

City of Biddeford
Finance Committee

July 20, 2021 5:00 PM Council Chambers & Via Zoom

Please click the link below to join the webinar:

<https://biddeford.zoom.us/j/91418104247?pwd=REtZRULucm5uY1Ezb2RpZ2RnQ011UT09>

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Dial(for higher quality, dial a number based on your current location):

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669 900 9128 or +1 253 215 8782**

Webinar ID: 914 1810 4247

International numbers available: <https://biddeford.zoom.us/u/agigxJRjE>

- 1. Call to order**
- 2. Approval of the Minutes**
 - 2.1. July 6, 2021 Finance Committee Meeting Minutes
[7-06-2021 Finance Committee Minutes.pdf](#)
- 3. Signing of the expenditure warrant**
- 4. Discussion/Approval**
 - 4.1. Approval/Replacement of Video Recorder - Addition of Cameras at Public Works Department/Minuteman Security Technologies
[7-20-2021 Video Equipment-DPW-MEMO.pdf.pdf](#)
[7-20-2021 Video Equipment-DPW - Sole Source Review.pdf](#)
[7-20-2021 Video Equipment- DPW-QUOTE.pdf](#)
 - 4.2. Approval/Domain Migration of Police and Fire Departments Domain to Biddeford Domain/Systems Engineering
[7-20-2021 Domain Migration- MEMO.pdf](#)
[7-20-2021 Domain Migration - Sole Source Review.pdf](#)
[7-20-2021 Domain Migration Proposal-Systems Engineering.pdf](#)
 - 4.3. Recommendation/Carry Forward Funds from FY21 to FY22
[7-20-2021 Carry Forward Reserves-FY21 to FY22-MEMO.pdf](#)
[7-20-2021 Carry Forward Reserves-FY21 to FY22-ORDER.docx](#)
 - 4.4. Recommendation/Lease-Purchase of Fire Pumper/Engine Truck/Dingee Machine Company, an Authorized Representative for Sutphen Corporation
[7-20-2021 Fire Pumper Lease-Purchase-MEMO.docx](#)
[7-20-2021 Fire Pumper Apparatus-BID.pdf](#)
[7-20-2021 Fire Pumper Specifications.docx](#)
- 5. Other Business**
- 6. Adjournment**

City of Biddeford
Finance Committee Meeting Minutes
July 6, 2021
(Due to COVID-19, the meeting was held virtually via ZOOM).

The meeting was called to order at 5:00 p.m. by the Chair, Councilor John McCurry.

Present: Chair, Council President, John McCurry; Mayor Alan Casavant; Councilor Stephen St. Cyr; Councilor Mike Ready; City Clerk, Carmen Morris; and Chief Operating Officer, Brian Phinney.

Adjustment to the Agenda

No adjustment to the agenda.

Approval of Minutes of June 15, 2021

Motion by Councilor Ready to accept the minutes as printed, seconded by Councilor St. Cyr.

Vote: unanimous.

Motion carries.

Discussion/Approval

Recommendation/Purchase of (2) Ford Interceptor Police Cruisers/Rowe Ford of Westbrook, Maine

Motion by Councilor Ready to recommend the purchase of (2) Ford Interceptor Police Cruisers from Rowe Ford of Westbrook, Maine, seconded by Councilor St. Cyr.

The Committee asked if these cruisers can be purchased using ARP (American Rescue Plan) funds. Brian Phinney, COO, will look into the eligibility of using the ARP funds to purchase the cruisers.

Vote: unanimous.

Motion carries.

Recommendation/Contract with Thyng Paving/Sidewalk Paving Projects on Simard Avenue, Wilson Street, Bacon Street and Piersons Lane

Motion by Councilor Ready to recommend awarding the paving contract to Thyng Paving for Sidewalk Paving Projects on Simard Avenue, Wilson Street, Bacon Street and Piersons Lane, seconded by Councilor St. Cyr.

Public Works Director, Jeff Demers, presented the item.

Vote: unanimous.

Motion carries.

Approval/Replacement of HVAC Unit at Fire Central Station

Motion by Councilor Ready to award the bid to Jim Godbout Plumbing & Heating for one unit at \$15,000.00, seconded by Mayor Casavant.

Fire Chief, Scott Gagne, presented this item. He explained the units are about 12 years old and the one unit will be fine for now. He will budget for the other unit in the next budget cycle. The unit stopped working on July 1.

Councilor St. Cyr asked where the money was coming from for the project since it is not a budgeted item. Brian Phinney will talk to the City Manager to see if he already has a plan on how to pay for this.

Vote: unanimous.

Motion carries.

Other Business

Councilor St. Cyr noted one of his frustrations is with funds where the revenue falls short of the budgeted expenditures. He wonders if appointing someone to look into that now might be prudent to figure out what funds are needed to bring these funds to being self-sufficient.

Councilor McCurry asked about shredding being done at Household Hazardous Waste Day, or even on a separate day.

Councilor Ready noted that shredding was typically offered on Earth Day at DPW.

Public Works Director, Jeff Demers, suggested coordinating with Drug Take-Back Day. He will speak with the Police Chief and contact a couple of companies to get pricing.

Motion to adjourn made by Councilor Ready, seconded by Councilor St. Cyr.

Vote: unanimous.

Motion carries.

Adjourned at 5:17 p.m.



Finance Committee

Meeting Date: July 20th 2021

Meeting Time: 5:00 PM

Agenda Item No: 4.1

Item Description: Camera Recorder and additional cameras

Submitted by: Jerry Gerlach, IT Director

Supporting Information/Documentation:

Vendor quote

Key Terms:

N/A

Executive Summary:

Replace video recorder at Public Works, and add 3 additional cameras

Detailed Review:

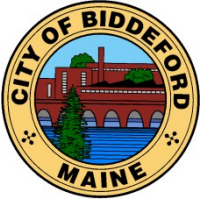
This will replace a 6 year old Video recorder and add 3 additional cameras to better cover the property. This project was slated for FY21 however was delayed due to COVID as part of the financial review process to ensure adequate cash flow for the fiscal year.

Funding Source:

\$19,974.27. This will be funded through CIP. Quote is below budgeted CIP value.

Staff Recommendation:

Staff recommends the Minuteman Security quote.



CITY OF BIDDEFORD

IT Department

Jerry Gerlach

205 Main St.

Biddeford,

ME 04005

Jerry.gerlach@biddefordmaine.org

207-286-0594

To: Jim Bennett
Brian Phinney

From: Jerry Gerlach

Date: July 7, 2021

Subject: Soul Source Justification

Mgt Review
Confirmed as per
Sec. 2-340
07/09/21
Brian S. Phinney

In accordance with Section 2-340. Sole Source Procurement, staff requests sole source approval for the Domain Migration. This project will replace the video server at public works and add additional cameras.

The following are the reasons for a sole source request:

- Our camera system uses Exacq Vision servers. All of our cameras, and door locks have been installed and maintained by Minuteman Security.
- - For compatibility reasons we must continue with Exacq servers.
 - Allowing multiple vendors on our network brings security risks that can be easily avoided.
 - MinuteMan Security is located in Saco. This offers us quick access to support, and service.
 - Our IT staff has supported this system for years and is very familiar with its upkeep, changes, and support. This eliminates the need for additional training.
 - Minuteman Security has a proven track record of quality service, equipment, and support.

Please let me know if there are any question.

Jerry

**Quote**No.: **12313**Date: **9/23/2019**

Prepared for:
Carl Marcotte
Biddeford Public Works
371 Hill Street
Biddeford, ME 04005

Prepared by: Samuel Green
Account No.: 692

Job: Existing

Quote Description Camera System

Quantity	Item ID	Manufacturer	Description
1	IP04-36T-R4A		IP 4U recorder w/ 4 lic.exacqVision Pro Client, server Win10 unit 36TB storage
2	0801-001	Axis	Q3708-PVE 180 Degree 15MP WR Camera
2	5506-951	Axis	T91G61 Wall Mount
1	XNO-8080R		Wisenet 5 network IR outdoor bullet camera, 5MP @30fps, motorized vari-focal lens 2.4x (3.7~9.4mm), 120dB WDR, IR 164'
	CAT6	MST	CAT6 Plenum Cable
1.00	MISC-ME	MST	Miscellaneous Materials
	Maine Install Labor		Maine Install Labor

Your Price: **\$19,974.27**

Total: **\$19,974.27**

Prices are firm until 11/30/2019 Terms: Net 30

Prepared by: Samuel Green, sgreen@minutemanst.com

Date: 9/23/2019

Scope Of Work

MST will install (3) total cameras:
(1) outdoor bullet - side bus entrance
(2) outdoor 180s
- main entrance front of building
- back of building where the buses park

DEDUCT APPROXIMATELY \$3,000 IF WE DONT INSTALL THE 180 CAMERA IN THE BACK FACING THE BUSES*****

[SUMMARY COMMENTS]**Exclusions & Assumptions**

Minuteman assumes the following will be provided and/or installed by others:
110VAC as needed.

Minuteman Security Technologies
190 Riverside Street
Portland, ME 04103

Quote

No.: **12313**

Date: **9/23/2019**

POE/POE+ network switches and patch panels
Conduit, conduit installation and back-boxes as needed
Coring

Building penetrations

Rack space will be made available as needed

CAT6 cable and cable installation

Painting and patching as needed.

Minuteman assumes the existing video recording platform (NVR) can accommodate the additional IP cameras.

Minuteman assumes the existing (XXXX) access control system is licensed to accommodate the additional card reader packages.

Minuteman assumes all work will be completed during normal business hours of Monday - Friday 7:00AM - 5:00PM.

Customer Supplied Internet Connection:

A high-speed internet connection with a static IP address must be provided by the customer at the head-end location for remote access.

Customer Supplied LAN Connection:

A network connection must be provided at each specified location. An IP address may also be required. Details will be provided.

Existing Devices

This proposal assumes that any & all existing conduit, wire, devices & hardware to be used are in satisfactory condition and meet minimum requirements. Replacement, repairs and or changes to equipment will require change order authorization by both the customer & Minuteman Security Technologies, Inc.

Fire System Relay:

Connection to the building fire panel by others.

Freight:

Standard shipping charges, if applicable, will be included in the final invoice.

Infectious Disease Control Measures

This project contains measures for Infectious Disease Control.

Note:

The placement of security devices in the elevator cars requires co-operation with the building's elevator company. The cost of all elevator company interface wiring is the responsibility of the customer.

Payment Terms: [Net30]

Progress Payments Per AIA Form Will Be Submitted

Final Payment due upon completion of project

Accepted by: _____ **Date:** _____

Disclaimer

OPERATION: Customer shall be responsible for: (i) properly testing and setting the system on every closing and to properly turn off the system on each opening (if applicable); (ii) testing any detection device, or other electronic equipment designated in the Proposal prior to setting the System for closed periods; (iii) notifying Minuteman promptly if such equipment fails to respond to the test; and (iv) using and operating the System and the equipment properly and in accordance with proper operating procedures (if customer requires Minuteman Security Technologies). Whenever Minuteman employees or authorized representatives are sent to the Covered Premises in response to a service call or alarm signal caused by the Customer improperly following operating instructions or failing to close or properly secure a protected point, Customer agrees to pay an additional service charge at Minuteman's prevailing rate per occurrence.

DELAYS - INTERRUPTION OF SERVICE: Minuteman shall not be liable for any delays, however caused, or for interruptions of service caused by strikes, riots, floods, acts of God, loss of communication and or other signal transmission lines, or by any event beyond the control of Minuteman. Minuteman will not be required to furnish service to Customer while such interruption shall continue.

EXCLUSIONS: Services to be provided by Minuteman pursuant to this Agreement do not include:

- a) Repair of damage or increase in service time caused by failure to continually provide a suitable operating environment for the System as prescribed by Minuteman and/or the manufacturer of any equipment used in the System, including, but not limited to, the failure to provide, or the failure of, adequate and regulated electrical power, air conditioning or humidity control; or such special requirements as contained in the Proposal hereto.
- b) Repair of damage or increase in service time caused by use of the equipment for other than the ordinary use for which the equipment was designed or purpose for which it was intended.
- c) Repair of damage, replacement parts (due to other than normal wear) or repetitive service calls caused by the use of unauthorized supplies or equipment.
- d) Repair of damage or increase in service time caused by: accident, disaster, which shall include, but not be limited to, fire, flood, water, wind and lightning; transportation, neglect or misuse, alterations, which shall include, but not be limited to, any deviation from Minuteman's physical, mechanical or electrical machine design; attachments, which are defined as the mechanical, electrical or electronic interconnecting to non-Minuteman equipment and devices not supplied by Minuteman.
- e) Electrical work external to the equipment or accessories furnished by Minuteman.

ADDITIONAL CHARGES: Unless otherwise specified in the Proposal, service charges for the system are based upon coverage during "normal business hours of operation." Service performed outside this window, or as a result of the failure of the Customer to adhere to the requirements as specified by either the manufacturer or outside the scope of the Agreement, shall be chargeable at Minuteman's prevailing rates. Customer shall not tamper with, adjust, alter, move, remove, or otherwise interfere with equipment without Minuteman's specific permission, nor permit the same by other contractors. Any work performed by Minuteman to correct Customer's breach of the foregoing obligation shall be corrected and paid for by Customer at Minuteman's prevailing rates. Remedial maintenance due to Acts of God or events beyond the control of Minuteman shall be corrected by Minuteman and paid for by Customer in accordance with Minuteman's prevailing rates.

Minuteman shall have the right to increase or decrease the periodic service charge provided above at any time or times after the expiration of one year from the date service is operative under this Agreement, upon giving Customer written notice thirty (30) days in advance of the effective date of such increase or decrease.

LIQUIDATED DAMAGES -MINUTEMAN'S LIMITS OF LIABILITY: Customer understands that Minuteman is not an insurer; that Customer is responsible for obtaining insurance for such reasons or purposes, including theft and vandalism, and in such amounts, as Customer shall determine. Customer further understands and agrees that the sums payable hereunder to Minuteman are based upon the value of services offered and equipment value provided and such sums are not related to the value of property belonging to Customer or to others located on the Covered Premises. Customer does not and shall not seek indemnity under this Agreement from Minuteman, and specifically waives any rights for indemnity for any damages or losses caused by hazards to customers, invitees, guests, or property of customer or third parties. Customer understands and agrees that the System and the services to be supplied hereunder are designed to detect security breaches, and that MINUTEMAN MAKES NO WARRANTY, EXPRESS OR IMPLIED, THAT THE SYSTEM OR THE SERVICES IT FURNISHES WILL AVERT OR PREVENT OCCURRENCES, OR THE CONSEQUENCES THEREFROM. Customer agrees that Minuteman shall not be liable to Customer, its employees, agents or guests, or to any third party, for any losses or damages, irrespective of origin, to person or property, whether directly or indirectly caused by performance or non-performance of obligations imposed upon Minuteman under this Agreement or by negligent acts or omissions of Minuteman, its agents or employees. In all events, it is further agreed that if Minuteman should become liable for any losses or damages for any reason having to do with this Agreement, Minuteman's total liability to Customer shall be limited \$250., which sum the Customer agrees is reasonable. The payment of this amount shall be Minuteman's sole and exclusive liability regardless of the amount of loss or damage incurred by the Customer.

Indemnification:

Each party shall indemnify and hold harmless the other, their trustees, officers, professional staff, employees and agents from and against any loss, damage, claim or liability, including reasonable attorneys' fees (collectively "liabilities"), arising out of the performance of this Agreement to the extent that such liabilities arise from the acts or omissions, negligence, gross or reckless misconduct, or intentional wrongdoing of the indemnifying party, its trustees, officers, professional staff, employees or agents.

Minuteman Security Technologies, Inc Full One Year Limited Warranty:

What is Covered:

This warranty covers any defects in materials or workmanship, including installation, with the exceptions stated below.

Quote
No.: 12313
Date: 9/23/2019

How Long Coverage Lasts:

This warranty runs for one year from the date your system was installed and accepted.

What is not covered:

This warranty does not cover intentional or un-intentional misuse or of any of the system components or software. The warranty does not cover damage as a result of acts of god (lighting, floods, storms, etc...) or electric surge.

What Minuteman Will Do:

Minuteman will repair any part of the system that is proved to be defective in materials or workmanship. In the event repair is not possible on certain system components, Minuteman will replace said component with similar specification and price.

How To Get Service:

Contact our service department at your nearest service center. A service representative will review your system and take any necessary action to correct problems covered by this warranty.

How State Law Applies:

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



Finance Committee

Meeting Date: July 20th 2021

Meeting Time: 5:00 PM

Agenda Item No: 4.2

Item Description: Domain Migration

Submitted by: Jerry Gerlach, IT Director

Supporting Information/Documentation:

Vendor quote

Key Terms:

"N/A"

Executive Summary:

Migrate Police and Fire Dept. user to the Biddeford Domain. Once complete, decommission and remove three servers now supporting the BiddefordPD domain.

Detailed Review:

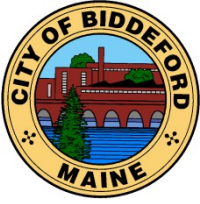
We will be migrating all Police and Fire users to the Biddeford domain where all other network users reside. This will allow us to disband the BiddefordPD domain, and retire three servers. This is the final step in migrating all city services to one unified network. This project was slated for FY21 however was delayed due to COVID as part of the financial review process to ensure adequate cash flow for the fiscal year.

Funding Source:

The budgeted amount for this CIP item is \$10,000. The proposal is for \$28,100.00. The funding will be FY21 CIP (delayed for COVID) \$10,000, FY20 IT Carry-over in the amount of \$12,500, and the balance of \$5,600 from under budget Police Phone System Upgrade project. As with most IT projects we will attempt to reduce this by doing some of the work as time and skills allow.

Staff Recommendation:

Staff recommends the Systems Engineering quote. They are our solutions provider and support us through a critical care contract that the target migration servers are covered by.



CITY OF BIDDEFORD

IT Department

Jerry Gerlach

205 Main St.

Biddeford,

ME 04005

Jerry.gerlach@biddefordmaine.org

207-286-0594

To: Jim Bennett
Brian Phinney

From: Jerry Gerlach

Date: July 7, 2021

Subject: Soul Source Justification

Mgt Review
Confirmed as per
Sec. 2-340
07/09/21
Brian S. Phinney

In accordance with Section 2-340. Sole Source Procurement, staff requests sole source approval for the Domain Migration. This project will migrate all Police, and Fire Department users to the Biddeford.local domain where all other users reside. This will allow us to demote and retire three servers. It also allows for better support, as our IT staff will have one domain to manage.

The following are the reasons for a sole source request:

- Systems Engineering has performed the migration for previous servers. With the scope and complexity of this project it is best to stay with the same company that provides support for our network. Security is a big concern when allowing vendors access to our network. Systems Engineering has supported our system for 15 + years. Due to their vast understanding of our systems they are able to provide secure and prompt attention without the need to "learn" a new system. If there is a technical issue down the road we do not have multiple vendors that could potentially work against each other to correct the issue.
 - IT routinely checks and compares quotes with other vendors to make sure we are getting a fair and competitive quote.
 - Allowing multiple vendors on our network brings security risks that can be easily avoided.
 - Systems Engineering has a proven track record with the City of providing outstanding service and support and has worked on the previous migrations.
 - We have a Critical Care contract with Systems Engineering that covers the servers involved in this migration. Having another company involved on these servers would require a post migration evaluation by Systems Engineering in order to continue this contract which brings an additional cost.

Please let me know if there are any question.

Jerry

The City of Biddeford is an Equal Opportunity/Affirmative Action Employer



City of Biddeford - Domain Consolidation

Prepared for:
City of Biddeford

Prepared by:
Mark Jutkiewicz
April 16, 2021

Introduction

City of Biddeford and Biddeford Police Department have been eyeing a move to consolidate their two domains for some time. Given the relative complexity, timing was going to be important, and since some services and some Microsoft 365 features have slowly started to sync up, we performed a discovery project with the intent of putting together a complete statement of work to complete the project. The intent was to both provide a plan for Biddeford that was complete and considered all aspects, as well as put a budget on it for Systems Engineering to perform the project.

