIV" shall be provided on each 6" suction inlet. The Hale MIV valve is a NFPA compliant large diameter intake valve of all bronze construction that mounts between the pump body and suction tube behind the pump compartment panel. The MIV is hydro tested at 600 PSI and allows full water flow up to rated pump capacity during draft operation.

The MIV has a built-in adjustable bronze relief valve plumbed out to a 2 ½" NST threaded adapter, an air bleed tap and a second auxiliary with electric operation permitting total remote operation of the valve from the pump operator's panel.

One (1) MIV-E, electrically operated valve shall be installed behind the left side pump panel. The MIV-E includes a 12-VDC remote control electric motor operation that uses a panel-mounted switch. The MIV-E also includes a panel mounted manual override handwheel that permits operation of the valve during abnormal conditions.

One (1) MIV-E electrically operated valve shall be installed behind the right side pump panel. The MIV-E includes a 12-VDC remote control electric motor operation that uses a panel-mounted switch. The MIV-E also includes a panel mounted manual override handwheel that permits operation of the valve during abnormal conditions.

For suction mounted valves, there are no special tools or partial disassembly of either the valve or apparatus required to make emergency operations.

### SUCTION INLETS:

Two (2) 6" suction inlets shall be provided one (1) on each side of the apparatus. The suction fittings shall include a removable die cast screen to provide cathodic protection for the pump thus reducing corrosion.

Short style suction tubes shall be used to prevent excessive overhang of valves and pump mounted accessories.

Each suction inlet shall include one (1) 6" N.S.T. x 5" Storz 30 degree elbow adapter with 5" Storz blind cap with cable.

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All Discharge Valves shall be Elkhart electric style with full flow valves.

### **DISCHARGE OUTLETS:**

One (1) 1 ½' discharge with an Elkhart 1 ½" electric full flow valve shall be supplied to the booster reel. It shall be controlled by an Elkhart UBEC2 electric controller with a digital pressure reading on the controller on the left side pump panel

Four (4) 2 ½" discharges shall be supplied, one (1) on the right side pump panel, two (2) on the left side pump panel, and one (1) 2 ½" discharge piped to the front of the hose bed.

All 2 ½" discharges shall have 2 ½" electric full-flow Elkhart valves. They shall be controlled by an Elkhart UBEC2 electric controller with a digital pressure reading on the controller on the left side pump panel Discharges shall also include 30-degree chrome elbows with caps and chains. One (1) 2 ½" discharged piped to the front of the hose bed will be equipped with an Elkhart UBEC3 electric controller with digital pressure and flow readings which will be located on the left side of the pump panel.

One (1) Elkhart, 3" electric valve shall be piped over the top of the pump with an 8-bolt flange for an Elkhart deck gun. It shall be controlled by an Elkhart UBEC2 electric controller with a digital pressure reading on the controller on the left side pump panel

One (1) Akron Brass model# 3418 Apollo 1250 GPM, electric monitor shall be supplied with panel mounted control style# 6041 and hand held wireless control style# 3600. It shall feature a stream straightener with a remote controlled automatic nozzle style #5177. It shall also have a set of stack four stack tips style# 2499 that shall be mounted on the apparatus.

One (1) Akron Brass 12" Electric Riser shall be furnished and installed. It shall be controlled from the left pump operator's panel.

One (1) Elkhart, 3.5" electric valve shall be piped to the right side pump operator's panel. This discharge shall have 3.5" piping with 3.5" N.S.T. chrome adapter with 5" Storz, 30-degree Storz elbow with cap. It shall be controlled by an Elkhart UBEC2 electric controller with a digital pressure reading controller on the left side pump panel

Two (2) crosslay hosebeds shall be furnished above the pump. Each shall have a capacity of 300 ft. of 1 ¾" double-jacketed hose. Each 1 ¾" crosslay shall be supplied with a 2" electric Elkhart valve. Each shall be controlled by an Elkhart UBEC3 electric controller with a digital pressure reading and flow meter controller on the left side pump panel. Each of these hosebeds shall be furnished with a 2" by 1 ½" mechanical swivel.

The crosslay hosebeds shall be constructed of stainless steel with turtle tile flooring

The crosslay hosebeds shall have a aluminum tread plate hinged cover and red D & S Custom Covers vinyl crosslay covers attached to the hinged cover on both ends with rope cords along the

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sides to meet NFPA.

### **DRAINS:**

#### **MASTER DRAIN:**

The pump shall be equipped with a manifold drain assembly consisting of a stainless steel plunger in a bronze body with multiple ports. The valve shall be designed so that the pump discharge pressure is used to force the plunger closed. The drain valve control shall be cable operated from the pump operator's panel and is identified as PUMP DRAIN. A master drain valve shall be supplied that shall drain the main pump. The control shall be push-pull on operator's panel. The valve shall be manufactured by Hale.

#### **LINE DRAINS:**

One (1) ¾" drain valve shall be furnished for all discharge. The valves shall be located along the bottom of the pump panels, both sides. The valves shall have ¼ turn control knobs and shall also be color-coded and numbered.

#### **PUMP COOLER:**

One (1) 3/8" pump cooler line with ¼ turn-type control on operator's panel. The line shall run from the discharge side of pump back to the booster tank to cool the pump during sustained periods of pump operation when water is not being discharged. A check valve shall be supplied.

#### **TANK SUCTION VALVE:**

One (1) Elkhart 3.5" electric valve with 4" piping shall be supplied from the front of the tank to the pump. A 3 ½" x 4" Hump Hose" is furnished in the piping to allow the tank to flex if necessary. This piping shall allow at least a flow rate of 600 G.P.M.. A check valve shall be supplied on the pump. All plumbing shall be stainless steel. It shall be controlled by an Elkhart UBEC1 electric controller on the left side pump panel

#### **TANK FILL:**

A 2" pump to tank refill line shall be supplied. The piping shall be 2" I.D. with an Elkhart 2" electric full flow valve. All plumbing shall be stainless steel. It shall be controlled by an Elkhart UBEC1 electric controller on the left side pump panel

#### **PUMP OPERATORS' CONTROL PANEL:**

Operator's panel is located on left side and shall include all valves, controls, and gauges, unless otherwise specified. Both right side and left side panels are to be removable for pump access. Polished stainless steel trim rings to be installed around all inlets, outlets and control rod openings.

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Each right and left pump panel controls and gauges shall be illuminated by LED lights mounted under a stainless steel hood. These LED light shall be controlled by the parking brake.

Both pump panels shall be black vinyl clad aluminum, with all pump controls installed for the best operation.

### **PUMP ACCESS DOOR:**

The right side pump panel shall have a pump access door approximately 16" x 22" for inspection and service of the pump and controls. The door shall be flat type vertically hinged with "D" ring latch. Perimeter of opening shall be trimmed with polished aluminum moldings.

### **PUMP AND GAUGE PANEL LABELS:**

All gauges, discharge outlets, discharge controls, and drains shall be labeled for ease of identification. Vision Mark etched labels shall be used.

The Vision Marks labels shall be color-coded, function I.D. and have a clear coat finish.

All labels shall be fastened to the body surfaces using mechanical fasteners and/or attached by adhesive materials. Lettering shall be etched on a color-coded matte surface within the bezel opening.

### **PUMP CONTROLS:**

#### **ELECTRONIC PRESSURE GOVERNOR:**

A Fire Research "INCONTROL" 400 Governor System designed to control the engine to maintain a desired pump pressure or engine speed setting shall be provided. This unit shall work with the electronically controlled engine via an electrical control signal to the engine control module.

The unit shall include an "RPM" mode, "PSI" mode, "Idle" mode, "Preset" mode, and "High Idle" mode. Switching between the modes shall be achieved by pressing and holding the mode switch, which shall change the controller between modes without loss of speed or pressure. The display shall change accordingly. The control shall be on the pump operator's panel.