This proposal is for the complete project owned and performed by Systems Engineering. The statement of work is Biddeford's to consider, and based on the previous project performed for discovery, if there are any clarifications needed or questions about what information was gathered we are happy to share that output. Please review this statement of work as well as the budgeted hours required to complete and provide any feedback.

Statement of Work

Scope of Work

City of Biddeford Police Department Domain Migration

Scope of Work

Active Directory Migration

Setup Migration Software (ADMT) in the City Hall's domain

Test Migration with a test user

Verify migrated users are still able to connect to exchange after the migration

Test disconnecting the link mailbox then reconnecting the mailbox to the user account on the city hall's domain

Migrate or build new GPO's

Pre-Migrate Group and Users with SID History from the Source to Target Domain

Prepare Computers for Migration

Migrate Users and Groups

Finalize migration

Soft or hard merge the user accounts for Azure MFA

File Server Migration

Migrate user home directory and folder redirection data to City's

file server

Reconfigure user home directory path

Exchange Migration

Disconnect the linked PD mailbox accounts

Reconnect the disconnected mailboxes to the user's City Hall's domain account

DHCP Migration

Create/migrate PD DHCP scope on the City's existing DHCP server (Netserver_1)

Infrastructure Configuration Changes

Change IP helper address in the switch/router configuration

Change VPN groups within the ASA configuration to use new Radius IP address

Azure Active Directory – MFA Migration

Add NPS role and migrate NPS configuration

Install Azure NPS Extension for MFA

Change the NetScaler authentication policies for PD Access

Gateway site to authenticate to the new NPS/Radius IP and the City's Active Directory

Azure AD Connect -

Once all the PD users have been migrated and merge to the City's domain, the Azure AD connect software needs to be migrated

Install Azure AD Connect on an existing server on the City's domain in a Staging Mode

Change the PD Azure Connect to stage mode

Remove Staging mode from the city's AD connect

Verify there are no syncing issues

Uninstall AD Connect from the PD Server

Remove the Biddefordpd local domain from the AD connect configuration

Project Management

Project and schedule creation

Project kickoff

Change management

Weekly status updates

Project closeout

Customer Responsibilities

Work with application providers if needed to resolve any issues related to user/PC migrations
Communicate downtime windows with end-users

Assumptions

Systems Engineering resources will have access to necessary equipment locations, including IDF's/MDF at agreed upon times
Systems Engineering will be able to complete the cutover of equipment in a sequential amount of days in order to avoid project creep
The client understands that there will be down time during this project and will communicate the planned downtime window to all their users

Out of Scope

Travel is not included in labor estimate
Disposal of old hardware
Migration of any unknown applications not identified in the Scope of Work
Anything not explicitly defined in this Scope of Work
Any issues out of direct control of SE

Labor Estimate

Product Description	Qty	Price	Ext. Price
T&M Senior Engineer	132	\$175.00	\$23,100.00
T&M Infrastructure	4	\$200.00	\$800.00
T&M Project Management	24	\$175.00	\$4,200.00
Subtotal:			\$28,100.00

City of Biddeford - Domain Consolidation



Prepared by:

Systems Engineering

Mark Jutkiewicz
207.772.3199
Fax 207.772.0620
mjutkiewicz@systemsengineering.com

Prepared for:

City of Biddeford

205 Main Street City Hall
PO Box 586
Biddeford, ME 04005
Jerry Gerlach
(207) 286-0594
jerry.gerlach@biddefordmaine.org

Quote Information:

Quote #: 005659

Version: 1
Delivery Date:
04/16/2021
Expiration Date:
05/14/2021

Investment Summary

Description	Amount
Labor Estimate	\$28,100.00
Total: \$28,100.00	

Taxes, shipping, handling and other fees may apply. Product pricing is subject to change based on availability and manufacturer's discretion. Proposal Terms are attached to this document.

Systems Engineering

City of Biddeford

Signature: _____



Name: Mark Jutkiewicz

Title: Account Manager

Date: 04/16/2021

Signature: _____

Name: Jerry Gerlach

Date: _____

Proposal Terms

When signed by both parties, this agreement, including and together with the Service Schedule and the Inventory Schedule attached hereto, and all other exhibits and attachments, if any, shall be deemed to be the "Proposal" and shall be incorporated into and become a part of the currently effective Master Service Agreement, if any, between Systems Engineering ("SE") and the Customer identified below, as the same may be modified from time to time (the "MSA"). The accepted Proposal is effective as of the date of SE's signature ("the Effective Date"). All terms used herein that are not otherwise defined herein shall have the meanings provided in the MSA.

Additional terms and conditions applicable to the work performed hereunder:

1. **ADDITIONAL SERVICE.** SE shall provide the services described in this Proposal as either T&M, Fixed Price Work or Recurring Service Fee, under the terms and conditions set forth in the MSA.
2. **PAYMENT.** As consideration for the services to be provided hereunder, Customer shall pay SE for authorized work as set forth in the Proposal and for all Recurring Services, if any, as set forth in the attached Service Schedule. In addition, Customer shall pay SE for all reasonable preapproved travel and lodging expenses incurred by SE in providing services under this Proposal. Customer is responsible for all travel and lodging expenses of its own employees.
3. **CHANGES AND RETURNS.**
 - a. Changes to Bill of Materials: This Proposal is a best effort at defining the bill of materials (BOM) required for the project defined herein. SE reserves the right to modify the BOM and bill the Customer accordingly as required by such circumstances or occurrences including, but not limited to, product changes by the manufacturer, errors or mistakes in quotes and estimates issued by the manufacturer, product lifecycle issues, product availability issues, or actual material requirements.
 - b. Third-Party Licensing. Customer shall be responsible for the payment of all recurring third-party licensing fees and charges for Equipment, software and other technology ordered as part of this Proposal and for any increase in the cost for that licensing originated by the manufacturer.
 - c. Returns. Products shall not be returned by Customer without SE's prior written authorization. Authorization will not be unreasonably withheld; however, it will be subject to the extent the return policy of each manufacturer will allow. Any authorized returns shall be returned at Customer's sole expense, freight prepaid. Customer shall be responsible for any third-party restocking fee that Customer incurs. Returns of special order or made-to-order items are not allowed. No returns shall be accepted following 30 days after delivery to either SE or the Customer. No credit will be issued for shipping charges or other special expenses.

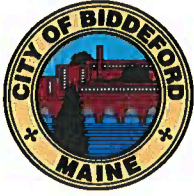
4. **SCOPE OF SUPPORT.** All SE services described in this proposal apply only to hardware and software product versions that are within the manufacturer's published support dates. SE is under no obligation to provide support for items that are outside of the manufacturer's published support dates. Further, any software product that is past its end of support date will no longer receive any patches from the manufacturer including security updates. therefore, Systems engineering shall not be held responsible and shall have no liability for any damages, losses, causes of action, claims, liabilities, work stoppages, business interruptions and any noncompliance risks associated with unsupported products relative to applicable regulations or other terms of business which may apply to the customer that are caused by, resulting from or related to customer's use of hardware and/or software that are past their respective manufacturer's published support dates.
5. **CONFIDENTIALITY.** This proposal contains confidential information relating to the design, process, and methodology SE uses in designing network infrastructure and security, core server and storage solutions, and in developing technology strategies and plans. These designs, processes and methodologies are owned solely by SE. Disclosure of any design, process or method information included herein to others is expressly prohibited.
6. **OWNERSHIP OF WORK PRODUCT.** The parties acknowledge and agree that all SE work product and deliverables purchased by Customer and delivered by SE as a result of this Proposal, including, without limitation network and core infrastructure design, research reports, technology strategies and plans, applications and process recommendations, and system and user requirements (collectively, the "Deliverables", and all intellectual property rights connected therewith or arising therefrom, shall at all times remain solely in SE, subject to the Customer's license and right to use the Deliverables in accordance with the terms of this Proposal and the MSA, and that such Deliverables shall not be considered a work made for hire within the meaning of the copyright laws of the United States. As such, all rights in the Deliverables, including copyright, shall vest in SE.

In the event that, for any reason whatsoever, the Deliverables shall be considered a "work made for hire" under such copyright laws, then the Customer hereby grants and assigns to SE, and its successors and assigns, all of its right, title and interest in and to the Deliverables including, but not limited to, the copyright therein throughout the world (and any renewal, extension or reversion of copyright now or hereafter provided), and all other rights in the Deliverables of any nature whatsoever, whether now known or hereafter devised including, but not limited to, the right to make such changes in, derivatives of, and uses of the Deliverables as SE may determine.

Customer agrees to assist SE, or its designee, at SE's expense, in every proper way to secure SE's rights in the Deliverables and any copyrights, trademarks, patents or other intellectual property rights relating thereto in any and all countries, including the disclosure to SE of all pertinent information and data with respect thereto and the execution of all applications, specifications, oaths, assignments and all other instruments which SE shall deem necessary in order to apply for and obtain such rights and in order to assign and convey to SE and its successors and assigns the sole and exclusive right, title and interest in and to such Deliverables, and any copyrights, patents or other intellectual property rights relating thereto. The covenants set forth herein shall survive termination of this Agreement.

- 7. CONFLICTS IN PROVISIONS.** In the event of a conflict among the provisions of the MSA and this Proposal with respect only to the services and products provided under this Proposal, the priority of the documents shall be (1) this Proposal and (2) the MSA.
- 8. AUTHORITY.** The Customer warrants the person signing this Proposal on behalf of Customer is authorized to do so, and that Customer has obtained all approvals and resolutions necessary to enter into this Proposal and to make the Proposal binding upon Customer.
- 9. EXPIRATION OF PROPOSAL.** Unless executed by the parties hereto, this Proposal will expire at the earliest of, (i) thirty (30) days from the date of SE's execution thereof, (ii) the expiration date shown on the signature page of this Proposal or (iii) expiration of any manufacturer's discount included in this Proposal.

City of Biddeford, Maine



The Office of
City Manager

James A. Bennett

Email: jbennett@biddefordmaine.org

MEMORANDUM

TO:	Honorable Mayor Casavant Honorable City Council
FROM:	James A. Bennett, City Manager
DATE:	July 15, 2021
RE:	Carry Forward Requests and Capital Funds Allocation

As part of the normal process of fiscal year activities, the City Council is asked to approve certain carry forward funds from the previous year to be established in designated reserves. In addition, the Council receives the recommendation for the allocation of the capital funds that are included within the approved annual budget. On Tuesday evening, each of these items appear on your agenda for consideration. The Capital Committee met on July 13 and have made the recommendations contained within this memo. While each item is different agenda item, this memo is written to cover both of the items.

For background purposes, a copy of the Capital Committee agenda package is included. Of the package, the July 12, 2021 memo is the most important.

Allocation of the FY22 Capital Funds

The approved FY22 budget included \$1,750,000. The Capital Committee met in February to do an initial allocation of the funding. At their meeting last evening, the committee reaffirmed that recommendation. It now appears before the Council for approval. The recommended allocation is as follows:

FY22 CAPITAL FUND USES

NEW FURNANCE PWD	\$75,000
THATCHER BROOK III	\$80,000
FIRE SUBSTATION ARCHITECT PHASE I	\$0
VEHICLE REPLACEMENTS	
TOTAL COST	\$899,000
LESS: LEASE PORTION	\$575,000
CASH REQUIRED	\$324,000
VEHICLE ADDITIONS	\$70,000
RIVER WALL ENGINEERING-MECHANICS PARK	\$200,000
PACTS (FEDERAL) MATCH	
ELM & PEARL STUDY	\$50,000
PRECOURT PAVING	\$70,000
PAVING	\$525,000

205 Main Street

Biddeford, ME 04005

Phone: 207.284.9313

Fax 207.571.0678

*The City of Biddeford is an equal opportunity provider. To file a complaint, write to
Diana Depaolo, Human Resource Director, 205 Main Street Biddeford, ME 04005, or call (207) 286-0593.*

SIDEWALK	\$75,000
OTHER:	
ECONOMIC DEVELOPMENT	
OTHER MATCH FUNDS	
CONTINGENCY FOR INCREASING COSTS	\$281,000
TOTAL	\$1,750,000

The vehicle replacement includes the recommended vehicles listed below. The estimated costs projections are nearly six months old and in some cases older. Normally, that would not be an issue but given the current supply issues worldwide and other factors, we know that some of the estimates are no longer reasonable (see the purchase of the fire truck on the agenda). As presented the recommendation is to use \$324,000 towards these purchases (with the balance being lease/purchases).

<i>Department</i>	<i>Item</i>	<i>Replacing</i>	<i>Net Cost Estimate</i>
<i>Police</i>	Detective Vehicle	2010 Chevy Impala	\$28,000
<i>Police</i>	Detective Vehicle	2010 Chevy Impala	\$28,000
<i>Fire Department</i>	Fire Trucker (Pumper)	1995 International Pumper	\$500,000
<i>Public Works</i>	Engineering Vehicle	2007 Ford Expedition	\$26,000
<i>Public Works</i>	Parks Pick Up	2008 GMC 2500	\$34,000
<i>Public Works</i>	Wheeler Plow Truck	2008 Volvo Plow	\$210,000
<i>Public Works</i>	Backhoe/Loader	2010 John Deere	\$80,000

The recommendation for funding also includes \$70,000 for the purchase of two new vehicles to the fleet. The first is to purchase a used pick up for the recreation department. The second is to set up a pickup for the Fire Department on Duty Captain.

Appropriation of FY21 Carryforward Funds

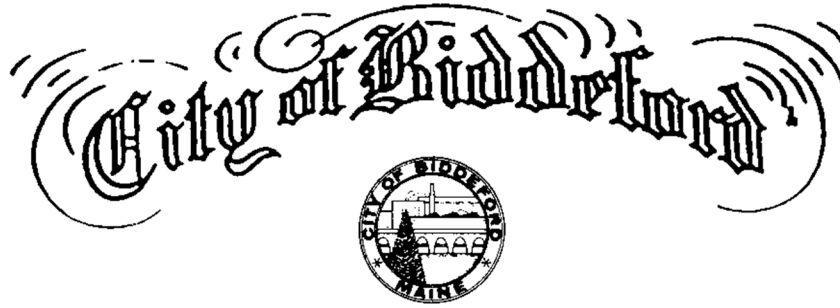
There are two separate recommendation for carry forward funds. The first is the annual exercise of appropriating into reserve any capital funds that remain unspent in the current year for the specific purpose originally intended. This year the unspent funds (\$540,000) is higher than usual because staff was not allowed to use the funds until this spring as a precaution against potential adverse impacts from COVID.

The second request includes \$587,500 as noted below in the chart below. These are not new requests and have been explained during the budget deliberations.

Item	Request
Assessing Consultant (for commercial review)	\$50,000
Engagement Position	\$57,500
Engineering Consulting	\$55,000
Grant Matches*	\$85,000
Biddeford Pool Study	\$30,000

Engineering (MERC Tower)	\$30,000
Crosswalk Warning Lights	\$100,000
Software for Mobile App (citizen focus)	\$30,000
Additional Sidewalk Work	\$150,000
Backstop/netting for field #1 for St. Louis Field #1	\$150,000
Total	\$737,500

Based on the expected operational surplus prior to the Council allocations to date and the expectation that the Council will accept the Capital Committee's recommendation, the remaining funds (\$619,380) will become part of the City's unassigned fund balance. I would point out that this amount is \$110,753 higher than the recommendation found in the July 12, 2021 memo.



2021.78

IN BOARD OF CITY COUNCIL...JULY 20, 2021

BE IT ORDERED, that the Deputy Finance Director is authorized to create dedicated reserve accounts under the listed fund balance accounts, and transfer remaining funds from the FY 2021 Budget to said dedicated accounts as herein named in amounts not to exceed those stated, as of June 30, 2021 deducting any encumbrances:

10013-30101, General Fund Assigned Fund Balance

<u>Account Description</u>	<u>Amount</u>
Assessing Consultant (for commercial review)	\$50,000
Engagement Position	\$57,500
Engineering Consulting	\$55,000
Grant Matches*	\$85,000
Biddeford Pool Study	\$30,000
Engineering (MERC Tower)	\$30,000
Crosswalk Warning Lights	\$100,000
Software for Mobile App (citizen focus)	\$30,000
Backstop/netting for field #1 for St. Louis Field #1	\$150,000
Total	<u>\$737,500</u>

BE IT FURTHER ORDERED, that the Deputy Finance Director is authorized to create dedicated reserve accounts for all unspent FY21 Capital Improvement Funds (estimated at \$540,000), and transfer remaining funds from the FY 2021 Budget to said dedicated accounts for the same purposes as of June 30, 2021 deducting any encumbrances:

BE IT FURTHER ORDERED, that the City Manager be authorized to expend from the above dedicated reserves for expenses related to on-going project costs as approved in accordance with the Purchasing Code.

NOTE: The Finance Committee will consider this item at the July 20, 2021 meeting and vote on recommendation for approval by the City Council.



Finance Committee/City Council

Meeting Date: 7/20/21
Meeting Time: 1700/1800

Agenda Item No: 2021.81
Item Description: Fire Department Pumper Apparatus

Submitted by: Chief Gagne

Supporting Information/Documentation:

Replacement of current 1995 pumper apparatus

Key Terms:

N/A

Executive Summary:

This pumper purchase is requested to replace a 1995 pumper. This new pumper would be placed in service at Central Station as the primary response pumper for the department.

Detailed Review:

This Pumper was selected to be presented for funding from the department spec committee made up of representatives from the fire and public works department. The spec was sent out and be bided on by three companies through the national bid process, public procurement authority, Houston-Galveston Area Council.

The results are as follows:

- Dingee Machine Company - Cornish, NH (Sutphen) \$702,048.00
- Specialty Vehicles, INC – Plainville, MA (Rosenbauer) \$711,544.00
- Allegiance Fire & Rescue – Walpole, MA (Pierce) \$712,576.00

The above prices do not list any pre-pay. Pre-pay options are as follows:

- Sutphen – 25% - \$2,340.16 savings
50% - \$4,680.32 savings
75% - \$7,020.48 savings
100% - \$9,360.00 savings
- Pierce - 100% - \$19,724.00 savings
- Rosenbauer – no pre-pay savings listed

Funding Source:

List purchase was listed in the FY 22 CIP items.

Staff Recommendation:

Staff has recommended the Sutphen Pumper sold by Dingee Machine Company. This pumper most closely match the specification listed in our specs with the highest consideration being place on apparatus size and wheel base length.

As of 8/1/21 each company will have an increase in the price as follows:

Sutphen – 30%

Rosenbauer – 1.2%

Pierce – 1.8%



**FAMILY OWNED
SINCE 1890**

**Prepayment Discount Options
For The
Biddeford Fire Department
Biddeford, ME**

Current Bid Price **\$702,048.00**

Option 1 25%	For a prepayment in the amount of \$175,512.00 the discount would be \$2,340.16 for a total selling price of \$699,707.84
Option 2 50%	For a prepayment in the amount of \$351,024.00 the discount would be \$4,680.32 for a total selling price of \$697,367.68
Option 3 75%	For a prepayment in the amount of \$526,536.00 the discount would be \$7,020.48 for a total selling price of \$695,027.52
Option 4 100%	For a full prepayment, we offer a discount of \$9,360.64 for a final selling price of \$692,687.36

NOTE: For any option above, the prepayment would be due within 30
days of contract signing in order to receive the discounts listed.
Any remaining balance would be due at the time of delivery.