The following gauges and controls shall be furnished on the gauge panel and pump panel:

|           |   |
|-----------|---|
| Three (3) | Elkhart UBEC3 Valve controllers                             |
| Six (6)   | Elkhart UBEC2 Valve controllers                             |
| Three (3) | Elkhart UBEC1 Valve controllers                             |
| One (1)   | Fire Research Corp. In-Control 400 governor                 |
| One (1)   | ¼" plugged test outlets, one for suction, one for discharge |
| One (1)   | Pump cooler control valve.                                  |
| One (1)   | Auxiliary engine cooler control valve.                      |

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|         |  |
|---------|--|
| One (1) | Foam Fill System controller                            |
| One (1) | Automatic Direct Tank Filler controller                |
| One (1) | Pump primer control push button type.                  |
| One (1) | Master drain control and hose line drains.             |
| One (1) | Fire Research "TankVision" water tank level indicator. |
| One (1) | Fire Research "TankVision" foam tank level indicator.  |
| One (1) | Momentary switch to activate the chassis air horns.    |

### **FOAM SYSTEM:**

A Hale FoamLogix model 3.3 foam system shall be supplied and installed.

The system shall include the following components.

- Operate control module
- Paddle wheel flow meter
- Pump and electric motor/motor drives
- Wiring Harnesses
- Low Level tank switch
- Foam injection check valve
- Shut-off valve on foam tank
- Stainless steel manifold with stainless steel check valve

The foam shall be supplied through the two (2) crosslays and the rear 2 ½" discharge.  
The manifold shall flow a min of 660 gpm.

### **BOOSTER TANK: UPF POLY TANK II E:**

Tank shall be constructed of Amoco-ACCTUF resin. The tank shall have a capacity of 750 U.S. Gallons complete with a lifetime warranty. The purpose of the markings and notice is to inform department personnel who store, stock, or use the tank that the unit is under warranty. Markings may be brief but should include a short statement that a warranty exists, the substance of the warranty, its duration, and who to notify if the tank is found to be defective.

### **CONSTRUCTION:**

The UPF Poly-Tank II E shall be constructed of 1/2" thick PT2E polypropylene sheet stock. This material shall be a non-corrosive stress relieved thermo-plastic, natural in color, and U.V. stabilized for maximum protection.

The booster and/or foam tank shall be of a specific configuration and is so designed to be completely independent of the body and compartments. All joints and seams shall be nitrogen welded and tested for maximum strength and integrity. The top of the booster tank is fitted with removable lifting eyes designed with a 3 to 1 safety factor to facilitate easy removability. The transverse swash partitions shall be manufactured of 3/8" PT2E polypropylene (natural in color) and extend from approximately 4" off the floor to just under the cover. The longitudinal swash

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partitions shall be constructed of 3/8" PT2E polypropylene (natural in color) and extend from the floor of the tank

through the cover to allow for positive welding and maximum integrity. 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 welded to each other as well as to the walls of the tank.

### **FILL TOWER AND COVER:**

The tank shall have a combination vent and manual fill tower. The fill tower shall be constructed of 1/2" PT2E polypropylene and shall be a minimum dimension of 8" x 8" outer perimeter. The tower shall be located in the left front corner of the tank. The tower shall have a 1/4" thick removable polypropylene screen and a PT2E polypropylene hinged-type cover. Inside the fill tower, approximately 4" down from the top, shall be fastened 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 behind the rear wheels as to maximize traction.

The tank cover shall be constructed of 1/2" thick PT2E polypropylene, natural in color, and UV stabilized, to incorporate a multi three-piece locking design, which allows for individual removal and inspection if necessary. The tank cover shall be recessed 3/8" from the top of the tank and shall be welded to both sides and longitudinal partitions for maximum integrity.

Each one of the covers shall have hold-downs consisting of 2" polypropylene dowels spaced a maximum of 30" apart. These dowels shall extend through the covers and shall assist in keeping the covers rigid under fast filling conditions. A minimum of two lifting dowels shall be drilled and tapped 1/2" x 13" to accommodate the lifting eyes.