Sutphen Corporation
PO Box 158 • Amlin, OH 43002-0158
6450 Eiterman Road • Dublin, OH 43016-8711
Tel 614 889-1005 • Toll Free 800 848-5860 • Fax 614 889-0874
www.sutphen.com • Sutphen@sutphencorp.com



PROPOSAL

TO THE:

Biddeford Fire Department
Chief Gagne & Assistant Chief LaBrecque
152 Alfred Street
Biddeford, Maine 04005

DATE: July 14, 2021

We hereby propose and agree to furnish the following firefighting equipment upon your acceptance of this proposal:

One (1) Sutphen Heavy Duty Custom Pumper Complete and Delivered for the

Total Sum of \$702,048.00

The unit shall be manufactured completely in accordance to the following proposal and delivered in approximately **13-15** months from the date of the contract signing or purchase order, subject to delays from all causes beyond our control.

This proposal shall be valid until July 31, 2021. If the contract or purchase order is not received within this proposed duration, we reserve the right to extend, withdraw, or modify our proposal, including pricing, delivery times, and prepayment discounts as applicable.

Please note that a contract must be signed and submitted no later than July 31, 2021 to guarantee the cost quoted. Any contract after this date will be subject to the upcoming price increase.

Respectfully submitted,

Larry Dingee

Larry Dingee
Dingee Machine Company
Authorized Representative for Sutphen Corporation
603.542.9682

SUTPHEN CORPORATION

6450 Eiterman Road | Dublin, OH 43016 | 1-800-848-5860



Specialty Vehicles, Inc.



18 Commerce Blvd.
Plainville, MA 02762
Tel: 508.699.0616
Fax: 508.699.0977
Toll Free: 888.699.0616
www.svine.com

To: Biddeford, Maine Fire Department
From: Specialty Vehicles, Inc.
Date: 07/07/2021
Re: Biddeford ME Pumper Bid Cost Reduction

Chief Gagne,

It has been requested of me to provide the Biddeford Fire Department with a list of items that could potentially cut cost off of the bid price of \$755,827.00. Please see below for individual option prices. Please note these prices are subject to fluctuate slightly depending on certain selections that are made. I have done my best to show you as accurate numbers as possible but the final pricing may vary slightly. Other add/delete options are available upon request from BFD.

Cab/Chassis

1. Delete Cummins ISL Service Manual: -\$408.00
2. Delete Allison Transmission Service Manual: -\$190.00
3. Delete rear facing storage cabinet integral with chassis overhead HVAC system: -\$1,288.00
4. Delete Line-X black door jamb scuff plates: -\$800.00
5. Change power windows to manual crank: -\$1,273.00
6. Change cab rear wall coating from Line-X to marine grade vinyl: -\$842.00
7. Delete Line-X Black tread plate floor covering in crew area: -\$1,326.00
8. Delete Line-X Black tread plate floor cover in driver/officer area: -\$1,011.00
9. Delete Rosenbauer Clean Air Scrubber: -\$2,885.00
10. Delete cross view mirror: -\$195.00
11. Change rear suspension from air-ride to parabolic spring: -\$1,044.00
12. Change cab door warning lights from M4 to OS model: -\$524.00

Total potential Cab/Chassis deduction: -\$11,786.00

Body

1. Delete manufacturer provided 4-days training: -\$1,500.00
2. Delete pair of 21" light bars above cab doors: -\$2,292.00
 - a. If electing this option recommend increasing forward facing light bar from 55" to 72": +\$143.00
3. Delete one of the two pairs of M6 warning lights on the bumper tails: -\$682.00
4. Delete dunnage area lighting: -\$613.00
5. Delete scene lights from front bumper tails: -\$1,066.00
6. Delete Roto-Ray: -\$3,382.00
7. Delete qty. 2 Mars Lights: -\$3,630.00
8. Replace rear tow bar with tow plates: -\$863.00
9. Delete rear engine tunnel mounted cabinet: -\$2,703.00
10. Delete overhead forward facing cabinet: -\$2,652.00
11. Delete 2.5" dead lay storage above speed lays: -\$865.00

12. Delete two speed lays and change to cross lays (1.75" & 2.5"): -\$2,451.00
13. Customer supplies own hose (200' x 1") for hose reel: -\$1,366.00
14. Customer supplies own 1" nozzle for hose reel: -\$834.00
15. Replace sliding tread plate hose bed cover with standard bi-fold tread plate cover: -\$2,606.00
16. Customer supplies own 6" x 10' hard suction hose, qty. 2: -\$1,232.00
17. Change rub rails from rubber to extruded aluminum: -\$903.00

Total potential body deduction: -\$29,497.00

Delete pre-construction meeting at manufacturer facility: -\$3,000.00

Total purchase price if all deductions are taken: \$711,544.00

ALLEGIANCE
FIRE & RESCUE

2181 Providence Highway
Walpole, MA 02081
508.668.3112
www.AllegianceFR.com

July 8, 2021

Chief Scott Gagne
Biddeford Fire Department
152 Alfred Street
Biddeford, ME 04005

Chief Gagne,

Thank you for providing Allegiance Fire & Rescue the opportunity to work with you in creating a Pumper for the Biddeford Fire Department. After meeting with you and the committee on Tuesday, we have made the following changes to the proposal

- Removed Two (2) Trips for three (3) department members
- Add Additional Aluminum wheels to rear that are blacked out
- Added Gantry System for One (1) Hard Suction hose on Left Side of Body
- Removed One (1) 2.5" discharge from Left Side of Pump
- Changed Pump House to include three (3) Speedlays which included changing to a Hale QMAX-XS-150 Pump to help reduce the size of the pump house. We are able to add the speedlays and only increase the wheelbase by 4.00" to 191.50" and changing the over all length by 4.00" as well to 32' 4.00"

Additional changes were made to the tires, changing them to Michelin where the tread design that Goodyear had has been discontinued. This can be revisited at the approval meeting if need be.

With the current proposal and the changes made this week pricing is

Purchase price of Pumper **\$712,576.00**

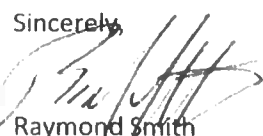
If a 100% prepay is made within 15 days of signing a contract you may deduct **\$19,724.00** from the above cost.

This brings the discounted cost to **\$692,852.00**

Please contact me if you have any further questions regarding the proposal and pricing.

With our Service Center in Auburn Maine and soon to be Saco Maine as well as providing road service we are here to serve the Biddeford Fire Department with your next pumper purchase.

Sincerely,



Raymond Smith
Allegiance Fire & Rescue



Biddeford Fire Department

Revised 05.27.2021

The City of Biddeford Fire Department is seeking proposal for one **triple combination pumper in accordance with the current edition of NFPA 1901 standards**. The following paragraphs will describe specifications equipment proposed.

Proposals shall be submitted to the Biddeford Fire Department 152 Alfred Street Biddeford Maine no later than June 24, 2021. Submittals can be e-mailed to Assistant Chief Paul LaBrecque at paul.labrecque@biddefordmaine.org or Chief Scott Gagne at scott.gagne@biddefordmaine.org (207) 282-6632

1-1 MINIMUM QUALIFICATIONS

- At least three years of recent experience with fire suppression vehicle manufacturer.
- Experience in developing specifications and producing fire suppression vehicles that meet federal, State, and Local standards.
- Knowledge of and participation in joint power agreement (JPA), Public Procurement Authority (PPA), Houston- Galveston Area Council (HGCA) of similar procurement process.

1-3 QUALITY AND WORKMANSHIP

The selected manufacturer shall provide quality workmanship and ensure all steel welding follows American Welding Society D1.1-2004 recommendations for structural steel welding. All aluminum welding follows American Welding society and ANSI D1.2-2003 requirements for structural welding of aluminum. All sheet metal welding follows American welding Society B2.1-2000 requirements for structural welding Society D1.1 of sheet metal and ensuring all steel welding follows flux core arc welding uses alloy rods, type 7000 and is performed to American Welding Society standards A5.20-E70T1.

1-4 DELIVERY

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

1-5 MANUAL AND SERVICE INFORMATION

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

1-6 SAFETY VIDEO

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

Biddeford Fire Department

2-1 PERFORMANCE TESTS

A road test will be conducted with the apparatus fully loaded and a continuous run of no less than ten 10 miles. During that time the apparatus will show no loss of power nor will it overheat. The transmission drive shaft or shafts and the axles will run quietly and be free of abnormal vibration or noise. The apparatus when fully loaded will not have less than 25 percent nor more than 50 percent on the front axle, and not less than 50 percent nor more than 75 percent on the rear axle. The apparatus will meet NFPA 1901 acceleration and braking requirements.

2-2 SERVICE AND WARRANTY SUPPORT

A service center will have factory-trained mechanics on staff versed in fire apparatus. The service facility will be located within one hundred (100) miles of the fire department.

2-3 LIABILITY

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

2-4 INSURANCE PROVIDED BY BIDDER

2-5 COMMERCIAL GENERAL LIABILITY INSURANCE

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

Each Occurrence\$1,000,000

Products/Completed Operations Aggregate\$1,000,000

Personal and Advertising Injury\$1,000,000

General Aggregate\$2,000,000

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

2-6 COMMERCIAL AUTOMOBILE LIABILITY INSURANCE

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

Each Accident Combined Single Limit:\$1,000,000

Biddeford Fire Department

3-1 UMBRELLA/EXCESS LIABILITY INSURANCE

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

Aggregate:\$3,000,000

Each Occurrence:\$3,000,000

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

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

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

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

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

3-2 INSURANCE PROVIDED BY MANUFACTURER

3-3 PRODUCT LIABILITY INSURANCE

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

Each Occurrence\$1,000,000

Products/Completed Operations Aggregate\$1,000,000

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

3-4 UMBRELLA/EXCESS LIABILITY INSURANCE

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

Each Occurrence:\$25,000,000

Aggregate:\$25,000,000

Biddeford Fire Department

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

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

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

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

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

4-1 NFPA 2016 STANDARDS

This unit will comply with the NFPA standards effective January 1, 2016, except for fire department directed exceptions. These exceptions will be set forth in the Statement of Exceptions.

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

All horizontal surfaces designated as a standing or walking surface that are greater than 48.00" above the ground must be defined by a 1.00" wide line along its outside perimeter. Perimeter markings and designated access paths to destination points will be identified on the customer approval print and are shown as approximate. Actual location(s) will be determined based on materials used and actual conditions at final build. Access paths may pass through hose storage areas and opening or removal of covers or restraints may be required. Access paths may require the operation of devices and equipment such as the aerial device or ladder rack.

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

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

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

4-2 NFPA COMPLIANCY

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

4-3 VEHICLE INSPECTION PROGRAM CERTIFICATION

To assure the vehicle is built to current NFPA standards, the apparatus, in its entirety, will be third-party, audit-certified through Underwriters Laboratory (UL) that it is built and complies to all applicable standards in the current edition of NFPA 1901. The certification will include: all design, production, operational, and performance testing of not only the apparatus, but those components that are installed

Biddeford Fire Department

on the apparatus.

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

5-1 PUMP TEST

Underwriters Laboratory (UL) will test, approved, and certify the pump. The test results and the pump manufacturer's certification of hydrostatic test; the engine manufacturer's certified brake horsepower curve; and the pump manufacturer's record of pump construction details will be forwarded to the Fire Department.

5-2 TRAINING

A qualified training engineer will be provided by the manufacturer. The training engineer shall instruct the Fire Department in the operation and maintenance of the chassis pump and its appurtenances on the vehicle for a period of not less than (4) Days

5-3 CONSTRUCTION REVIEW AND WEEKLY PROGRESS REPORTS

The Manufacturer will also provide weekly photographic progress reports and inspection services, provided by an independent third party.

- 1) Comprehensive review of the bid documents with the factory order to ensure accuracy.
- 2) Weekly progress reports including photographs of the apparatus or the major components as they are being constructed. The reports shall commence at the beginning of the manufacturing process and shall continue until just prior to the final inspection. The reports shall show the progress of the apparatus through the course of each week. Special attention shall be given to show the unique features and aspects of the apparatus as construction progresses.
- 3) In addition, after the final inspection has been completed by the customer or third party, the third party inspector shall review all items noted in the inspection for completion prior to the apparatus leaving the manufacturing facility for delivery to the local service area for pre-delivery service.

5-4 State of Maine Commercial Vehicle Inspection

The vehicle will be delivered with a State of Maine Commercial Vehicle Inspection.

5-6 BID BOND

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

Biddeford Fire Department

Notwithstanding any document or assertion to the contrary, any surety bond related to the sale of a vehicle will apply only to the Basic One (1) Year Limited Warranty for such vehicle. Any surety bond related to the sale of a vehicle will not apply to any other warranties that are included within this bid (OEM or otherwise) or to the warranties (if any) of any third party of any part, component, attachment or accessory that is incorporated into or attached to the vehicle. In the event of any contradiction or inconsistency between this provision and any other document or assertion, this provision will prevail.

6-1 PERFORMANCE BOND. 1 YEAR

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

Bidder and Bidder's surety agree that the Bond issued hereunder, whether expressly stated or not, also includes the surety's guarantee of the vehicle manufacturer's Basic One (1) Year Limited Warranty period included within this proposal. Owner agrees that the penal amount of this bond will be simultaneously amended to 100% percent of the total contract amount upon satisfactory acceptance and delivery of the vehicle(s) included herein. Notwithstanding anything contained within this contract to the contrary, the surety's liability for any warranties of any type will not exceed one (1) year from the date of such satisfactory acceptance and delivery, or the actual Basic One (1) Year Limited Warranty period, whichever is shorter.

6-2 APPROVAL DRAWING

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

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

6-3 ELECTRICAL WIRING DIAGRAMS

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

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7-1 CHASSIS

Chassis provided will be a new, tilt-type custom fire apparatus. The chassis will be manufactured in the apparatus body builder's facility eliminating any split responsibility. The chassis will be designed and manufactured for heavy-duty service, with adequate strength, capacity for the intended load to be sustained, and the type of service required. The chassis will be the manufacturer's first line tilt cab. 96"-100" Wide.

7-2 WHEELBASE

The Wheelbase of the vehicle not to exceed 190.00.

7-3 GVW RATING

The gross vehicle weight rating to be determined.

7-4 FRAME

The chassis frame will be built with two (2) steel channels bolted to five (5) cross members or more, depending on other options of the apparatus. The side rails will be heat-treated steel measuring 10.25" x 3.50" x 0.375".

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

7-5 FRONT AXLE

The front axle will be a reverse "I" beam type with inclined king pins. It will be a Meritor® axle, Model MFS-20, with a rated capacity of 20,000 lb.

7-6 FRONT SUSPENSION

The front springs will be a Standens, three (3)-leaf, taper leaf design, 54.00" long x 4.00" wide, with a ground rating of 20,000 lb.

The two (2) top leaves will wrap the forward spring hanger pin. The top leaf will also wrap the rear spring hanger pin. Both the front and rear eyes will be Berlin style wraps that will place the eyes in the horizontal plane within the main leaf. This will reduce bending stress from acceleration and braking.

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

7-7 SHOCK ABSORBERS

To provide a smoother ride, the front axle will be furnished with heavy-duty telescoping shock absorbers.

7-8 FRONT OIL SEALS

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

7-9 FRONT TIRES

Front tires will be Goodyear® 315/80R22.50 radials, 20 ply G289 WHA tread, rated for 20,400 lb maximum axle load and 68 mph maximum speed.

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

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8-1 REAR AXLE

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

8-2 TOP SPEED OF VEHICLE

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

8-3 REAR SUSPENSION

Rear suspension will be a Hendrickson FMX 312 EX, air ride with a ground rating of 31,000 lb. The suspension will have the following features:

- Heavy-duty shock absorbers to protect air springs from overextension
- Heavy-duty torque rods and bushings
- Premium, heavy-duty rubber bushings require no lubrication
- Integrated stabilizer design results in greater stability
- Low spring rate air springs for excellent ride quality
- Dual height control valves to maintain level vehicle from side to side

8-4 REAR OIL SEALS

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

8-5 REAR TIRES

Rear tires shall be four (4) Goodyear 315/80R22.50 radials with load range L, Endurance TSD, rated for 35,400 lb maximum axle load and 75 mph maximum speed.

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

8-6 TIRE BALANCE

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

8-7 TIRE PRESSURE MANAGEMENT

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

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

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

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9-1 FRONT HUB COVERS

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

9-2 REAR HUB COVERS

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

9-3 CHROME LUG NUT COVERS

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

9-4 MUD FLAPS

Mud flaps will be installed behind the front and rear wheels. RV mud flap to be installed full width across rear of apparatus

9-5 WHEEL CHOCKS

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

9-6 Wheel Chock Brackets

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

9-7 ANTI-LOCK BRAKE SYSTEM

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

9-8 BRAKES

The service brake system will be full air type by Meritor™.

Front brakes will be Model EX225 Disc Plus, disc type with automatic pad wear adjustment and 17.00" ventilated rotors for improved stopping distance.

The rear brakes will be Meritor™ 16.50" x 7.00" cam operated with automatic slack adjusters. Dust shields will be provided.

9-9 BRAKE SYSTEM AIR COMPRESSOR

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

9-10 BRAKE SYSTEM

The brake system will include:

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- Brake treadle valve
- Heated automatic moisture ejector on air dryer
- Total air system minimum capacity of 4,272 cubic inches
- Two (2) air pressure gauges with a red warning light and an audible alarm, that activates when air pressure falls below 60 psi
- Spring set parking brake system
- Parking brake operated by a push-pull style control valve. One on drivers side and another to be located on the officers side
- A parking "brake on" indicator light on instrument panel
- Park brake relay/inversion and anti-compounding valve, in conjunction with a double check valve system, with an automatic spring brake application at 40 psi
- A pressure protection valve to prevent all air operated accessories from drawing air from the air system when the system pressure drops below 80 psi (550 kPa)
- 1/4 turn drain valves on each air tank

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

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

10-1 BRAKE SYSTEM AIR DRYER

The air dryer will be a WABCO System Saver 1200 IWT, with internal wet tank, spin-on coalescing filter cartridge and 100 watt heater.

10-2 BRAKE LINES

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

10-3 AIR INLET

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

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11-1 ENGINE

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

Make:	Cummins
Model:	L9
Power:	450 hp at 2100 rpm
Torque:	1250 lb-ft at 1400 rpm
Governed Speed:	2200 rpm
Emissions Level:	EPA 2021
Fuel:	Diesel
Cylinders:	Six (6)
Displacement:	543 cubic inches (8.9L)
Starter:	Delco 39MT™
Fuel Filters:	Spin-on style primary filter with water separator and water-in-fuel sensor. Secondary spin-on style filter.

The engine will include On-board diagnostics (OBD), which provides self diagnostic and reporting. The system will give the owner or repair technician access to state of health information for various vehicle sub systems. The system will monitor vehicle systems, engine and after treatment. The system will illuminate a malfunction indicator light on the dash console if a problem is detected.

11-2 HIGH IDLE

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

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

11-3 ENGINE BRAKE

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

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

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

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

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

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

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12-1 CLUTCH FAN

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

12-2 ENGINE AIR INTAKE

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

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

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

12-3 EXHAUST SYSTEM

The exhaust system will be stainless steel from the turbo to the engine's after treatment device, and will be 4.00" in diameter. The exhaust system will include a single module after treatment device to meet current EPA standards. An insulation wrap will be provided on all exhaust pipes between the turbo and after treatment device to minimize the heat loss to the after treatment device. The exhaust will terminate horizontally ahead of the right side rear wheels. A tailpipe diffuser will be provided to reduce the temperature of the exhaust as it exits. Heat deflector shields will be provided to isolate chassis and body components from the heat of the tailpipe diffuser.

12-4 EXHAUST MODIFICATION

A Plymovent® adapter will be provided on the end of the tailpipe.

12-5 RADIATOR

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

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

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

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

The radiator will be compatible with commercial antifreeze solutions.

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

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

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

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

13-1 COOLANT LINES

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

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

13-2 FUEL TANK

A 65 gallon fuel tank will be provided and mounted at the rear of the chassis. The tank will be constructed of stainless steel. It will be equipped with swash partitions and a vent. The exterior of the tank will be painted to match lower body paint. To reduce the effects of corrosion, the fuel tank will be mounted with stainless steel straps.