### **SUMP:**

The sump shall be at the front of the tank and shall be large enough to accommodate two (2) 4" diameter polypropylene tanks to pump pipes that incorporate a dip tube from the front of the tank to the sump location. The sump shall have a 3" threaded outlet on the bottom for a drain plug. Anti-swivel devices are located above sump.

### **MOUNTING:**

The UPF Poly-Tank II E 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 .250 x 2" and a minimum Rockwell Hardness of 60 durometer. Additionally, the tank must be supported around the entire bottom outside perimeter and captured both front and rear as well as side to side to prevent tank from shifting during

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vehicle operation.

Although the tank is designed on a free floating suspension principal, it is required that the tank has adequate hold down restraints to minimize movement during vehicle operation. A 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 must be constructed of stainless steel angle having minimum dimensions of 3" x .250 and shall be approximately 6 to 12 inches long. These brackets must incorporate a hard rubber isolating pad with a minimum thickness of .250 inch affixed on the underside of the angle.

The angle shall then be bolted to the body sidewalls, of the vehicle, while extending down to rest on the top outside edge of the upper sidewall of the tank.

Internal mounting block design, and the hosebed floor, shall 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 to come in contact with the individual covers where a puncture could occur. Hose floor loading shall support up to 200 lbs. per sq. foot and shall be evenly distributed whenever possible. Other equipment such as generators, portable pumps, etc. shall not be mounted directly to the tank top unless provisions have been designed into the Poly-Tank for that purpose. The tank shall be completely removable without disturbing or dismantling the apparatus structure.

### **AUTO DIRECT TANK FILL SYSTEM:**

A Fire Research "Wise" Auto Fill system shall be supplied and installed. This system shall control a 2 ½" Elkhart electric valve direct tank filler mounted on the left pump panel. It shall be controlled by the Fire Research water tank gauge allowing water to automatically fill the water tank when need. It shall have a manual mode to allow the valve to be opened manually. The control shall be on the operators pump panel. Piping shall be 2 ½" with a 2 ½" chrome plated swivel, strainer and chrome plated plug.

### **FOAM TANK:**

A 40-gallon foam tank shall be furnished and shall be located inside of the water tank. A foam fill and vent shall be located on the top surface of the booster tank and shall be identified.

### **FOAM FILL SYSTEM:**

The apparatus shall be equipped with a Hale Products, Inc. EZ-Fill™ fixed-mount foam tank refill pump system. The unit shall include a 12-volt electric motor that drives a 5-gpm foam concentrate pump used to refill the foam apparatus reservoir(s), a panel mounted smart-switch operator control and a wand suction hose connection.

The EZ-Fill system shall incorporate push-button smart-switch technology and be designed so that with a momentary press of the EZ-Fill control panel "Fill" or "Flush" buttons, the unit shall automatically cycle respectively filling the foam concentrate reservoir or running itself through a flush cycle.

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The system shall be configured to handle refilling a single foam concentrate tank apparatus reservoir system.

The EZ Fill shall be equipped with a clear wand suction hose having a cam-lock fitting designed for 5-gallon pail drafting operations. The suction hose shall be equipped with integral strainer to prevent intake of unwanted debris. The cam-lock foam suction inlet connection shall be equipped with a cap for stowage. The wand shall attach to a cam-lock fitting receptacle on the pump operators panel during the refill process. Once the clear suction wand is connected via the cam-lock fitting, and the wand end is placed in a 5-gallon bucket of foam concentrate, with one push of the "Fill" button the unit shall self-prime and fill the apparatus foam concentrate reservoir. The EZ-Fill system shall then automatically shut itself off either after a 60-second run duration or when the foam concentrate reservoir is full. The EZ-Fill system shall contain a foam pump Flush" feature via a three-way integral valve mounted inside the pump-house.

The EZ-Fill pump panel smart-switch control shall be designed to override automatic re-fill operation by allowing the pump operator to hold down the "Fill" or "Flush" buttons, which allows for continuous foam pump refill or flush action. The foam concentrate reservoir(s) shall be equipped with a "high level tank switch" to prevent foam reservoir overflow during automatic operation. The EZ-Fill shall include a factory supplied wiring harness configured for power and ground leads and an installation and operation manual.