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

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

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

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

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

13-3 DIESEL EXHAUST FLUID TANK

A 4.5 gallon diesel exhaust fluid (DEF) tank will be provided and mounted in the driver's side body rearward of the rear axle.

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

A fill inlet will be provided and marked "Diesel Exhaust Fluid Only". The fill inlet will be located adjacent to the engine fuel inlet behind a common hinged, spring loaded, polished stainless steel door on the driver side of the vehicle.

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

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

The stainless steel flip door for selecting between DEF fill and the diesel fill will be spring loaded to default to covering the DEF fill.

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14-1 FUEL PRIMING PUMP

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

14-2 FUEL SHUTOFF

A shutoff valve will be installed in the fuel line, near the filter.

14-3 TRANSMISSION

An Allison 5th generation, Model EVS 3000P, electronic torque converting automatic transmission will be provided.

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

Two (2) PTO openings will be located on both sides of converter housing (positions 4 o'clock and 8 o'clock) as viewed from the rear.

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

14-4 TRANSMISSION SHIFTER

A five (5)-speed push button shift module will be mounted to right of driver on console. Shift position indicator will be indirectly lit for after dark operation.

The transmission ratio will be:

1st	3.49 to 1.00
2nd	1.86 to 1.00
3rd	1.41 to 1.00
4th	1.00 to 1.00
5th	0.75 to 1.00
R	5.03 to 1.00

14-5 TRANSMISSION COOLER

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

14-6 DOWNSHIFT MODE (W/ENGINE BRAKE)

The transmission will be provided with an aggressive downshift mode.

This will provided earlier transmission downshifts to 2nd gear, resulting in improved engine braking performance.

14-7 DRIVELINE

Drivelines will be a heavy-duty metal tube and be equipped with Spicer® 1710 universal joints.

The shafts will be dynamically balanced before installation.

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

15-1 STEERING

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Dual steering gear, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate an air to oil cooler and Vickers® V20NF hydraulic pump with integral pressure and flow control. All power steering lines will have wire braded lines with crimped fittings.

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

15-2 STEERING WHEEL

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

15-3 BUMPER

A one (1)-piece bumper manufactured from .25" formed steel with a .38" bend radius will be provided. The bumper will be a minimum of 10.00" high with a 1.50" top and bottom flange. The bumper will be 95.28" wide with 45 degree corners. The bumper will be metal finished and painted job color.

Cheveron will be installed on the front of the entire bumper face.

There will be (2) two scene light recess mounted one on the right and left side end of bumper and (2) two red warning strobes recessed mounted one on the right and left side end of the bumper just below the scene light.

The bumper will extend 22.00" from the face of the cab.

The bumper extension frame will be fabricated using .38" gussets welded to 2.00" x 5.00" steel tubing running front to back with .50" front and rear plates mounted to the chassis frame. Fabricated "U" shaped channel supports the weight of the bumper and provides the main strength in frontal crash. .25" steel is formed into "C" shaped backing plates for mounting of the bumper and providing protection to the cab.

The bumper extension's cross section is considered expendable, and a crush zone. The bumper is not intended for pushing other vehicles or objects.

Tow hooks/eyes located under the bumper extension are for straight pull only.

15-4 LIFT AND TOW MOUNTS

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

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

15-5 TOW HOOKS

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

15-6 FRONT BUMPER LINE-X COATING

Protective black Line-X® coating will be provided on the outside exterior of the top front bumper flange. It will not be sprayed on the underside of the flange.

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The lining will be properly installed by an authorized Line-X dealer.

16-1 CAB

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

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

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

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

The front of the cab will be constructed of a 0.13" firewall plate, covered with a 0.090" front skin (for a total thickness of 0.22"), and reinforced with a full width x 0.50" thick cross-cab support located just below the windshield and fully welded to the engine tunnel. The cross-cab support will run the full width of the cab and weld to each A-pillar, the 0.13" firewall plate, and the front skin.

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

The cab will be 96.00" - 100.00" wide (outside door skin to outside door skin) to maintain maximum maneuverability.

The forward cab section will have an overall height (from the cab roof to the ground) of approximately 99.00". The crew cab section will have a 10.00" raised roof, with an overall cab height of approximately 109.00". The overall height listed will be calculated based on a truck configuration with the lowest suspension weight rating, the smallest diameter tires for the suspension, no water weight, no loose equipment weight, and no personnel weight. Larger tires, wheels, and suspension will increase the overall height listed.

The floor to ceiling height inside the crew cab will be 64.50" in the center and outboard positions.

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

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

The crew cab will be a totally enclosed design with the interior area completely open to improve

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visibility and verbal communication between the occupants.

The cab will be a full tilt cab style.

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

17-1 CAB ROOF DRIP RAIL

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

17-2 INTERIOR CAB INSULATION

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

17-3 FENDER LINERS

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

17-4 WINDSHIELD

Safety glass windshield will be provided with over 2,775 square inches of clear viewing area. The windshield will consist of three (3) layers: outer light, middle safety laminate, and inner light. The outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage. The inner light will provide yet another chip resistant layer. The cab windshield will be bonded to the aluminum windshield frame using a urethane adhesive. A custom fit pattern will be applied on the outside perimeter of the windshield for a finished automotive appearance.

17-5 CREW CAB WINDOWS

There will be no fixed windows in cab

17-6 WINDSHIELD WIPERS

Electric windshield wipers with washer will be provided that meet FMVSS and SAE requirements.

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

17-7 ENGINE TUNNEL

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

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

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

17-8 CAB REAR WALL EXTERIOR COVERING

The exterior surface of the rear wall of the cab will be overlaid with Black Lynex material.

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18-1 CAB LIFT

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

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

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

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

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

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

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

18-2 Cab Lift Interlock

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

18-3 GRILLE

A bright finished aluminum mesh grille screen, inserted behind a bright finished grille surround, will be provided on the front center of the cab. (Black Out with American Flag Graphic)

18-4 DOOR JAMB SCUFFPLATES

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

18-5 SIDE OF CAB MOLDING

Chrome molding will be provided on both sides of cab.

18-6 MIRRORS

A Retraco, Model 613423, dual vision, motorized, west coast style mirror, with chrome finish, will be mounted on each side of the front cab door with spring loaded retractable arms. The flat glass and convex glass will be heated and adjustable with remote control within reach of the driver.

18-7 FRONT CROSS VIEW MIRROR

A Grote 10.50" diameter convex mirror will be provided. The mirror will provide the driver with a view of the right front bumper corner and the area several feet in front of the truck.

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The mirror housing, tubing, clamps and hardware will be constructed of corrosion resistant stainless steel.

19-1 DOORS

To enhance entry and egress to the cab, the forward cab doors will be a minimum of 37.50" wide x 75.50" high. The crew cab doors will be located on the sides of the cab and will be constructed in the same manner as the forward cab doors. The crew cab door openings will be a minimum of 34.30" wide x 85.50" high.

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

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

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

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

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

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

The cab steps at each cab door location will be located inside the cab doors to protect the steps from weather elements.

19-2 DOOR PANELS

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

All cab interior doors will have reflective stop sign mounted on the lower door surface.

19-3 ELECTRIC OPERATED CAB DOOR WINDOWS

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

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

19-4 CAB STEPS

The forward cab and crew cab access steps will be a full size two (2) step design to provide largest

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possible stepping surfaces for safe ingress and egress. The bottom steps will be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps will be a bolt-in design to minimize repair costs should they need to be replaced. The forward cab steps will be a minimum 25.00" wide, and the crew cab steps will be 21.65" wide with a 10.00" minimum depth. The inside cab steps will not exceed 16.50" in height.

The vertical surfaces of the step well will be aluminum tread plate with linex coating.

20-1 CAB EXTERIOR HANDRAILS

A 1.25" diameter slip-resistant, Black rubber handrail will be provided adjacent to each cab and crew cab door opening to assist during cab ingress and egress.

20-2 STEP LIGHTS

There will be white LED step lights installed for cab and crew cab access steps.

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

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

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

20-3 FENDER CROWNS

Black rubber fender crowns will be installed at the cab wheel openings.

20-4 TRANSVERSE STORAGE COMPARTMENT

Provided under the forward facing crew cab seats will be a transverse compartment. The compartment will be open top to bottom with no dividers. The lower portion will be 13.00" wide x 24.50" high x 16" deep on both sides. The compartment will extend from the bottom of the cab to the top of the riser seat. The compartment will continue from the lower bottom of the compartment to approximately 72" high. The transvers compartment will be accessed from the exterior and fully opened to access driver side mounted SCBA and turnout gear.

The compartment will be 13.00" w x approximately 9.00" high, full transvers of the crew cab. The passenger side will be the same layout without SCBA mounted. A bracket will be mounted to accommodate a water can fire extinguisher.

A 4.00" long x 7.50" diameter tube will be recessed below the compartment floor. The tube will be angled approximately 10 degrees for ease of removing an extinguisher from the compartment.

There will be two (2) double pan doors painted to match the cab exterior with a non-locking Clam shell latch, one (1) on each side of the cab. A rubber bumper for each exterior door will be used as a door stop. The clear door opening of each compartment door will be 9.25" wide x 72.00" high.

The compartment interior will be painted spatter gray.

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21-1 COMPARTMENT LIGHTS

There will be two (2) white Amdor, LED strip lights provided, one (1) each hinged side of compartment door openings. The lights will be controlled by an automatic door switch.

21-2 PIKE POLE STORAGE

There will be three (3) tubes provided for storage of pike poles. **The tubes will be located in the transverse section of the crew cab compartment, below the seat box.** The poles will be stored so that one (1) pole can be accessed from the driver side and two (2) from the passenger side.

The size and brand of the pike poles stored will be TBD.

21-3 PIKE POLE STORAGE

There will be two (2) set(s) of holders for mounting of pike pole(s). The holders will be mounted vertically One (1) each side, mounted to back of the cab. The middle of the pole will be held in place with a Handlelok, P/N 1004, adjustable mounting bracket. The top of the pole will be held in place with a Flexmount, P/N 1002-2, short locking mount and the bottom of the pole will be located in a cup holder.

21-4 CAB DASH

The driver side dash, switch panel located to the right of the driver, and center console will be an easily removable high impact resistant polymer cover.

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

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

21-5 MOUNTING PLATE ON ENGINE TUNNEL

Equipment installation provisions will be installed on the engine tunnel.

A 0.188" smooth aluminum plate will be bolted to the top surface of the engine tunnel. The plate will follow the contour of the engine tunnel and will run the entire length of the engine tunnel. The plate will be spaced off the engine tunnel 1.00" to allow for wire routing below the plate.

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

21-6 CAB INTERIOR

The cab interior will be constructed of primarily metal painted Splatter Black to withstand the severe duty cycles of the fire service.

The engine tunnel will be aluminum painted Splatter Black" on the top and sides,

For durability and ease of maintenance, the cab interior side walls will be painted aluminum. The rear wall will be painted aluminum.

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

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

All wiring will be placed in metal raceways.

22-1 CAB INTERIOR UPHOLSTERY

The cab interior upholstery will be 36 oz Black vinyl.

22-2 CAB INTERIOR PAINT

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

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

22-3 CAB FLOOR

The cab and crew cab flooring will be constructed with Aluminum covered with Black textured Linex.

22-4 DEFROST / AIR CONDITIONING SYSTEM

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

22-5 Cab Defroster

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

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

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

22-6 Cab/Crew Auxiliary Heater

There will be one (1) 31,000 BTU auxiliary heater with 560 SCFM of air flow provided in each outboard rear facing seat risers with a dual scroll blower. An aluminum plenum incorporated into the cab structure used to transfer heat to the forward positions.

22-7 Air Conditioning

A condenser will be a 59,644 BTU output that meets and exceeds the performance specification will be mounted on the radiator.

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

The evaporator unit will be installed in the rear portion of the cab ceiling over the engine tunnel. The

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evaporator will include one (1) high performance heating core, one (1) high performance cooling core with (1) plenum directed to the front and one (1) plenum directed to the rear of the cab. The rear plenum a formed plastic cover.

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

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

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

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

- Minimum of five (5) will be directed towards crew cab area

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

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

23-1 Climate Control

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

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

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

23-2 Gravity Drain Tubes

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

23-3 WINDOW DEFROST FANS

Two (2) window defrost fans will be mounted on the ceiling of the cab, located To Be Determined at Approval meeting.

23-4 SUN VISORS

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

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

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24-1 GRAB HANDLES

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

24-2 ENGINE COMPARTMENT LIGHTS

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

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

24-3 ACCESS TO ENGINE DIPSTICKS

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

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

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

24-4 MAP BOX

There will be one (1) map box(es) with three (3) bins, open at top. The map box(es) will be installed at final inspection. The map box(es) will be divided into three (3) bins, each being 12.50" wide x 3.00" high x 12.00" deep. Each bin will slant 30 degrees from horizontal. The map box(es) will be constructed of 0.125" aluminum and will be painted to match the cab interior.

24-5 VELCRO STRAP(S) FOR MAP BOX

There will be one (1) Velcro® strap(s) installed on the map box.

24-6 CAB SAFETY SYSTEM

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

- A supplemental restraint system (SRS) sensor will be installed on a structural cab member behind the instrument panel. The SRS sensor will perform real time diagnostics of all critical subsystems and will record sensory inputs immediately before and during a side roll or frontal impact event.
- A slave SRS sensor will be installed in the cab to provide capacity for eight (8) crew cab seating positions.
- A fault-indicating light will be provided on the vehicle's instrument panel allowing the driver to monitor the operational status of the SRS system.
- A driver side front air bag will be mounted in the steering wheel and will be designed to protect the head and upper torso of the occupant, when used in combination with the 3-point seat belt.

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- A passenger side knee bolster air bag will be mounted in the modesty panel below the dash panel and will be designed to protect the legs of the occupant, when used in combination with the 3-point seat belt.
- Air curtains will be provided in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.
- Suspension seats will be provided with devices to retract them to the lowest travel position during a side roll or frontal impact event.
- Seat belts will be provided with pre-tensioners to remove slack from the seat belt during a side roll or frontal impact event.

25-1 FRONTAL IMPACT PROTECTION

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

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

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

25-2 SIDE ROLL PROTECTION

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

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

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

25-3 SEATING CAPACITY

The seating capacity in the cab will be four (4).

25-4 DRIVER SEAT

A seat will be provided in the cab for the driver. The seat design will be a cam action type, with air suspension. For increased convenience, the seat will include a manual control to adjust the horizontal position (6.00" travel). The manual horizontal control will be a towel-bar style located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have an

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adjustable reclining back. For optimal comfort, the seat will be provided with foam cushions designed with EVC (elastomeric vibration control).

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

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

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

26-1 OFFICER SEAT

A seat will be provided in the cab for the passenger. The seat will be a cam action type, with air suspension. For optimal comfort, the seat will be provided with 17.00" deep foam cushions designed with EVC (elastomeric vibration control).

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

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

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

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

26-2 REAR FACING LEFT SIDE CABINET

A EMS rear facing cabinet will be provided in the crew cab at the left side outboard position.

The cabinet will be 23.00" wide x 28.00" high x 26.75" deep with one (1) Amdor rollup door with white finish, non-locking, radius track style. That is, it will travel over the top and down the back of the cabinet. Front top corners of the cabinet will be radiused. This will allow access through the front and top section of the cabinet. The cabinet will be accessible from the interior crew cab as well to be equipped with webbing. A shield will be installed to keep items in this cabinet from falling into the door tracking area and jamming the door. The frame to frame opening will be 16.00" wide x 27.75" high. The minimum clear door opening of the cabinet will be 13.25" wide x 25.25" high.

RADIUS CLEAR DOOR OPENINGS (F-F = Frame to Frame)					
AMDOR		GORTITE		ROM	
HORIZONTAL	VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL	VERTICAL
Subtract 2.00" from F-F	Subtract 2.50" from Height	Subtract 2.75" from F-F	Subtract 2.50" from Height	Subtract 2.56" from F-F	Subtract 2.50" from Height

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

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the cab interior.

The cabinet will be accessible from inside the cab and outside the cab

The cabinet will include no louvers.

The cabinet will also provide access from outside the cab with one Roll up door painted to match the cab exterior. The exterior clear door opening will be 17.00" wide x 24.75" high.

The exterior access will be provided with a polished stainless steel scuff plate on the lower door frame.

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

27-1 Cabinet Light

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

27-2 REAR FACING RIGHT SIDE CABINET

A rear facing cabinet will be provided in the crew cab at the right side outboard position.

The cabinet will be 23.00" wide x 28.00" high x 26.75" deep with one (1) Amdor rollup door with white finish, non-locking, radius track style. That is, it will travel over the top and down the back of the cabinet. Front top corners of the cabinet will be radiused. This will allow access through the front and top section of the cabinet. The cabinet will be accessible from the interior crew cab as well to be equipped with webbing. A shield will be installed to keep items in this cabinet from falling into the door tracking area and jamming the door. The frame to frame opening will be 15.00" wide x 27.75" high. The minimum clear door opening of the cabinet will be 12.25" wide x 25.25" high.

RADIUS CLEAR DOOR OPENINGS (F-F = Frame to Frame)					
AMDOR		GORTITE		ROM	
HORIZONTAL	VERTICAL	HORIZONTAL	VERTICAL	HORIZONTAL	VERTICAL
Subtract 2.00" from F-F	Subtract 2.50" from Height	Subtract 2.75" from F-F	Subtract 2.50" from Height	Subtract 2.56" from F-F	Subtract 2.50" from Height

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

The cabinet will include no louvers.

The cabinet will have access from outside the cab via a Roll up painted door. The exterior clear door opening will be 17.00" wide x 24.75" high.

The exterior access will be provided with a polished stainless steel scuff plate on the lower door frame.

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

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28-1 Cabinet Light

There will be one (1) white Amdor LED strip light installed on the left side of the exterior cabinet door opening,

one (1) white Amdor LED strip light installed on the right side of the exterior cabinet door opening,

one (1) white Amdor LED strip light installed on the right side of the interior cabinet door opening

one (1) white Amdor LED strip light installed on the left side of the interior cabinet door opening.

The lights will be controlled by an automatic door switch.

28-2 FORWARD FACING CENTER SEATS

There will be two (2) forward facing seats provided at the center position in the crew cab. The seats will be spaced an additional 11.00" apart to provide more room for each occupant. For optimal comfort, the seats will be provided with 15.00" deep foam cushions designed with EVC (elastomeric vibration control).

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

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

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

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

28-3 FORWARD FACING OVERHEAD STORAGE COMPARTMENT

There will be a storage cabinet overhead across entire rear wall of cab above the two rear forward facing seats. (14.00" x 14.00" to 16" D). The compartment will include netting made with 2.00" wide nylon material with 2.00" openings. The nylon webbing will be permanently fastened at the bottom side of the cabinet and have seat belt buckle fasteners on the opposite side to secure it.

28-4 REAR FACING CENTER CABINET

A rear facing cabinet will be provided on the top rear of the engine tunnel.

The cabinet will be 43.00" wide x 19.00" high x 13.50" deep at the top. The back of the cabinet will follow the contour of the engine tunnel. The interior door will be web netting. The netting will be made with 1.00" wide nylon material with 2.00" openings. The nylon webbing will be permanently fastened at the top side of the cabinet and have 1.00" side release fasteners on the opposite side to secure it. The clear door opening will be 40.50" wide x 16.00" high.

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

The cabinet will include no louvers.

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

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29-1 Cabinet Light

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

29-2 REAR FACING OVERHEAD STORAGE COMPARTMENT

There will be two (2) overhead rear facing storage compartments installed at the raised roof within the crew cab, on each side of the air conditioner. The compartments will be 21.00" wide x 10.00" high x 20.00" deep at the bottom.

Each compartment will include one (1) web net door. The netting will be made with 2.00" wide nylon material with 2.00" openings. The nylon webbing will be permanently fastened at the bottom side of the cabinet and have seat belt buckle fasteners on the opposite side to secure it. The clear door opening of the compartment will be 18.50" wide x 7.00" high.