### **TANK GAUGES:**

One (1) Fire Research model #WLA200-A "Tank Vision" kit for water, including display, sensor, and 12" sensor cable shall be supplied. This shall be located on the left pump operator's panel

Three (3) Fire Research model #WLA280-A00, large remote water level gauges shall be supplied. Two shall be mounted on the cab (that are included in the chassis section), one each side and one on the rear of the apparatus.

One (1) Fire Research model #WLA260-A "Tank Vision" kit for class "A" foam, including display, sensor, and 12" sensor cable shall be supplied. This shall be located on the left pump operator's panel

### **BOOSTER REEL:**

One (1) Akron model ERWB-22-20, 12 volt electric rewind booster reel will be supplied and mounted in the rear compartment. This reel will have the capability of holding up to 200' of ¾" booster line. This reel will be plumbed into the pump with a 1 ½" valve and controlled at the left side pump panel.

There will be an electric rewind button on the right hand pump panel. The reel will be wired to the chassis electrical system.

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There will be 200' of Mercedes Textiles Boostlite 3/4" booster hose supplied with an Elkhart "Chief" 1 inch nozzle with pistol grip handle and shut-off.

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### **ELECTRICAL:**

All the electrical equipment installed in the body shall conform to the National Electrical Code. Wiring installed by the manufacturer shall be run in heat resistant plastic convoluted loom split along its entire length and shall be protected by automatic reset circuit breakers.

All wiring shall be number and/or color-coded. Grommets shall be used wherever wires or loom pass through holes in metal.

All necessary clearance, marker and back-up lights along with a lighted license plate bracket shall be furnished and shall meet Federal Standards. Rear cluster marker lights shall be recess mounted in the rear step flange for protection.

All electrical and electronic components shall be selected to minimize electrical loads, thereby not exceeding the vehicle's generating system capacity. The electrical system components and wiring shall be readily accessible through panels for checking and maintenance. All electrical shall be monitored by the Multiplex system.

### **12 VOLT LIGHTING:**

### **EXTERIOR LIGHTS:**

Clearance, marker and license plate lights, shall be L.E.D. type red marker/clearance lights, along with reflectors shall be mounted along the length of the body and at the rear of the body and shall be wired in accordance with federal regulations. A rear license plate bracket with LED light shall be furnished.

A rear LED marker light shall be furnished at each side, outermost practical mounting location at the top of the body.

A secondary turn signal/clearance light, Whelen model #50A00XAR amber LED, shall be provided below each side of the body, in the area forward of the rear axle.

The following lights shall be mounted in a #M6FCV4 four light housing, mounted on each side on the rear of the compartments.

1. Two (2) Whelen model #M6BTT, M6 series, LED rectangular, red stop/tail lights.
2. Two (2) Whelen model #M6T, M6 series, LED, left & right rectangular amber directional signal lights.
3. Two (2) Whelen model #M6BUW, M6 series, LED rectangular, automatically operated clear back-up lights.

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Three (3) LED type hose loading lights, mounted on stanchion brackets shall be supplied and installed. These lights shall be one spot and one flood. Two (2) lights shall be mounted on the rear of the hose bed and one (1) flood light shall be mounted on the front of the hose bed. All these lights shall be controlled from the cab.

Pump panel lighting as previously mentioned shall be supplied and installed as specified in the PUMP OPERATOR'S CONTROL PANEL section.

Six (6) Tecniq LED ground lights, two (2) each side under the pump panel step and two (2) in the rear shall be mounted on angle brackets and controlled by switch in cab shall be supplied and installed.

Four (4) Whelen model #PCPSM1C, Pioneer surface mount 12-volt clear LED scene lights shall be furnished and installed, one on each side of the body and two in the rear. They shall be controlled from the cab.

LED step lights with rubber grommets shall be provided and located to properly illuminate all body steps, walkway areas and hose bed where required.