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

29-3 Compartment Light

The storage compartment lighting will consist of one (1) white Amdor LED strip light installed horizontally above each compartment door opening. The lighting will be controlled by a rocker switch on the compartment exterior.

29-4 SEAT UPHOLSTERY

All seat upholstery will be leather grain 36 oz black vinyl resistant to oil, grease and mildew. The cab will have four (4) seating positions.

29-5 AIR BOTTLE HOLDERS

All SCBA type seats in the cab will have a "Hands-Free" auto clamp style bracket in its backrest. For efficiency and convenience, the bracket will include an automatic spring clamp that allows the occupant to store the SCBA bottle by simply pushing it into the seat back. For protection of all occupants in the cab, in the event of an accident, the inertial components within the clamp will constrain the SCBA bottle in the seat and will exceed the NFPA standard of 9G.

There will be a quantity of three (3) SCBA brackets.

29-6 SEAT BELTS

All cab and tiller cab (if applicable) seating positions will have red seat belts. To provide quick, easy use for occupants wearing bunker gear, the female buckle and seat belt webbing length will meet or exceed the current edition of NFPA 1901 and CAN/ULC - S515 standards.

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

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

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

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

30-1. HELMET STORAGE PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2016 edition, section 14.1.7.4.1 requires a location for helmet storage be provided.

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

30-2. CAB DOME LIGHTS

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

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

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

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

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

30-3. PORTABLE HAND LIGHTS. PROVIDED BY FIRE DEPARTMENT

NFPA 1901, 2016 edition, section 5.9.4 requires two portable hand lights mounted in brackets fastened to the apparatus.

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

30-4. CAB INSTRUMENTATION

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

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31-1 Gauges

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

- Voltmeter gauge (volts):
 - o Low volts (11.8 VDC)
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
 - o High volts (15.5 VDC)
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
 - o Very low volts (11.3 VDC)
 - Red warning indicator on the information center with a steady alarm
 - Amber caution light on gauge assembly
 - o Very high volts (16.0 VDC)
 - Red warning indicator on the information center with a steady alarm
- Amber caution light on gauge assembly
- Engine Tachometer (RPM)
- Engine Hour Meter
- Speedometer MPH (Major Scale), KM/H (Minor Scale)
- Fuel level gauge (Empty - Full in fractions):
 - o Low fuel (1/8 full)
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
 - o Very low fuel (1/32 full)
 - Red caution indicator on the information center with steady alarm
 - Amber caution light on gauge assembly
- Engine Oil pressure Gauge (PSI):
 - o Low oil pressure to activate engine warning lights and alarms
 - Red caution indicator on the information center with steady alarm
 - Amber caution light on gauge assembly
- Front Air Pressure Gauges (PSI):
 - o Low air pressure to activate warning lights and alarm
 - Red warning indicator on the information center with a steady alarm
 - Amber caution light on gauge assembly
- Rear Air Pressure Gauges (PSI):
 - o Low air pressure to activate warning lights and alarm
 - Red warning indicator on the information center with a steady alarm
 - Amber caution light on gauge assembly
- Transmission Oil Temperature Gauge (Fahrenheit):
 - o High transmission oil temperature activates warning lights and alarm
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
- Engine Coolant Temperature Gauge (Fahrenheit):

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- o High engine temperature activates an engine warning light and alarms
 - Amber caution indicator on the information center with intermittent alarm
 - Amber caution light on gauge assembly
- Diesel Exhaust Fluid Level Gauge (Empty - Full in fractions):
 - o Low fluid (1/8 full)
 - Amber indicator light in gauge dial

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

32-1 Indicator Lamps

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

The following amber telltale lamps will be present:

- Low coolant
- Trac cntl (traction control) (where applicable)
- Check engine
- Check trans (check transmission)
- Aux brake overheat (Auxiliary brake overheat)
- Air rest (air restriction)
- Caution (triangle symbol)
- Water in fuel
- DPF (engine diesel particulate filter regeneration)
- Trailer ABS (where applicable)
- Wait to start (where applicable)
- HEST (engine high exhaust temperature) (where applicable)
- ABS (antilock brake system)
- MIL (engine emissions system malfunction indicator lamp) (where applicable)
- Side roll fault (where applicable)
- Front air bag fault (where applicable)

The following red telltale lamps will be present:

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

The following green telltale lamps will be provided:

- Left turn
- Right turn
- Battery on

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The following blue telltale lamp will be provided:

- High beam

33-1 Alarms

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

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

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

33-2 Indicator Lamp and Alarm Prove-Out

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

33-3 Control Switches

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

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

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

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

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

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

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Heater, defroster, and air conditioning control panel.

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

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

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

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

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

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

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

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

34-1 Custom Switch Panels

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

34-2 Diagnostic Panel

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

The diagnostic panel will include the following:

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

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35-1 Cab LCD Display

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

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

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

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

35-2 AIR RESTRICTION INDICATOR

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

35-3 OVERHEAD SPEEDOMETER

A Class I digital display speedometer will be provided on the officer side overhead position.

35-4 "DO NOT MOVE APPARATUS" INDICATOR

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

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

35-5 DO NOT MOVE TRUCK MESSAGES

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

The following messages will be displayed (where applicable):

- Do Not Move Truck
- DS Cab Door Open (Driver Side Cab Door Open)
- PS Cab Door Open (Passenger's Side Cab Door Open)
- DS Crew Cab Door Open (Driver Side Crew Cab Door Open)
- PS Crew Cab Door Open (Passenger's Side Crew Cab Door Open)
- DS Body Door Open (Driver Side Body Door Open)
- PS Body Door Open (Passenger's Side Body Door Open)
- Rear Body Door Open
- DS Ladder Rack Down (Driver Side Ladder Rack Down)
- PS Ladder Rack Down (Passenger Side Ladder Rack Down)

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- Deck Gun Not Stowed
- Lt Tower Not Stowed (Light Tower Not Stowed)
- Fold Tank Not Stowed (Fold-A-Tank Not Stowed)
- Aerial Not Stowed (Aerial Device Not Stowed)
- Stabilizer Not Stowed
- Steps Not Stowed
- Handrail Not Stowed

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

36-1 SWITCH PANELS

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

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

36-2 WIPER CONTROL

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

36-3 SPARE CIRCUIT

There will be three (3) dual USB fast charge socket mounts installed on the apparatus.

The above wires will have the following features:

- The positive wire will be connected directly to the battery power.
- The negative wire will be connected to ground.
- Wires will be protected to 4.8 amps at 12 volts DC.
- The USB socket mount will be Two (2) in the officers side instrument panel One (1) in the crew cab area.
- Termination will be a Blue Sea Systems part number 1045 dual USB charger socket.
- Wires will be sized to 125% of the protection.

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

36-4 CUSTOMER SUPPLIED RADIO WIRING

There will be one (1) 12 volt combination wiring leads of which each will include one (1) battery switched, one (1) ignition and one (1) negative for use with radio equipment.

Each lead will be 18.00" long and be provided Behind Officer Seat, with 5' of extra wire coiled up. The leads will be clearly marked in a coil and terminate with butt splices.

A breaker rated for 30 amps will be provided for circuit protection of the battery switched lead with a minimum of 10 gauge wire.

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A breaker rated for 7.5 amps will be provided for circuit protection of the ignition lead.

The wires will be colored coded as follows:

- red for battery switched
- yellow for ignition
- black for ground

37-1 SPARE CIRCUIT

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

The above wires will have the following features:

- The positive wire will be connected directly to the battery power
- The negative wire will be connected to ground
- Wires will be protected to 15 amps at 12 volts DC
- Power and ground will terminate both in location 14
- Termination will be with 15 amp, power point plug with rubber cover
- Wires will be sized to 125 percent of the protection

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

37-2 SPARE CIRCUIT

There will be three (3) pair of wires, including a positive and a negative, installed on the apparatus.

The above wires will have the following features:

- The positive wire will be connected directly to the battery power
- The negative wire will be connected to ground
- Wires will be protected to 30 amps at 12 volts DC
- Power and ground will terminate behind officer seat, in EMS compartment(s) and Engine Tunnel, Right Side, Mounted at Final
- Termination will be with a 10-place bus bar with screws and removable cover
- Wires will be sized to 125% of the protection

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

37-3 INFORMATION CENTER

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

The information center will have the following specifications:

- Operate in temperatures from -40 to 185 degrees Fahrenheit
- An Optical Gel will be placed between the LCD and protective lens
- Five weather resistant user interface switches
- Grey with black accents
- Sunlight Readable
- Linux operating system

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- Minimum of 1000nits rated display
- Display can be changed to an available foreign language
- A LCD display integral to the cab gauge panel will be included as outlined in the cab instrumentation area.
- Programmed to read US Customary

38-1 General Screen Design

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

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

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

38-2 Home/Transit Screen

This screen will display the following:

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

38-3 On Scene Screen

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

- Battery Voltage
- Hour Meter
- Fuel
- Oil Pressure
- Coolant Temperature
- RPM
- Water Level (if equipped)
- Foam Level (if equipped)
- Foam Concentration (if equipped)

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- Water Flow Rate (if equipped)
- Water Used (if equipped)
- Active Alarms

39-1 Virtual Buttons

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

39-2 Page Screen

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

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

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- Setup
 - o Clock Setup
 - o Date & Time
 - 12 or 24 hour format
 - Set time and date
 - o Backlight
 - Daytime
 - Night time
 - Sensitivity
 - o Unit Selection
 - o Home Screen
 - o Virtual Button Setup
 - o On Scene Screen Setup
 - o Configure Video Mode
 - Set Video Contrast
 - Set Video Color
 - Set Video Tint
- Do Not Move
 - o The screen will indicate the approximate location and type of item that is open or is not stowed for travel. The actual status of the following devices will be indicated
 - Driver Side Cab Door
 - Passenger's Side Cab Door
 - Driver Side Crew Cab Door
 - Passenger's Side Crew Cab Door
 - Driver Side Body Doors
 - Passenger's Side Body Doors
 - Rear Body Door(s)
 - Ladder Rack (if applicable)
 - Deck Gun (if applicable)
 - Light Tower (if applicable)
 - Hatch Door (if applicable)
 - Stabilizers (if applicable)
 - Steps (if applicable)
- Notifications
 - o View Active Alarms
 - Shows a list of all active alarms including date and time of the occurrence is shown with each alarm
 - Silence Alarms - All alarms are silenced
- Timer Screen
- HVAC (if equipped)
- Tire Information (if equipped)
- Ascendant Set Up Confirmation (if equipped)

Button functions and button labels may change with each screen.

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41-1 COLLISION MITIGATION

There will be a HAAS Alert®, Model HA5 Responder-to-Vehicle (R2V) collision avoidance system provided on the apparatus. The HA5 cellular transponder module will be installed behind the cab windshield, as high and near to the center as practical, to allow clear visibility to the sky. The module dimensions are 5.40" long x 2.70" wide x 1.30" high, and operating temperature range is -40 degree C to 85 degree C.

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

While responding with emergency lights on, the HA5 transponder sends alert messages via cellular network to motorists in the vicinity of the responding truck that are equipped with the WAZE app.

While on scene with emergency lights on, the HA5 transponder sends road hazard alerts to motorists in the vicinity of the truck that are equipped with the WAZE app.

The HA5 Responder-to-Vehicle (R2V) collision avoidance system will include the transponder and a 5 year cellular plan subscription.

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

41-2 VEHICLE DATA RECORDER

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

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

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

- Vehicle Speed - MPH
- Acceleration - MPH/sec
- Deceleration - MPH/sec
- Engine Speed - RPM
- Engine Throttle Position - % of Full Throttle
- ABS Event - On/Off
- Seat Occupied Status - Yes/No by Position
- Seat Belt Buckled Status - Yes/No by Position
- Master Optical Warning Device Switch - On/Off
- Time - 24 Hour Time
- Date - Year/Month/Day

41-3 Seat Belt Monitoring System

A seat belt monitoring system (SBMS) will be provided on the Command Zone™ color display. The

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SBMS will be capable of monitoring up to 10 seating positions indicating the status of each seat position per the following:

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

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

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

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

42-1 BRACKET ONLY INSTALLATION

There shall be two (2) customer supplied Thermal Imaging camera charging bracket(s) sent to the apparatus manufacturers preferred installer to be installed Engine Tunnel TBD.

Specific shipping requirements will be followed.

42-2 RADIO ANTENNA MOUNT

There will be four (4) standard 1.125", 18 thread antenna-mounting base(s) installed Left, Right and Rear Centered, leaving 42" extra cable on the cab roof with high efficiency, low loss, coaxial cable(s) routed to behind the officer seat. A weatherproof cap will be installed on the mount.



42-3 VEHICLE CAMERA SYSTEM

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

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

The camera images will be displayed on the driver's vehicle information center display. Audio from the microphone on the active camera will be not provided.

The following components will be included:

- One (1) SV-CW134639CAI, camera
- One (1) amplified speaker (if applicable)
- All necessary cables

42-4 RECESS REAR CAMERA

A rear camera recess will be provided in the center at the rear .

42-5 ELECTRICAL POWER CONTROL SYSTEM

The primary power distribution will be located forward of the officer's seating position and be easily

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accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be easily accessible.

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

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

43-1 Solid-State Control System

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

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

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

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

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

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- Module circuit board will meet SAE J771 specifications
- Operating temperature from -40C to +70C
- Storage temperature from -40C to +70C
- Vibration to 50g
- IP67 rated enclosure (Totally protected against dust and also protected against the effect of temporary immersion between 15 centimeters and one (1) meter)
- Operating voltage from eight (8) volts to 16 volts DC

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

44-1 Circuit Protection and Control Diagram

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

44-2 On-Board Electrical System Diagnostics

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

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

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

44-3 Prognostics

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

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

Prognostics will include:

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

44-4 Advanced Diagnostics

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

The service and maintenance software will be easy to understand and use and have the ability to view

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system input/output (I/O) information.

45-1 Tech Module With WiFi

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

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

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

A USB connection will be provided on the Tech Module. It will provide a means to download data logger information and update software in the device.

45-2 Indicator Light and Alarm Prove-Out System

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

45- 3 Voltage Monitor System

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

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

45-4 Power and Ground Studs

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

The spare circuits will consist of the following:

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

45-5 Enhanced Software

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

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

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

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

46-1 EMI/RFI Protection

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

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter requirements.

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

46-1 ELECTRICAL

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

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

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

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compound added to the socket terminal area.

6. All electrical terminals in exposed areas will have silicon (1890) applied completely over the metal portion of the terminal.

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

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

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

47 -1 BATTERY SYSTEM

There will be **six (6)** 12 volt Exide®, Model 31S950X3W, batteries that include the following features will be provided:

- 950 CCA, cold cranking amps
- 190 amp reserve capacity
- High cycle
- Group 31
- Rating of 5700 CCA at 0 degrees Fahrenheit
- 1140 minutes of reserve capacity
- Threaded stainless steel studs

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

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

The battery charger/Inverter will be located on the back wall of the EMS compartment, located Behind Drivers Seat.

47-2 BATTERY SYSTEM

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

47-3 MASTER BATTERY SWITCH

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

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

47-4 BATTERY COMPARTMENTS

Batteries will be placed on non-corrosive mats and stored in well ventilated compartments located under the cab.

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

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

48-1 JUMPER STUDS

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

48-2 BATTERY CHARGER

There will be a battery charger with 2000 watt inverter provided.

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

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

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

48-3 AUTO EJECT FOR SHORELINE

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

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

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

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

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

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

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

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

48- 4 ALTERNATOR

A Leece-Neville, Model BLP4004H, alternator will be provided. It will have a rated output current of 350 amp as measured by SAE method J56. The alternator will feature an integral, self diagnostic regulator and rectifier. The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

48- 5 ELECTRONIC LOAD MANAGER

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

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integrity of the electrical system.

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

The system will include the following features:

- System voltage monitoring.
- A shed load will remain inactive for a minimum of five minutes to prevent the load from cycling on and off.
- Sixteen available electronic load shedding levels.
- Priority levels can be set for individual outputs.
- High Idle to activate before any electric loads are shed and deactivate with the service brake.
 - o If enabled:
 - "Load Man Hi-Idle On" will display on the information center.
 - Hi-Idle will not activate until 30 seconds after engine start up.
- Individual switch "on" indicator to flash when the particular load has been shed.
- The information center indicates system voltage.

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

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

49-1-SEQUENCER

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

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

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

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

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

- Cab Heater and Air Conditioning
- Crew Cab Heater (if applicable)

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

50-1 HEADLIGHTS

There will be two (2) *Firetech* LED 4x6 headlights and high beam lights

- the headlights to include chrome bezels

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

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

50-2 DIRECTIONAL LIGHTS

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

The lens color(s) to be the same as the LEDs.

50-3 INTERMEDIATE LIGHT

There will be two (2) Weldon, Model 9186-8580-29, amber LED turn signal marker lights furnished, one (1) each side, in the rear fender panel. The light will double as a turn signal and marker light.

50-4 CAB CLEARANCE/MARKER/ID LIGHTS

There will be seven (7) amber LED lights provided per the following:

- Three (3) amber LED identification lights will be installed in the center of the cab above the windshield.
- Two (2) amber LED clearance lights will be installed, one (1) on each outboard side of the cab above the windshield as close to the outside of the apparatus as practical.
- Two (2) amber LED clearance lights will be installed, one (1) on each side of the cab as high and far forward as practical.

50-5 FRONT CAB SIDE CLEARANCE/MARKER LIGHTS

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

The lights will activate as additional directional lights with the corresponding directional circuit.

50-6 REAR CLEARANCE/MARKER/ID LIGHTING

There will be a three (3) LED light bar used as identification lights located at the rear of the apparatus per the following:

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

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There will be two (2) LED lights installed at the rear of the apparatus used as clearance lights located at the rear of the apparatus per the following:

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

There will be two (2) LED lights installed on the side of the apparatus used as marker lights as close to the rear as practical per the following:

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

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

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

Per FMVSS 108 and CMVSS 108 requirements.

51-1 REAR FMVSS LIGHTING

The rear stop/tail and directional LED lighting will consist of the following:

- Two (2) Whelen®, Model M6BTT, red LED stop/tail lights
- Two (2) Whelen, Model M6T, amber LED arrow turn lights

The lights will be provided with color lenses.

The lights will be mounted in a polished combination housing.

There will be two (2) Whelen Model M6BUW, LED backup lights provided in the tail light housing.

51-2 LICENSE PLATE BRACKET

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

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

51-3 LIGHTING BEZEL

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

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52-1 REAR TAILGATE SIDE MARKER LIGHTS

There will be two (2) rubber flex marker lights to be installed on both right and left side of rear tailgate.

52-2 BACK-UP ALARM

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

52-3 CAB PERIMETER SCENE LIGHTS

There will be four (4) Truck-Lite, Model 6060C, white LED lights with grommets provided, one (1) for each cab and crew cab door.

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

52-4 PUMP HOUSE PERIMETER LIGHTS

There will be two (2) Truck-Lite, Model 6060C, white LED lights with grommets provided under the pump panel running boards, one (1) each side.

The lights shall be activated when the parking brake is applied

52-5 BODY PERIMETER SCENE LIGHTS

There will be two (2) Truck-Lite, Model 6060C, white LED lights with grommets provided under at the rear step area of the body, one (1) each side shining to the rear.

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

52-6 STEP LIGHTS

There will be four (4) white LED, step lights provided. One (1) step light will be provided on each side, on the front compartment face and two (2) step lights at the rear to illuminate the tailboard.

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

These step lights will be actuated when the ignition switch is on and the parking brake is set.

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

52-7 12 VOLT LIGHTING

There will be two (2) Whelen® Model P*H2*, 17,750 lumens 12 volt DC light(s) with a combination of flood and spot optics provided on the front visor, one (1) on the driver's side and one (1) on the passenger's side with 30 degree outward bracket.

The housing(s) painted parts of this light assembly to be black.