### WARNING LIGHT SYSTEM:

Listed below is a Whelen Engineering flashing LED lighting system that shall be provided which consist of the following:

Zone "A" Upper, (cab roof): One (1) Whelen model #FN72QLED Edge "Ultra" lightbar, length 72", with two (2) front corner red LED's, four (4) front LED's (2 Red & 2 White) and two (2) end red LED's.. The lightbar shall include one (1) Opticom unit mounted in the center.

Zone "B" Upper & Zone "D" Upper, (left & right, front & rear corners): Both upper front zones shall be covered by the side modules of the lightbar and the right and left rear by the rear LED beacons.

Zone "C" Upper, (upper rear body): Two (2) Whelen model #B6MMRAP dual level super LED beacons color red with a rear facing linear amber super LED light. The rear amber lights shall activate when the parking brake is applied and when the warning lights are activated.

Zone A Lower, (front of cab): See Cab section for description.

Zone B Lower, (right lower side of apparatus): Two (2) Whelen model #M6R LED warning lights shall be supplied. One (1) shall be mounted in the front side on the cab radius and One (1) shall be mounted on the cab side. Two (2) Whelen model #M2R, surface mounted LED flashers, color red. Lightheads shall be mounted as follows: one (1) in the middle of the apparatus and one (1) on the side of the body at the rear of the apparatus in the rub rail area. Each light head shall be mounted in a chrome bezel with a gasket.

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Zone C Lower, (lower rear body): Two (2) Whelen model #M6R series surface mounted LED flashers, color red. Each light head shall be mounted in the quad housing in the lower position.

Zone B Lower, (right lower side of apparatus): Two (2) Whelen model #M6R LED warning lights shall be supplied. One (1) shall be mounted in the front side on the cab radius and One (1) shall be mounted on the cab side. Two (2) Whelen model #M2R, surface mounted LED flashers, color red. Lighthoods shall be mounted as follows: one (1) in the middle of the apparatus and one (1) on the side of the body at the rear of the apparatus in the rub rail area. Each light head shall be mounted in a chrome bezel with a gasket.

One (1) Whelen model #TAL85 amber LED "Traffic Advisor" mounted on the rear body panel with control head located on the front dash panel.

### **WARNING LIGHT CERTIFICATION:**

The warning light systems specified shall have a total amperage draw of 45 AMPS with all lights activated in either the "Clearing Right of Way" or the "Blocking Right of Way" mode.

This warning light system shall be certified by the light system manufacturer, to meet all of the requirements as noted in chapter 13 of the 2009 edition of the NFPA 1901 fire Apparatus Standard.

## WATERTOWN FIRE DEPARTMENT

### **GENERATOR:**

A Harrison hydraulic driven A/C electric generator system with updraft fan shall be installed, model 10 MCR-16R, 120/240, 10,000 watt capacity. This unit shall be powered by a P.T.O. from the transmission. The PTO control shall be on the cab dash with all the necessary lights to alert the operator that the generator is running. The generator shall be supported and mounted on top of the tank next to the fill tower.

A circuit breaker panel shall be installed in the left front equipment compartment and shall contain a breaker panel that is capable of holding ten (10) breakers with a main breaker. All circuits shall be identified on the inside cover of the box.

A Fire Research FROG meter shall be supplied and connected to the generator and mounted adjacent to the circuit breaker panel.

Generator shall have full rated power from idle to maximum engine R.P.M.

One (1) generator engage/disengage control shall be through the Vista multiplex and shall indicate when the generator is engaged.

### **ELECTRIC CABLE REEL (120 VOLTS):**

The apparatus shall be equipped with an electrical cable reel, connected directly to the generator system. It shall be mounted behind the right side pump panel area.

One (1) Akron electric rewind cable reel shall be provided, equipped with fully enclosed 30 amp three conductor collector rings. Rollers and guides shall be supplied on the reel for easy rewind of the cable.

The reel shall be equipped with 200 feet of 10/3 Type SO yellow electrical cable and a Akron model # EJB Junction Box with one (1) 20 amp GFI duplex outlet, one (1) 20 amp duplex outlet and two (2) 20 amp twist-lock outlets. The junction Box shall have rubber feet and be powder coated yellow and mounted in the right front compartment.

The reel shall be wired directly to the chassis battery system with heavy duty stranded copper cable, with guarded finger type rewind button at the electrical reel frame.

The wiring from the generator system shall be through electrical weatherproof loom, with stranded copper wiring. The wiring shall terminate in a sealed conduit box at the reel with mechanical type connectors for quick removal of wiring.

## WATERTOWN FIRE DEPARTMENT

### **LIGHT TOWER**

A Will-Burt "Nightscan" model 3.0 Powerlite P/N NS3.0-1400 SPC-MAX, 1,300 watt light tower with four FRC Spectra 240 volt LED light heads shall be supplied and installed on the roof of the cab. Each light head produces 20,000 Lumens. It shall be wired to the generator circuit breaker panel. It shall have an NFPA umbilical cord remote control that shall be mounted next to the circuit breaker panel. It shall have an aluminum shield fabricated and installed around the light tower to protect it. The cover shall be painted white to match the cab of the apparatus.

## WATERTOWN FIRE DEPARTMENT

### **PAINT, PREPARATION AND FINISH:**

The PPG Delta, low VOC polyurethane finishing system shall be utilized.

All exposed welds shall be ground smooth for final finishing of areas to be painted. After final bodywork is completed, grinding (36 and 80 grit), and finish sanding shall be used in preparation for priming.

Priming shall be a two-stage process. First stage shall be coating with a two-part component, self-etching, corrosion resistant primer to chemically bond the surface of the metal for increased adhesion. Second stage shall be multiple coats of a catalyzed two-component polyurethane, primer surfacer, applied for leveling of small imperfections and topcoat sealing.

Three (3) color coats of PPG Delta low VOC polyurethane shall be applied with two (2) to three (3) coats of clear polyurethane over the color coats. The clear coats are sanded and buffed to a mirror finish.

All removable items such as brackets, etc. shall be painted separately to insure finish paint behind mounted items.

The inside and underside areas of the complete body assembly shall be painted black with a polyurethane base paint prior to the installation of the body on the chassis.

All compartment un-welded seams exposed to high moisture environments shall be sealed using permanent pliable caulking. One (1) pint of each exterior color of paint for touch-up purposes shall be supplied to the Watertown Fire Department.

The interior of the fire body compartments shall have a "swirled" stainless steel finish.

The inside of the hose body panels and hose bed partitions shall have a "DA" brushed finish.

The fire body and cab shall be painted to match the Fire Department's existing apparatus, PPG paint #DUHS-72704K. The cab shall have a white top PPG paint #DUHS-2185

### **PAINT FINISH WARRANTY:**

The finish paint on the unit shall be provided with a seven (7) year paint finish guarantee, which shall cover the finish for the following items:

1. Peeling or delamination of the topcoat and/or other layers of paint.
2. Cracking or checking
3. Loss of gloss caused by defective PPG Fleet Finishes, which are covered by this guarantee.

A copy of this warranty is included with the proposal.

## WATERTOWN FIRE DEPARTMENT

### **RUST PROOFING:**

Rust proofing shall be applied during the assembly process. The only area to be rust proofed is the entire underside of cab. All other areas are to be painted.

### **LETTERING:**

All gold leaf lettering and striping, and fire department seal, shall be 23-Karat computer generated gold leaf. Lettering and striping shall be of a design that matches existing Watertown Fire Department apparatus. All lettering shall be 23-Karat with shading.

### **SCOTCHLITE STRIPE:**

A ¼" wide white reflective stripe equally spaced above and below a 3 ½" stripe shall be provided around the perimeter of the apparatus. The stripe shall be applied on a minimum of 50% of each side of the unit, and 25% on the front of the unit.