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

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

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53-1 12 VOLT DC SCENE LIGHTS

There will be one (1) Whelen® Model PCPSM2*, 16,000 lumens 12 volt DC powered light(s) with white LEDs installed on the cab located, (1) high, at the LS, between the cab and crew cab doors.

The surface mount housing(s) will be provided with a chrome cover.

The light(s) will be activated by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.

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

53-2 12 VOLT DC SCENE LIGHTS

There will be one (1) Whelen® Model PCPSM2*, 16,000 lumens 12 volt DC powered light(s) with white LEDs installed on the cab located, (1) high, at the RS, between the cab and crew cab doors.

The surface mount housing(s) will be provided with a chrome cover.

The light(s) will be activated by a switch at the driver's side switch panel, by a switch at the driver's side pump panel and by a switch at the passenger's side switch panel.

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

53-3 12 VOLT LIGHTING

There will be one (1) Whelen® Model PCPSM2*, 16,000 lumens 12 volt DC surface mount light(s) installed on the body of the apparatus located, Right Side rearward above the catwalk.

The light(s) will include housing(s) with a black cover.

The light(s) will be controlled by the same control that has been selected for the passenger's side scene light(s).

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

53-4 12 VOLT LIGHTING

There will be one (1) Whelen® Model PCPSM2*, 16,000 lumens 12 volt DC surface mount light(s) installed on the body of the apparatus located, Left Side rearward above the catwalk.

The light(s) will include housing(s) with a black cover.

The light(s) will be controlled by the same control that has been selected for the driver's side scene light(s).

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

53-5 FRONT ZONE UPPER SCENE LIGHTS

There will be (2) Whelen PCH2 Pioneer Plus Dual Panel Flood/Spotlights mounted at 30 degree angle on cab roof just above the windshield.

53-6 HOUSING TO MOUNT RECESSED LIGHT ONTO A HORIZONTAL SURFACE

There will be two (2) housings fabricated with painted aluminum installed on the apparatus One (1)

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each side out the rear of the side sheet for the 12 volt DC recessed lights.

54-1 HOSE BED LIGHTS

There will be white 12 volt DC LED light strips with stainless steel protective cover, provided to light the hose bed area. Hose Bed lights will meet the photometric levels listed in NFPA 1901 for Hose Bed lighting requirements.

- Light strip(s) will be installed along the upper edge of the left side of the hose bed.
- Light strip(s) will be installed along the upper edge of the right side of the hose bed.

The lights will be activated by a cup switch at the rear of the apparatus no more than 72.00" from the ground.

54-2 REAR SCENE LIGHTS

There will be two (2) Whelen® Model M9LZC, LED scene lights with black trim installed at the rear of the apparatus. These lights will be installed between 30.00" and 102.00" above the ground.

The lights will be controlled by a switch at the driver's side switch panel and by a cup switch at the driver's side rear bulkhead.

54-3 WALKING SURFACE LIGHT

There will be Model FRP, 4" round black 12 volt DC LED floodlight with bolt mount provided to illuminate the cargo area.

The FRP light will be activated with the park brake interlock.

There will be four (4) LED model P25 lights to illuminate the top of the aluminum hosebed cover.

These lights will be activated when the parking brake is applied .

54-4 WATER TANK

Booster tank will have a capacity of 1000 gallons and be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated.

The tank will be designed to achieve a low hose bed. Tank design will be a stepped design with the forward section of the tank higher than the section of the tank that is below the hose bed.

Tank joints and seams will be nitrogen welded inside and out.

Tank will be baffled in accordance with NFPA Bulletin 1901 requirements.

Baffles will have vent openings at both the top and bottom to permit movement of air and water between compartments.

Longitudinal partitions will be constructed of .38" polypropylene plastic and will extend from the bottom of the tank through the top cover to allow for positive welding.

Transverse partitions will extend from 4.00" off the bottom of the tank to the underside of the top cover.

All partitions will interlock and will be welded to the tank bottom and sides.

Tank top will be constructed of .50" polypropylene. It will be recessed .38" and will be welded to the

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tank sides and the longitudinal partitions.

Tank top will be sufficiently supported to keep it rigid during fast filling conditions.

Construction will include 2.00" polypropylene dowels spaced no more than 30.00" apart and welded to the transverse partitions. Two (2) of the dowels will be drilled and tapped (.50" diameter, 13.00" deep) to accommodate lifting eyes.

A sump that will be sized dependent on the tank to pump plumbing will be provided at the bottom of the water tank.

Sump will include a drain plug and the tank outlet.

Tank will be installed in a fabricated cradle assembly constructed of structural steel.

Sufficient crossmembers will be provided to properly support bottom of tank. Crossmembers will be constructed of steel bar channel or rectangular tubing.

Tank will "float" in cradle to avoid torsional stress caused by chassis frame flexing. Rubber cushions, .50" thick x 3.00" wide, will be placed on all horizontal surfaces that the tank rests on.

Stops or other provision will be provided to prevent an empty tank from bouncing excessively while moving vehicle.

Mounting system will be approved by the tank manufacturer.

Fill tower will be constructed of .50" polypropylene and will be a minimum of 8.00" wide x 14.00" long.

Fill tower will be furnished with a .25" thick polypropylene screen and a hinged cover.

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

55-1 SLEEVE, PLUMBING, THROUGH TANK

One (1) sleeve will be provided in the water tank for a 3.00" pipe to the rear.

55-2 WATER TANK RESTRAINT

A heavy-duty water tank restraint will be provided.

55-3 HOSE BED

The hose bed will be fabricated of 0.125"-5052 aluminum with a nominal 38,000 psi tensile strength.

The hose bed will be as low as practical.

Upper and rear edges of side panels will have a double break for rigidity.

The upper inside area of the beavertails will be covered with brushed stainless steel to prevent damage to painted surface when hose is removed.

Flooring of the hose bed will be removable aluminum grating with the top surface corrugated to aid in hose aeration. The grating slats will be a minimum of 0.50" x 4.50" with spacing between slats for hose

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ventilation.

A cross divider will be provided at the front of the hose bed before the tank transitions from the lower section to the upper section. The divider will run from the top of the side sheet down below the hose bed grating.

Hose bed will accommodate 1200' of 5" LDH.

56-1 EQUIPMENT STORAGE

A full width equipment storage rack will be provided below the hose bed for storage of removable hose trays.

A flange will be provided at the rear to contain the trays. The hosebed restraint will extend below the rack to retain the hose.

The size and type of the equipment storage rack will be Four (4) Poly hose trays sized to fit the following amounts. #1, 225' of 1.75" Hose #2, 225' of 1.75" Hose #3, 225' of 2.5" Hose #4, 325' of 2.5" Hose One Divider between #2 and #3.

56-2 CROSS TUBE REINFORCEMENT, HOSE BED

There will be one (1) 2.00" x 3.00" square cross tube mounted Across top of hose bed, as high as possible. above the hosebed. Reinforcement for the cross tube will be provided on each side sheet to support the tube.

56-3 REMOVABLE HOSE TRAY(S) IN HOSE BED

There will be four (4) removable U-shaped hose tray(s) provided inside the hose bed.

Tray will be sized Four (4) Poly hose trays sized to fit the following amounts. #1, 225' of 1.75" Hose #2, 225' of 1.75" Hose #3, 225' of 2.5" Hose #4, 325' of 2.5" Hose.

Tray will be fabricated of poly with two (2) hand hold cutouts on each side. Tray will slide on stainless steel angles. Bottom of angles will be lined with Dura-surf anti friction poly slides for ease of removal. A stop will be provided at the front of the tray to prevent the tray from moving forward and a strap will be supplied at the rear.

Tray will be located Equipment Storage Beneath the hose bed.

There will be four (4) spare removable hose trays the same type and size.

56-4 HOSE BED COVER

A hose bed cover, constructed of .125" bright aluminum treadplate, will be a sliding design and provide full coverage to the top of the hose bed area. The cover will slide towards the front of the hose bed on channel tracks and have sealed ball bearing rollers.

A two point latch with a single release will be provided at the center of the rear-facing edge to operate the cover. The cover will automatically latch in the closed position and rubber bumpers will be provided to stop the cover when in the fully open position.

The cover will be stowed over the forward cargo area in front of the hose bed and a portion of the hose bed, may remain covered when the cover is open.

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The cover will be reinforced so that it can support the weight of a man walking on the cover.

A magnetic switch will be provided to activate the "do not move vehicle" light (for the right side compartments) inside the cab when the cover is moved out of the closed position.

57-1 HOSEBED END FLAP

There will be two (2) black vinyl flaps installed on the rear of the hose bed. The flaps will be split horizontally Bottom of the Hose Bed above the equipment storage area, to create an upper and lower rear flap.

The upper flap will attach with four (4) seat belt buckles at the top and four (4) seat belt buckles at the bottom. At the top, the receiver portion of the seat belt fasteners will be mounted on brackets with the tab portion attached to the vinyl cover. At the base, the receiver portion of the seat belt fasteners will be attached to the vinyl cover.

The bottom flap will attach at the top with four (4) seat belt buckles at the top and four (4) seat belt buckles at the bottom. At the top, the tab portion will be installed on the flap, to be inserted into the receivers on the upper flap. At the base, the receiver portion will be attached to the vinyl cover. The tab portion will be mounted to the base of the hose bed on hinged brackets. The hinged brackets will allow the tabs to rotate down out of the way of hose deploying from the hose bed.

An additional vinyl flap will be sewn into the upper flap to cover the four (4) seat belt buckles between the upper and lower flaps. This additional flap will be sewn into the upper flap only, to allow access to the seat belt buckles when lifted.

Tether straps will be provided on the top four (4) seat belt buckles of both the upper and lower flaps, for a total of eight (8) tether straps. The upper straps will be orange and the lower straps will be red. The lower tether straps shortened based on the location of the horizontal split.

57-2 RUNNING BOARDS

Running boards will be fabricated of .125" aluminum treadplate coated with black Lynex material.

A recessed area build into the running boards large enough to hold 35' of 5" supply line and couplings. Below 6" intake under pump panel both sides of truck

Each running board will be supported by a welded 2.00" square tubing and channel assembly, which will be bolted to the pump compartment substructure.

Running boards will be 12.75" deep and spaced .50" away from the pump panel.

A splash guard will be provided above the running board tread plate.

57-3 TAILBOARD

The tailboard will also be constructed of .125" aluminum tread plate coated with black Lynex material and spaced .50" from the body, as well as supported by a structural steel assembly.

The tailboard area will be 14.00" deep and full width of the body.

The outboard sides of the tailboard will be angled at 45 degrees beginning at the point where the body meets the tailboard at the forward outboard edge angling rearward to the rear edge of the tailboard.

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The exterior side will be flanged down and in for increased rigidity of tailboard structure.

58-1 REAR WALL. SMOOTH ALUMINUM/BODY MATERIAL

The rear facing surfaces of the center rear wall will be smooth aluminum.

The bulkheads, the surface to the rear of the side body compartments, will be smooth and the same material as the body.

The rear wall will be flush.

58-2 TOW BAR

A tow bar will be installed under the tailboard at center of truck.

Tow bar will be fabricated of 1.00" CRS bar rolled into a 3.00" radius.

Tow bar assembly will be constructed of .38" structural angle. When force is applied to the bar, it will be transmitted to the frame rail.

Tow bar assembly will be designed and positioned to allow up to a 30-degree upward angled pull of 17,000 lb, or a 20,000 lb straight horizontal pull in line with the centerline of the vehicle.

Tow bar design will have been fully tested and evaluated using strain gauge testing and finite element analysis techniques.

58-3 RUNNING BOARD HOSE RESTRAINT

A pair of 2.00" wide black nylon straps with Velcro fasteners will be provided for each hose tray to secure the hose during travel. There will be Two (2) hose trays located one (1) in each side running board.

58-4 HOSE TRAY

Two (2) hose trays will be recessed one (1) in each side running board.

Capacity of the tray will be 35.00' of 5.00" soft suction hose.

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

58-5 COMPARTMENTATION

Body and compartments will be fabricated of .125", 5052-H32 aluminum.

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

Circular fender liners will be provided for prevention of rust pockets and ease of maintenance.

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

The side compartment door opening will be framed by flanging the edges in 1.75" and bending out again .75" to form an angle.

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

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

Side compartment covers will be separate from the compartment tops.

Front facing compartment walls will be covered with bright aluminum treadplate.

All screws and bolts which protrude into a compartment will have acorn nuts on the ends to prevent injury.

59-1 UNDERBODY SUPPORT SYSTEM

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

The backbone of the support system will be the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads.

The support system will include .375" thick steel vertical angle supports bolted to the chassis frame rails with .625" diameter bolts.

Attached to the bottom of the steel vertical angles will be horizontal angles, with gussets welded to the vertical members, which extend to the outside edge of the body.

A steel frame will be mounted on the top of these supports to create a floating substructure which will result in a 500 lb equipment support rating per lower compartment.

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

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

The neoprene isolators will be installed in a modified V three (3)-point mounting pattern to reduce the natural flex of the chassis being transmitted to the body.

59-2 AGGRESSIVE WALKING SURFACE

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

60-1 LOUVERS

Louvers will be stamped into compartment walls to provide the proper airflow inside the body compartments and to prevent water from dripping into the compartment. Where these louvers are provided, they will be formed into the metal and not added to the compartment as a separate plate.

60-2 TESTING OF BODY DESIGN

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

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

The criteria used during the testing procedure will include:

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

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

60-3 LEFT SIDE COMPARTMENTATION

The left side compartmentation will consist of three rollup door compartments.

A rollup door compartment ahead of the rear wheels will be provided as large as possible.

A rollup door compartment over the rear wheels will be provided as large as possible.

A rollup door compartment behind the rear wheels will be provided as large as possible.

The interior height of the compartments will be measured from the compartment floor to the ceiling.

The spool of the rollup door at the top of the compartment takes up some usable space. The depth of the compartments will be measured from the back wall to the inside of the door frame.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

Rear left side compartment will be equipped with 110 power receptical outlet.

60-4 RIGHT SIDE COMPARTMENTATION

The right side compartmentation will consist of three rollup door compartments.

A rollup door compartment ahead of the rear wheels will be provided as large as possible.

A rollup door compartment over the rear wheels, will be provided as large as possible.

A rollup door compartment behind the rear wheels will be provided as large as possible.

The interior height of the compartments will be measured from the compartment floor to the ceiling.

The spool of the rollup door at the top of the compartment takes up some usable space. The depth of the compartments will be measured from the back wall to the inside of the door frame.

Closing of the doors will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

The drop-down door will be furnished with two chain-style door holders with a plastic covering around the chain.

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Rear right side compartment will be equipped with 110 power receptical outlet.

61-1 SIDE COMPARTMENT ROLLUP DOORS

Six (6) compartment doors will be installed on the side compartments, double faced, aluminum construction, will be installed on the side compartments, double faced, aluminum construction, painted one (1) color to match the lower portion of the body and manufactured by AMDOR™ brand roll-up doors .

Door(s) will be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats will be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain will be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats will be mounted in reusable slat shoes with positive snap-lock securement.

Each slat will incorporate weather tight recessed dual durometer seals. One fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingress.

The doors will be mounted in a one-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

Bottom panel flange of roll-up door will be equipped with two cut-outs to allow for easier access with gloved hands.

A polished stainless steel lift bar to be provided for each roll-up door. The lift bar will be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

All injection molded roll-up door wear components will be constructed of Type 6 Nylon.

Each roll-up door will have a 3.00 inch diameter ballancer/tensioner drum to assist in lifting the door.

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

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

62-1 REAR COMPARTMENTATION

A roll-up door compartment above the rear tailboard will be provided.

The interior dimensions of this compartment will be a minimum of 40.00" wide x 33.63" high x 25.88" deep. The interior height of the compartments will be measured from the compartment floor to the ceiling. The spool of the rollup door at the top of the compartment takes up some usable space. The depth of the compartments will be measured from the back wall to the inside of the door frame.

A louvered, removable access panel will be furnished on the back wall of the compartment.

The rear compartment will be open into the rear side compartments.

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The clear door opening of this compartment will be a minimum of 33.25" wide x 23.88" high.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

62-2 ROLLUP REAR COMPARTMENT DOOR

The rear compartment will have a rollup door. This door will be painted Black with department requested decal.

The door will be double faced, aluminum construction, satin aluminum and manufactured by AMDOR™ brand rollup doors or equal.

The door will be constructed using 1.00" extruded double wall aluminum slats which will feature a flat smooth interior surface to provide maximum protection against equipment hang-up. The slats will be connected with a structural driven ball and socket hinge designed to provide maximum curtain diaphragm strength. Mounting and adjusting the curtain will be done with a clip system that connects the curtain to the balancer drum allowing for easy tension adjustment without tools. The slats will be mounted in reusable slat shoes with positive snap-lock securement.

Each slat will incorporate weather tight recessed dual durometer seals. One (1) fin will be designed to locate the seal within the extrusion. The second will serve as a wiping seal which will also allow for compression to prevent water ingress.

The door will be mounted in a one (1)-piece aluminum side frame with recessed side seals to minimize seal damage during equipment deployment. All seals including side frames, top gutters and bottom panel are to be manufactured utilizing non-marring materials.

Bottom panel flange of rollup door will be equipped with two (2) cut-outs to allow for easier access with gloved hands.

A polished stainless steel lift bar to be provided for each roll-up door. The lift bar will be located at the bottom of door with striker latches installed at the base of the side frames. Side frame mounted door strikers will include support beneath the stainless steel lift bar to prevent door curtain bounce, improve bottom seal life expectancy and to avoid false door ajar signals.

All injection molded rollup door wear components will be constructed of Type 6 Nylon.

The door will have a 3.00 inch diameter balancer/tensioner drum to assist in lifting the door.

The header for the rollup door assembly will not exceed 4.00".

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

63-1 DOOR GUARD

There will be six (6) compartment doors that will include a guard/drip pan designed to protect the rollup door from damage when in the retracted position and contain any water spray. The guard will be fabricated from stainless steel and installed left side rearward compartment, left side over the wheel compartment, left side forward compartment, right side rearward compartment, right side forward compartment and rear compartment.

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63-2 FLOOR MATTING

All compartments will have rubber matting on the bottom of the cabinets.

63-3 COMPARTMENT LIGHTING

There will be seven (7) compartments with white 12 volt DC LED compartment light strips. The lights will be mounted with mechanical fasteners.

There will be two (2) strip lights installed vertically in each compartment opening per the latest NFPA requirements.

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

63-4 COMPARTMENT LIGHTING

Metal clamps will be used to retain the strip lighting in all body compartments.

63-5 MOUNTING TRACKS

There will be (6) sets of tracks for mounting shelf(s) in LS1, LS3, RS1, RS2, RS3 and B1. These tracks will be installed vertically to support the adjustable shelf(s) and will be full height of the compartment. The track will be painted to match the compartment interior.

63-6 ADJUSTABLE SHELVES

There will be seven (7) shelves with a capacity of 500 lb provided.

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

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

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

The location(s) will be in LS1 at the depth transition point, in RS1 at the transition point, in RS3 at the transition point, in RS3 in the lower third, in LS3 in the upper third, in LS1 in the upper third and in LS3 at the depth transition point.

63-7 SLIDE-OUT ADJUSTABLE HEIGHT TRAY

There will be two (2) slide-out trays provided.

Each tray will have 2.00" high sides and a minimum capacity rating of 250 lb in the extended position.

Each tray will be constructed of aluminum painted spatter gray.

Each tray will be mounted on a pair of side mounted slides. The slide mechanisms will have ball bearings for ease of operation and years of dependable service. The slides will be mounted to shelf tracks to allow the tray to be adjustable up and down within the designated mounting location.

An automatic lock will be provided for both the in and out tray positions. The lock trip mechanism will be located at the front of the tray and will be easily operated with a gloved hand.

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

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64-1 SLIDE-OUT FLOOR MOUNTED TRAY

There will be three (3) floor mounted slide-out tray(s) provided.

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

Each tray will be constructed of aluminum painted spatter gray

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

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

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

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

The location(s) will be RS1, LS1 and B1.