### **REAR CHEVRONS:**

Retro reflective chevrons shall be applied to the rear of the apparatus covering at least 50 % of the rear facing vertical surface. Each stripe shall be a single color alternating between red and yellow. Each stripe shall be 6 inches in width. Each stripe shall slope downward at a 45 degree angle away from the center line of the apparatus.

### **CAB PAINT BREAK TRIM:**

A chrome style trim shall be applied to the paint break between the white and red on the chassis.

IT IS A REQUIREMENT OF  
THIS BID THAT EACH  
PROPOSAL SUBMITTED  
MUST HAVE A DUPLICATE  
COPY ATTACHED.

YOUR COOPERATION IS  
APPRECIATED

TOWN OF WATERTOWN  
WATERTOWN, CONNECTICUT 06795

BID PROPOSAL

Watertown Fire Department  
Fire Apparatus – Custom Class A Pumper

BID OPENING: 11:00 a.m., Tuesday, September 29, 2015

TO: *Jason Warner, Purchasing Agent*  
*Town of Watertown*  
*Town Hall Annex*  
*424 Main Street*  
*Watertown, CT 06795*

The undersigned, as bidder, agrees to furnish and deliver the truck as specified herein and declares that no person or persons, other than those named herein, are interested in this Proposal; that this Proposal is made without collusion with any person, firm, or corporation; that he has carefully examined the location of the proposed work; that no person or persons acting in any official capacity for the Town is directly or indirectly interested therein or in any portion of the profit thereof; and that he proposes and agrees, if this Proposal is accepted, to execute the Form of Contract with the Town; to provide all necessary equipment, tools, labor and deliver and to do all work and furnish all materials in the manner and time therein prescribed and according to the requirements of the Town as therein set forth, and that he will take in full payment therefor, the following unit prices and lump sums, to wit:

FIRM \_\_\_\_\_  
Name

Street \_\_\_\_\_

City State Zip Code

NAME \_\_\_\_\_  
Please Print

TELEPHONE NUMBER \_\_\_\_\_

FAX NUMBER \_\_\_\_\_

EMAIL ADDRESS \_\_\_\_\_

SIGNED \_\_\_\_\_ DATE \_\_\_\_\_

**PROPOSAL**

Cab & Chassis Manufacturer: \_\_\_\_\_

Model: \_\_\_\_\_

Year: \_\_\_\_\_

Engine: \_\_\_\_\_

Transmission: \_\_\_\_\_

Warranty: \_\_\_\_\_

Body Manufacturer: \_\_\_\_\_

Model: \_\_\_\_\_

Warranty: \_\_\_\_\_

Pump & Tank: \_\_\_\_\_

Warranty: \_\_\_\_\_

Electrical: \_\_\_\_\_

Warranty: \_\_\_\_\_

Generator & Lighting: \_\_\_\_\_

Warranty: \_\_\_\_\_

Paint & Lettering: \_\_\_\_\_

Warranty: \_\_\_\_\_

Cost Complete (without trade): \$ \_\_\_\_\_

**Suggested Options:**

1. ....\$ \_\_\_\_\_
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Delivery Date to Town: \_\_\_\_\_



**RECEIPT OF ADDENDA**

**ADDENDUM #**

**SIGNATURE**

**DATE**

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| 1. | _____ | __/__/__ |
| 2. | _____ | __/__/__ |
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| 4. | _____ | __/__/__ |

NAME OF BIDDER: \_\_\_\_\_

OFFICIAL ADDRESS: \_\_\_\_\_

PHONE NUMBER: \_\_\_\_\_

BY: \_\_\_\_\_ TITLE: \_\_\_\_\_  
(Please Print)

DATE: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

**PROPOSED SUBCONTRACTORS**

FIRM \_\_\_\_\_  
Name  
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Street  
\_\_\_\_\_  
City State Zip Code

CONTACT \_\_\_\_\_ TELEPHONE \_\_\_\_\_  
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TYPE OF WORK TO BE PERFORMED \_\_\_\_\_

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**REFERENCES**

**Please list a minimum of three references of similar work performed within the last three years.**

FIRM \_\_\_\_\_  
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