64-2 SWING OUT TOOLBOARD

A swing out aluminum toolboard will be provided.

It will be a minimum of .188" thick with .281" diameter holes in a pegboard pattern with 1.00" centers between holes.

A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the pegboard.

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

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

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

There will be One (1) toolboard(s) provided. The toolboard(s) will be spatter gray painted and installed LS2.

64-3 SLIDE OUT TOOL BOARD

Two slideout tool boards for mountings fittings and adapters will be installed LS3.

These boards will fill full depth and as tall as possible.

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65-1 PEGBOARD

There will be 3/16" thick aluminum pegboard spatter gray painted will be installed on the back wall of four (4) compartments. It will be mounted using two (2) horizontal tracks. Retainers will be used to mount the pegboard to the tracks. The pegboard(s) installed will be the full height of the upper standard depth section of the compartment. The holes will be .281" diameter, punched 1.00" on center. Pegboard will be provided in the following compartments: LS1, LS2, RS1 and RS3.

65-2 RUB RAIL

Bottom edge of the side compartments will be trimmed with Aluminum rub rail powder coated black.

Trim will be 2.12" high with 1.38" flanges turned outward for rigidity.

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

65-3 BODY FENDER CROWNS

Black rubber fender crowns will be provided around the rear wheel openings with a dielectric barrier will be provided between the fender crown and the fender sheet metal to prevent corrosion.

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

65-4 BODY FENDER LINER

A painted fender liner will be provided. The liners will be removable to aid in the maintenance of rear suspension components.

65-5 HARD SUCTION HOSE

Two (2) lengths of 6.00" clear corrugated PVC hard suction hose, 10' in length, will be provided. The hose will be equipped with a long handle female coupling on one (1) end and a rocker lug male coupling on the other end. Couplings will be hard coated aluminum.

Hard suction will be mounted on Zico rack extend down or it's likeness on drivers side.

65-6 HANDRAILS

The handrails will be 1.25" diameter black rubber covered to provide a positive gripping surface.

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

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

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

65-7 HANDRAILS

One (1) vertical handrail will be located on each rear beavertail.

One (1) horizontal black rubber-covered handrail will be provided above the hose bed at the rear of the apparatus. The hose bed dividers do not require additional reinforcement.

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66-1 EXTINGUISHER/AIR BOTTLE/ STORAGE (TRIANGULAR)

A total of one (1) extinguisher/air bottle/storage compartments will be provided Right Side Rear. The triangular shaped compartment will be sized to fit a 8.00" diameter extinguisher in the lower area and a 8.00" diameter extinguisher in the upper area. The compartment will be approximately 25.50" deep. A partition will be provided to separate the compartment. Also inside the compartment, black rubber matting will be provided. The compartment will be furnished with a drain hole. A stainless steel powder coated Black, triangular shaped door with a push latch will be provided to contain the air bottles. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

66-2 SPEEDY DRY / STORAGE BIN (TRIANGULAR)

A total of one (1) speedy dry storage compartment on the right side forward of the rear wheels.

The triangular shaped storage compartment will be sized to accommodate a sliding tray speedy dry dispenser.

66-3 AIR BOTTLE COMPARTMENT STRAP

A strap will be provided in the air bottle compartment(s) to help contain the bottles when the vehicle is parked on an incline. The strap will wrap around the neck and attach to the wall of the compartment.

66-4 AIR BOTTLE STORAGE (TRIPLE)

A quantity of two (2) air bottle compartments designed to hold (3) air bottles up to 7.25" in diameter x 26.00" deep will be provided on the left side forward of the rear wheels and on the right side forward of the rear wheels. A stainless steel powder coated black door with a push latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal.

Inside the compartment, black rubber matting will be provided.

66- 5 AIR BOTTLE COMPARTMENT STRAP

A strap will be provided in the air bottle compartment(s) to help contain the air bottles when the vehicle is parked on an incline. The strap will wrap around the neck and attach to the wall of the compartment.

66-6 EXTENSION LADDER

There will be a 24' two-section aluminum Duo-Safety Series 900-A extension ladder provided.

66-7 ROOF LADDER

There will be a 14' aluminum Duo-Safety Series 775-A roof ladder provided.

66-8 LADDER RACK

Ground ladders will be mounted above right side of body compartments in a Zico Quic-Lift electric ladder lowering system or it's likeness. The ladder rack mounts will be powered by two (2), 12-volt electric actuators.

The electric controls will be located at the pump panel or in such a manner to allow the operator full view of the area in which the ladders will be lowered.

The electric actuator control will have a master switch and be interlocked to prevent operation should

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a compartment door, in the travel area of the ladder bracket, be in the open position.

67-1 LADDER RACK INTERLOCK AND NOT STOWED INDICATOR LIGHT

An interlock will be provided to prevent operation of the ladder rack unless the apparatus parking brake has been activated.

A steady red indicator light will be located on the cab instrument panel and illuminated when the ladder rack is not in the stowed position. The light will be labeled "Ladder Rack". In addition, the "Do Not Move Apparatus" light located in the cab will be activated when the ladder rack is not in the stowed position.

67-2 LIGHTS. FLASHING. LADDER RACK

Flashing amber lights facing the front and rear will be provided on the ladder rack and activated whenever the rack is in the down position.

67-3 FOLDING LADDER

One (1) 10' aluminum Series 585-A Duo-Safety folding ladder will be provided. The folding ladder will be installed Painted Trough, Top of Left Side Compartment, mounted with an aluminum trough painted job color on the exterior and unpainted on the interior.

A Velcro® strap will be installed to hold the ladder in the trough.

67-4 8' PIKE POLE

One (1) pike pole, Fire Hooks Unlimited, Model RH 8, 8' long roof hook, with a steel handle and pry end will be provided and located on the ladder rack system.

67-5 6 FT PIKE POLE

There will be four (4) Fire Hooks Unlimited NY roof hook RH-6, 6 foot pike pole(s) with steel handles and pry end provided two on each Side Back of Cab.

67-6 FMVSS LABEL IN CAB (ADDITIONAL)

An additional FMVSS yellow label will be provided and attached to the driver's side cab door stainless steel panel. The label will be enlarged to an 8.50" x 11.00" size and installed as far to the inside as possible, next to the web strap of the door.

67-7 FOLDING STEPS FRONT OF BODY

Folding steps will be provided full height on the left side and one (1) step on the right side body compartments to provide access to the cargo bed. Steps will be spaced evenly on the sales drawing. Actual quantity may vary due to pump panel interferences but will meet the NFPA required maximum stepping height.

The Trident steps will be bright finished, non-skid with a black tread coating on the stepping surface.

The steps can be used as a hand hold with two openings wide enough for a gloved hand.

67-8 REAR FOLDING STEPS

Bright finished, non-skid folding steps with a black tread coating on the stepping surface will be provided at the rear. The steps can be used as a hand hold with two openings wide enough for a gloved hand.

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One (1) additional folding step will be located DS inner cargo sheet. The step(s) will be bright finished, non-skid, with a black tread coating on the stepping surface. The step(s) can be used as a hand hold with two openings wide enough for a gloved hand.

68-1 MIDSHIP FIRE PUMP

Midship fire pump will be a Hale QMAX-150, 1500 gpm single (1) stage midship mounted centrifugal type.

Pump will be the class "A" type.

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

- 100% of rated capacity at 150 psi net pump pressure.
- 100% of rated capacity at 165 psi net pump pressure.
- 70% of rated capacity at 200 psi net pump pressure.
- 50% of rated capacity at 250 psi net pump pressure.

Entire pump and both suction and discharge passages will be hydrostatically tested to a pressure of 500 psi.

Pump will be fully tested at the pump manufacturer's factory to the performance requirements as outlined by the current NFPA 1901 standards and will be free from objectionable pulsation and vibration.

Pump body and related parts will be of fine grain, alloy cast iron with a minimum tensile strength of 30,000 psi (2041.2 bar).

All moving parts in contact with water will be of high quality bronze or stainless steel.

Pump body will be horizontally split, on a single plane in two (2) sections, for easy removal of entire impeller assembly, including wear rings and bearings from beneath the pump, without disturbing pump piping or the mounting of the pump in the chassis.

Pump will have one (1) double suction impeller. The pump body will have two (2) opposed discharge volute cutwaters to eliminate radial unbalance.

Pump impeller will be hard, fine grain bronze of the mixed flow design, accurately machined, hand-ground, and individually balanced. The vanes of the impeller intake eyes will be hand-ground and polished to a sharp edge. They will be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Impeller clearance rings will be bronze and easily renewable without replacing impeller or pump volute body. They will be of the wrap-around double labyrinth design for maximum efficiency. Pump shaft will be electric furnace heat-treated, corrosion resistant stainless steel. It will be super-finished under packing with galvanic corrosion (zinc separators in packing) protection for longer shaft life. Pump shaft will be sealed with double oil seal to keep road dirt and water out of drive unit.

Pump shaft will be rigidly supported by three (3) bearings for minimum deflection. A high lead bronze

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sleeve bearing will be located immediately adjacent to the impeller (on the side opposite of the drive unit). The sleeve bearing will be automatically oil lubricated and pressure balanced to exclude foreign material. The remaining bearings will be heavy-duty, deep groove ball bearings in the gearbox and will be splash lubricated.

69-1 MECHANICAL SEAL ON PUMP

Only one (1) mechanical seal will be used on the suction (inboard) side of the pump. The mechanical seal will be 2.00" in diameter and will be spring loaded, maintenance-free, and self-adjusting.

The mechanical seal construction will be a carbon sealing ring, stainless steel coil spring, Viton® rubber boot, and a tungsten carbide seat with a Teflon backup seal.

69-2 PUMP TRANSMISSION

The drive unit will be cast and completely manufactured and tested at the Hale Products, Inc. factory. The pump drive unit will be of sufficient size to withstand up to 16,000 foot/ pounds of torque from the engine in both the road and pump operating conditions. The drive unit is will be designed with ample lubrication reserve to maintain the proper operating temperature.

The gearbox drive shafts will be of heat treated chrome nickel steel and 2.75" in diameter on both the input and output drive shafts. They will be designed to withstand the full torque of the engine in both road and pump operating conditions.

All gears, both drive and pump, will be of the highest quality, electric furnace, chrome nickel steel. Bores will be ground to size and teeth integrated, crown-shaved and hardened, to give an extremely accurate gear for long life, smooth, quiet running and higher load carrying capability. An accurately cut spur design will be provided to eliminate all possible end thrust.

Selected manufacturer will select the pump ratio to provide the maximum performance with the engine and transmission selected. Three (3) green warning lights will be provided to indicate to the operator(s) when the pump has completed the shift from Road to Pump position. Two (2) lights will be located in the truck driving compartment and one (1) light on pump operator's panel adjacent to the throttle control.

69-3 PUMPING MODE

An interlock system will be provided to ensure that the pump drive system components are properly engaged so that the apparatus can be safely operated. The interlock system will be designed to allow stationary pumping only.

69-4 AIR PUMP SHIFT

Pump shift engagement will be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab.

Two (2) indicator lights will be provided adjacent to the pump shift inside the cab. One (1) green light will indicate the pump shift has been completed and be labeled "pump engaged". The second green light will indicate when the pump has been engaged and the chassis transmission is in pump gear. This indicator light will be labeled "OK to pump".

The pump shift will be interlocked to prevent the pump from being shifted out of gear when the chassis transmission is in gear to meet NFPA requirements.

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The pump shift control in the cab will be illuminated to meet NFPA requirements.

70-1 TRANSMISSION LOCK-UP

The direct gear transmission lock-up for the fire pump operation will engage automatically when the pump shift control in the cab is activated.

70-2 AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system will be provided to allow the use of water from the discharge side of the pump for cooling the engine water. The heat exchanger will be a separate unit. The heat exchanger will be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger will be plumbed to the master drain valve.

70-3 INTAKE RELIEF VALVE

One (1) Trident Air Max intake relief valve(s) will be installed on the suction side of the pump preset at 125 psig.

The relief valve will have a working range of 50 PSI to 350 PSI.

The outlet will terminate below the frame rails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

One (1) adjustable air regulator and pressure indicating gauge will be located on a common bezel on the left side pump panel to control the intake valve(s).

70-4 PRESSURE CONTROLLER

A Pressure Governor will be provided. An electric pressure governor will be provided which is capable of automatically maintaining a desired preset discharge pressure in the water pump. When operating in the pressure control mode, the system will automatically maintain the discharge pressure set by the operator (within the discharge capabilities of the pump and water supply) regardless of flow, within the discharge capacities of the water pump and water supply.

A pressure transducer will be installed in the water discharge of the pump. The transducer continuously monitors pump pressure sending a signal to the Electronic Control Module (ECM).

The governor can be used in two (2) modes of operation, RPM mode and pressure modes.

In the RPM mode, the governor can be activated after vehicle parking brake has been set. When in this mode, the governor will maintain the set engine speed, regardless of engine load (within engine operation capabilities).

In the pressure mode, the governor system can only operate after the fire pump has been engaged and the vehicle parking brake has been set. When in the pressure mode, the pressure controller monitors the pump pressure and varies engine speed to maintain a precise pump pressure. The pressure controller will use a quicker reacting J1939 database for engine control.

A preset feature allows a predetermined pressure or rpm to be set.

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A pump cavitation protection feature is also provided which will return the engine to idle should the pump cavitate. Cavitation is sensed by the combination of pump pressure below 30 psi and engine speed above 2000 rpm for more than five (5) seconds.

The throttle will be a vernier style control, with a large control knob for use with a gloved hand. A throttle ready light will be provided adjacent to the throttle control. A large 0.75" RPM display will be provided to be visible at a glance.

Check engine, and stop engine indicator lights will be provided for easy viewing.

Large 0.75" push buttons will be provided for menu, mode, preset, and silence selections.

The water tank level indicator will be incorporated in the pressure governor.

A fuel level indicator will be incorporated in the pressure controller.

A pump hour meter will be incorporated in the pressure controller.

The pressure controller will incorporate monitoring for engine temperature, oil pressure, fuel level alarm, and voltage. Pump monitoring will include, pump gearcase temperature, error codes, diagnostic data, pump service reminders, and time stamped data logging, to allow for fast accurate trouble shooting. It will also notify the driver/engineer of any problems with the engine and the apparatus.

Complete understandable messages will be provided in a 20-character display, providing for fewer abbreviations in the messages. An automatic dim feature will be included for night operations.

The pressure controller will include a USB port for easy software upgrades, which can be downloaded through a USB memory stick, eliminating the need for a laptop for software installations.

A complete interactive manual will be provided with the pressure controller.

71-1 PRIMING PUMP

The priming pump will be a Trident Emergency Products compressed air powered, high efficiency, multi-stage venturi based AirPrime System, conforming to standards outlined in NFPA pamphlet #1901.

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

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

A second priming valve will be plumbed to the rear suction piping. The second push button control will be located at the pump operator's panel.

71-2 THERMAL RELIEF VALVE

A Hale TRV120-L thermal protection device will be included on the pump that monitors pump water temperature and opens to relieve water to cool the pump when the temperature of the pump water exceeds 120 Degrees F (49 C).

The thermal protection device will include a red warning light and audible alarm. The warning light with a test switch will be mounted on the pump operator panel.

The discharge line will be 3/8 inch diameter tubing plumbed to ground.

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72-1 PUMP MANUALS

There will be a total of three (3) pump manuals provided by the pump manufacturer and furnished with the apparatus. The manuals will be provided by the pump manufacturer in the form of one (1) hard, paper copy and two (2) electronic copies. Each manual will cover pump operation, maintenance, and parts.

72-2 PLUMBING, STAINLESS STEEL AND HOSE

All inlet and outlet lines will be plumbed with either stainless steel pipe, flexible polypropylene tubing or synthetic rubber hose reinforced with hi-tensile polyester braid. All hose's will be equipped with brass or stainless steel couplings. All stainless steel hard plumbing will be a minimum of a schedule 10 wall thickness.

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping will be equipped with victaulic or rubber couplings.

Plumbing manifold bodies will be ductile cast iron or stainless steel.

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

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

All piping, hose and fittings will have a minimum of a 500 PSI hydrodynamic pressure rating.

72-3 FOAM SYSTEM PLUMBING

All piping that is in contact with the foam concentrate or foam/water solution will be stainless steel. The fittings will be stainless steel or brass. Cast iron pump manifolds will be allowed.

72-4 MAIN PUMP INLETS

A 6.00" pump manifold inlet will be provided on each side of the vehicle. The suction inlets will include removable die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump.

72-5 MAIN PUMP INLET CAP

The main pump inlets will have National Standard Threads with a long handle chrome cap.

72-6 SHORT SUCTION TUBE(S)

The suction tube(s) on the water pump will have short suction tube(s) installed to allow for installation of adapters, elbows or intake valves without excessive overhang.

72-7 VALVES

All ball valves will be Akron® Brass. The Akron valves will be the 8900 series heavy-duty style with a polymer ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

Valves will have a ten (10) year warranty.

72-8 LEFT SIDE INLET

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There will be one (1) auxiliary inlet with a 2.50" valve at the left side pump panel, terminating with a 2.50" (F) National Standard hose thread adapter.

The auxiliary inlet will be provided with a strainer, chrome swivel and plug.

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

73-1 ANODE INLET

A pair of sacrificial zinc anodes will be provided in the water pump inlets to protect the pump from corrosion.

73-2 INLET CONTROL

The side auxiliary inlet(s) will incorporate a quarter-turn ball valve with the control located at the inlet valve. The valve operating mechanism will indicate the position of the valve.

73-3 LARGE DIAMETER REAR INLET

A 6.00" inlet rear inlet with screen will be provided using 5.00" stainless steel plumbing and a 5.00" MIV valve.

The screen will provide cathodic protection against corrosion in piping.

The piping will contain only large radius elbows, no mitered joints.

The plumbing will be routed to the rear through the water tank. The inlet will terminate beside the rear compartment, above the tailboard, on the right side.

A bleeder valve will be located at the threaded connection.

73-4 REAR INLET CAP

The rear inlet will have a National Standard hose thread adapter with a long handle chrome cap.

73-5 REAR INLET CONTROL

The rear inlet will be gated with an electric operated control at the pump operator's panel. The control will be momentary to allow the valve to be gated for ease of operation. Indicator lights will be provided to show if the valve is open or closed.

73-6 INTAKE RELIEF VALVE, REAR INLET

A Trident Air Max intake relief valve will be installed on the inlet side of the rear inlet valve.

The relief valve will have a working range of 50 PSI to 350 PSI.

The outlet will terminate below the frame rails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

The control for this rear inlet intake relief valve will be operated with the main pump Trident Air Max intake relief valve controls.

73-7 ELBOW, REAR INLET

The inlet, located at the rear of the apparatus, will be furnished with a 6.00" (F) National Standard hose thread x 5.00" Storz 30 degree elbow/adapter with a Storz cap.

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74-1 INLET BLEEDER VALVE

A 0.75" bleeder valve will be provided for each side gated inlet. The valves will be located behind the panel with a swing style handle control extended to the outside of the panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. The water discharged by the bleeders will be routed below the chassis frame rails.

74-2 TANK TO PUMP

The booster tank will be connected to the intake side of the pump with 4.00" heavy duty piping and a quarter turn 3.00" full flow line valve with the control remotely located at the operator's panel. Tank to pump line will run straight (no elbows) from the pump into the front face of the water tank and angle down into the tank sump. A rubber coupling will be included in this line to prevent damage from vibration or chassis flexing.

A check valve will be provided in the tank to pump supply line to prevent the possibility of "back filling" the water tank.

74-3 TANK REFILL

A 1.50" combination tank refill and pump re-circulation line will be provided, using a quarter-turn full flow ball valve controlled from the pump operator's panel.

74-4 LEFT SIDE DISCHARGE OUTLETS

There will be Two (2) discharge outlets with a 2.50" valve on the left side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

74-5 RIGHT SIDE DISCHARGE OUTLETS

There will be One (1) discharge outlet with a 2.50" valve on the right side of the apparatus, terminating with a 2.50" (M) National Standard hose thread adapter.

74-6 LARGE DIAMETER DISCHARGE OUTLET

There will be a 4.00" discharge outlet with a 4.00" Akron valve installed on the right side of the apparatus, terminating with a 4.00" (M) National Standard hose thread adapter. This discharge outlet will be actuated with a handwheel control at the pump operator's control panel. This discharge will have an adapter that can supply 5" or 2 1/2" (Kochek 201 universal storz adapter).

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

74-7 FRONT BUMPER CROSSLAYS

There will be two (2) 1.50" discharge outlets piped to the front of the apparatus and located in the front bumper extension.

The front hose bed will have a hose capacity of 200' of 1.75" double jacket cotton-polyester hose.

The rear hose bed (closest to the cab) will have a hose capacity of 200' of 1.75" double jacket cotton-polyester hose.

The hose beds will run from side to side in the bumper extension. The ends of the bed will be open for hose deployment.

Black rubber grating will be provided at the bottom of the tray. Drain holes will be provided in the bottom of each hose bed.

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Plumbing will consist of 2.00" piping and flexible hose with a 2.00" full flow ball valve controlled at the pump operator's panel. A fabricated weldment made of stainless steel pipe will be used in the plumbing where appropriate. The discharges will terminate with a 1.50" NST with 90 degree swivel. A swivel will be located on the top of the bumper and will swing from side to side.

There will be automatic drains provided at all low points in the plumbing.

75-1 FRONT BUMPER CROSSLAY COVER

A powder coated Black aluminum treadplate cover will be provided over the full width crosslays. The cover will be attached with a stainless steel hinge at the rear.

The cover will be secured with a D-ring latch on each side in the closed position and a pneumatic stay arm on each side will hold the cover in the open position.

A black 1.00" nylon webbing design with 2.00" box pattern will be installed on each end to retain the hose during travel. The webbing will be permanently attached at the bottom of the crosslay openings. There will be 1.00" side release fasteners located at the opposite end of the permanently attached webbing.

There will be sufficient space in the hose bed for nozzle storage with the cover in the closed position.

75-2 REAR DISCHARGE OUTLET

There will be Two (2) discharge outlets piped to the rear of the truck. One (1) each side, installed so proper clearance is provided for spanner wrenches or adapters. Left side plumbing will consist of 2.50" piping along with a 2.50" full flow ball valve with the control from the pump operator's panel. on Right side plumbing to consist of 3" piping along with 3" full flow ball valve with a slow open/close gate valve with the control from the pump operator's panel.

75-3 DISCHARGE CAPS/ INLET PLUGS

Chrome plated, rocker lug, caps with chain will be furnished for all discharge outlets 1.00" thru 3.00" in size, besides the pre-connected hose outlets.

Chrome plated, rocker lug, plugs with chain will be furnished for all auxiliary inlets 1.00" thru 3.00" in size.

The caps and plugs will incorporate a thread design to automatically relieve stored pressure in the line when disconnected.

75-4 OUTLET BLEEDER VALVE

A 0.75" bleeder valve will be provided for each outlet 1.50" or larger. Automatic drain valves are acceptable with some outlets if deemed appropriate with the application.

The valves will be located behind the panel with a swing style handle control extended to the outside of the side pump panel. The handles will be chrome plated and provide a visual indication of valve position. The swing handle will provide an ergonomic position for operating the valve without twisting the wrist and provides excellent leverage. Bleeders will be located at the bottom of the pump panel. They will be properly labeled identifying the discharge they are plumbed in to. The water discharged by the bleeders will be routed below the chassis frame rails.

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76-1 LEFT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the left side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

76-2 RIGHT SIDE OUTLET ELBOWS

The 2.50" discharge outlets located on the right side pump panel will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

76-3 REAR OUTLET ELBOWS

The 2.50" discharge outlets located at the rear of the apparatus will be furnished with a 2.50" (F) National Standard hose thread x 2.50" (M) National Standard hose thread, chrome plated, 45 degree elbow.

76-4 LARGE DIAMETER OUTLET ELBOWS

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

76-5 SPECIAL THREAD ADAPTERS

There will be four (4) adapters with MNPSH and cap. These adapters will be installed on One (1) each side of pump panel, One (1) for each rear discharge on the left side.

76-6 DISCHARGE OUTLET CONTROLS

The discharge outlets will incorporate a quarter-turn ball valve with the control located at the pump operator's panel. The valve operating mechanism will indicate the position of the valve.

If a handwheel control valve is used, the control will be a minimum of a 3.9" diameter stainless steel handwheel with a dial position indicator built in to the center of the handwheel.

76-7 SWING CONTROLS

There will be Ten (10) discharge outlets controlled by a vertical swing style control. These controls will be located on the following discharges One (1) for each 2.5" Discharge (6) One (1) for each 1.5" Discharge (3) One (1) for the Reel Line (1).

76-8 DELUGE RISER

A 3.00" deluge riser will be installed above the pump in such a manner that a monitor can be mounted and used effectively. Piping will be rigidly braced and installed securely so no movement develops when the line is charged. The riser will be gated and controlled at the pump operator's panel. The outlet will include an Akron valve with a handwheel control.

76-9 MONITOR

A deck gun that offers a solid stream and adjust ability for up and down, side to side will be properly installed on the deluge riser.

This monitor will include all electric 12 VDC controls for the monitor.

A remote control switch panel will be installed on the pump operator's panel.

The monitor will have the capability of operating using a lanyard remote

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control unit.

The monitor will be painted as provided by monitor manufacturer.

77-1 NOZZLE, DELUGE

A 1250 GPM Master solid Stream nozzle with 2.50" swivel and built in stream shaper will be provided. The nozzle will have a range of 250 to 1250 GPM.

The nozzle will have an electric pattern control.

The deluge riser will have ASA 150 lb 4.00" mounting flange for mounting the monitor.

77-2 1.50" CROSSLAY HOSE BED

One (1) pre-connected crosslay to provide 200' of 1.75' double jacketed hose which will be located on the lower bed of the crosslay compartment. The compartment will accommodate a poly slide out tray. The 2.50" discharge will be located on the exterior pump panel, driver side just below the hose treys.

The crosslay control will be at the pump operator's panel.

77-3 2.5" CROSSLAY HOSE BED

One (1) pre-connected 2.5" crosslay to provide 200' of 2.5" double jacketed hose which will be located above the 1.50" hose tray. The compartment will accommodate a poly side out tray.

The 2.50" discharge will be located on the right passenger side, exterior of the pump panel just below the hose treys.

HIGHRISE HOSE CROSSLAY NO PRECONNECT

There will be crosslay compartment with a poly slide out tray to accommodate 2.5" highrise hose to be located above the 2.5" hose tray. There will be no pre-connect discharges.

77-4 CROSSLAY HOSE RESTRAINT

There will be black vinyl end flap provided across each end of two (2) crosslay(s) to secure the hose during travel. Each vinyl flap assembly is to be attached at the bottom of the crosslays, with footman loops and a permanent attachment, and is to attach at the top outside corners with seat belt buckles. The female end of the seat buckle will be permanently attached at the top corner of the opening. A bar will be attached to the female ends of the seat belt buckles to allow a single pull release. A single nylon strap will be attached to the bar for releasing the buckles on the webbing.

78-1 CROSSLAY COVER

A hinged .19" aluminum treadplate cover will be installed over the crosslay hose beds. It will include a latch at each end of the cover to hold it securely in place, a chrome grab handle at each end for opening and closing the cover and a foam rubber gasket where the cover comes into contact to a painted surface.

The cover will be provided with rubber latch hold open device.

The hinge will be to the front of the hose beds.

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78-4 BOOSTER HOSE REEL

A Hannay electric rewind booster hose reel will be installed over the pump in a recessed open compartment on the right side of the apparatus. The reel will be fabricated of aluminum and have highly polished end discs.

A polished stainless steel roller and guide assembly will be mounted on the both sides of the apparatus with a nozzle mount on the right side of apparatus..

Discharge control will be provided at the pump operator's panel. Plumbing to the reel will consist of 1.50" Aeroquip hose and a 1.50" valve.

78-5 REEL REWIND SWITCH

Reel motor will be protected from overload with a circuit breaker rated to match the motor.

Electric rewind control will be a rubber covered button will be located Right Side .

Booster hose, 1.00" diameter and 200 feet, with chrome plated Barway, or equal couplings will be provided.

Working pressure of the booster hose will be a minimum of 800 psi.

Capacity of the hose reel will be 200 feet of 1.00" booster hose.

An Elkhart, model 4000-03, booster hose nozzle with pistol grip will be provided.

78-6 HOSE REEL BLOWOUT

A hose reel blowout will be furnished to blow out any remaining water from the reel. Blowout will be piped from the wet tank of the brake system to the reel, and will be controlled at the pump operator's panel with a quarter turn valve.

79-1 PRESSURE GAUGE

There will be a pressure gauge provided for one (1) hose reel(s). The gauge will be located Left Side Pump Panel. The gauge will match the discharge outlet gauges.

79-2 HOSEREEL ACCESS

A cutout will be provided in the side sheet next to the booster hose reel. This cutout will allow access to the hose and provide a window to view the reel. Stainless steel rollers with nylon bushings will be mounted horizontally and vertically around the cutout. The side rollers will be kept approximately 1.25" shorter than the opening in order to mount the top roller farther into the opening to prevent the hose from hitting the pumphouse before the roller.

An extra roller will be mounted on the back side of the side sheet in the top position to protect the roller from the edge of the side sheet.

79-3 HOSEREEL ACCESS

A quantity of one (1) cutout(s) will be provided in the Right Side Side Sheet Over Pump for the hose reel(s). These cutout(s) will allow access to the hose and provide a window to view the reel. Stainless steel rollers with nylon bushings will be mounted horizontally and vertically around the cutout.

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79-4 FOAM PROPORTIONER

A foam proportioning system will be provided. It will be a on demand, automatic proportioning, single point, direct injection system suitable for all types of Class A and B foam concentrates, including the high viscosity (6000 cps), alcohol resistant Class B foams. Operation will be based on direct measurement of water flow, and remain consistent within the specified flows and pressures. The system will automatically proportion foam solution at rates from .1 percent to 3 percent regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump.

This system will supply foam to up to five (5) 1.75" hand lines and have the ability to

79-5 System Capacity

The system will have the ability to deliver the following minimum foam solution flow rates at accuracies that meet or exceed NFPA requirements at a pump rating of 150 psi.

100 gpm @ 3 percent

300 gpm @ 1 percent

600 gpm @ 0.5 percent

Class A foam setting in .1 percent increments from .1 percent to 1 percent. Typical settings of 1 percent, .5 percent and .3 percent (maximum capacity will be limited to the plumbing and water pump capacity).

79-6 Control System

The system will be equipped with a digital electronic control display located on the pump operators panel. Push button controls will be integrated into the panel to turn the system on/off, control the foam percentage, and to set the operation modes.

The percent of injection will have a preset. This preset can be changed at the fire department as desired. The percent of injection will be able to be easily changed at the scene to adjust to changing demands.

Three (3) .50 tall LEDs will display the foam percentage in numeric characters. Three (3) indicator LEDs will also be included, one (1) green, one (1) red, and one (1) yellow. The LEDs will indicate various system operation or error states.

The indications will be:

- Solid Green - System On
- Solid Red - Valve Position Error
- Solid Yellow - Priming System
- Flashing Green - Injecting Foam
- Flashing Red - Low Tank Level
- Flashing Yellow - Refilling Tank

The control display will house a microprocessor, which receives input from the systems water flow meter while also monitoring the position of the foam concentrate pump. The microprocessor will compare the values of the water flow versus the position/rate of the foam pump, to ensure the proportion rate is accurate. One (1) check valve will be installed in the plumbing to prevent foam from

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contaminating the water pump.

80-1 Hydraulic Drive System

The foam concentrate pump will be powered by an electric over hydraulic drive system. The hydraulic system and motor will be integrated into one (1) unit.

80-2 Foam Concentrate Pump

The foam concentrate pump will be of positive displacement, self-priming; linear actuated design, driven by the hydraulic system. The pump will be constructed of brass body; chrome plated stainless steel shaft, with a stainless steel piston. In order to increase longevity of the pump, no aluminum will be present in its construction.

A relief system will be provided which is designed to protect the drive system components and prevent over pressuring the foam concentrate pump

The foam concentrate pump will have minimum capacity for 3 gpm with all types of foam concentrates with a viscosity at or below 6000 cps including protein, fluoroprotein, AFFF, FFFP, or AR-AFFF. The system will deliver only the amount of foam concentrate flow required, without recirculating foam back to the storage tank. Recirculating foam concentrate back to the storage tank can cause agitation and premature foaming of the concentrate, which can result in system failure. The foam concentrate pump will be self-priming and have the ability to draw foam concentrate from external supplies such as drums or pails.

80-3 External Foam Concentrate Connection

An external foam pick-up will be provided to enable use of a foam agent that is not stored on the vehicle. The external foam pick-up will be designed to allow continued operation after the on-board foam tank is empty, or the use of foam different than the foam in the foam tank.

80-4 Panel Mounted External Pick-Up Connection / Valve

A bronze three (3)-way valve will be provided. The unit will be mounted to the pump panel. The valve unit will function as the foam system tank to pump valve and external suction valve. The external foam pick-up will be one (1) 0.75" male connection GHT (garden hose thread) with a cap.

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81-1 Pick-Up Hose

A 0.75" flexible hose with an end for insertion into foam containers will be provided. The hose will be supplied with a 0.75" female swivel GHT (garden hose thread) swivel connector. The hose will be shipped loose.

81-2 Discharges

The foam system will be plumbed to the right side front bumper, left side of front bumper, left rear outlet, lower pump panel 2.50" crosslay.

81-3 System Electrical Load

The maximum current draw of the electric motor and system will be no more than 55 amperes at 12 VDC.

81-4 SINGLE FOAM TANK REFILL

The foam system's proportioning pump will be used to fill the foam tank. This will allow use of the auxiliary foam pick-up to pump the foam from pails or a drum on the ground into the foam tank. A foam shut-off switch will be installed in the fill dome of the tank to shut the system down when the tank is full. The fill operation will be controlled by a mode in the foam system controller. While the proportioner pump is filling the tank, the controller will display a flashing yellow LED to indicate that the tank is filling. When the tank is full, as determined by the float switch in the tank dome, the pump will stop and the controller will shut the yellow LED off. If it attempted to use tank fill and the refill valve and suction valve are in the wrong position(s), then a red LED will illuminate to indicate the improper valve position(s). When the valves are positioned properly, then filling will commence.

81-5 FOAM TANK

The foam tank will be an integral portion of the polypropylene water tank. The cell will have a capacity of 30 gallons of foam with the intended use of Class A foam. The foam cell will not reduce the capacity of the water tank. The foam cell will have a screen in the fill dome and a breather in the lid.

81-6 FOAM TANK DRAIN

The foam tank drain will be a 1.00" quarter turn drain valve located inside the pump/plumbing compartment.

81-7 PUMP COMPARTMENT

The pump compartment will be separate from the hose body and compartments so that each may flex independently of the other. The pump compartment will be constructed of the same material as the body compartmentation.

The pump compartment substructure will be a fabricated assembly of steel tubing, angles and channels which supports both the fire pump and the side running boards.

The pump compartment will be mounted on the chassis frame rails with rubber biscuits in a four point pattern to allow for chassis frame twist.

Pump compartment, pump, plumbing and gauge panels will be removable from the chassis in a single assembly.

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82-1 PUMP MOUNTING

Pump will be mounted to a substructure which will be mounted to the chassis frame rail using rubber isolators. The mounting will allow chassis frame rails to flex independently without damage to the fire pump.

82-2 LEFT SIDE PUMP CONTROL PANEL

All pump controls and gauges will be located at the left (driver's) side of the apparatus and properly identified.

Layout of the pump control panel will be ergonomically efficient and systematically organized.

The pump operator's control panel will be removable in two (2) main sections for ease of maintenance:

The upper section will contain sub panels for the mounting of the pump pressure control device, engine monitoring gauges, electrical switches, and foam controls (if applicable). Sub panels will be removable from the face of the pump panel for ease of maintenance. Below the sub panels will be located all valve controls and line pressure gauges.

The lower section of the panel will contain all inlets, outlets, and drains.

All push/pull valve controls will have 1/4 turn locking control rods with polished chrome plated zinc tee handles. Guides for the push/pull control rods will be chrome plated zinc castings securely mounted to the pump panel. Push/pull valve controls will be capable of locking in any position. The control rods will pull straight out of the panel and will be equipped with universal joints to eliminate binding.

82-3 IDENTIFICATION TAGS

The identification tag for each valve control will be recessed in the face of the tee handle.

All discharge outlets will have color coded identification tags, with each discharge having its own unique color. Color coding will include the labeling of the outlet and the drain for each corresponding discharge.

All line pressure gauges will be mounted directly above the corresponding discharge control tee handles and recessed within the same chrome plated casting as the rod guide for quick identification. The gauge and rod guide casting will be removable from the face of the pump panel for ease of maintenance. The casting will be color coded to correspond with the discharge identification tag.

All remaining identification tags will be mounted on the pump panel in chrome plated bezels.

The pump panel on the right (passenger's) side will be removable with lift and turn type fasteners.

Trim rings will be installed around all inlets and outlets.

82-4 PUMP OPERATOR'S PANEL DRAWING

A detailed drawing to scale of the pump operator's panel will be provided for the customer to review. The drawing will include all of the gauges, controls, switching, etc., located on the pump operator's panel. The customer will be allowed to make changes and/or mark-ups to this approval drawing. The

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fire apparatus manufacturer will make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump operator's panel drawing will become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items will NOT be shown on any pump panel approval drawing(s). These item(s) will be placed on pump panel(s) at the fire apparatus manufacturer discretion.

83-1 REMAINING PUMP PANEL(S)

Detailed drawing(s) to scale of the remaining pump panel(s) will be provided for the customer to review. The drawing(s) will include all of the gauges, controls, switching, etc., located on the pump panel(s). The customer will be allowed to make changes and/or mark-ups to these approval drawing(s). The fire apparatus manufacturer will make revisions (If needed) to the drawing(s) per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved pump panel drawing(s) will become part of the contract documents.

Due to the way drain(s), bleeder(s), operational/maintenance tag(s) and NFPA required warning tag(s) are placed on pump panel(s), these items will NOT be shown on any pump panel approval drawing(s). These item(s) will be placed on pump panel(s) at the fire apparatus manufacturer discretion.

83-2 COLOR CODED TAGS

A detailed drawing/chart of the colors used on all of the inlet(s) and outlet(s) will be provided for the customer to review. The customer will be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer will make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the colors will become part of the contract documents.

83-3 SPECIAL TEXT / VERBIAGE TAGS

A detailed drawing/chart of the text/verbiage used on all of the inlet(s) and outlet(s) will be provided for the customer to review. The customer will be allowed to make changes and/or mark-ups to this approval drawing/chart. The fire apparatus manufacturer will make revisions (If needed) to the drawing per the customer changes and/or mark-ups as long as the changes are physically possible within a specific product line.

The finalized and signed customer approved drawing/chart of the text/verbiage will become part of the contract documents.

83-4 PUMP PANEL CONFIGURATION

The pump panel configuration will be arranged and installed in an organized manner that will provide user-friendly operation.

83-5 PUMP AND GAUGE PANEL

The pump and gauge panels will be constructed of aluminum with a painted FormCoat black finish. A

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Black aluminum trim molding will be provided around each panel.

The right side pump panel will be removable and fastened with swell type fasteners.

84-1 PUMP COMPARTMENT LIGHT

There will be one (1) Whelen®, Model 3SC0CDCR, 3.00" white 12 volt DC LED light(s) with Whelen, Model 3FLANGEC, flange(s) installed in the pump compartment.

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

Engine monitoring graduated LED indicators will be incorporated with the pressure controller.

Also provided at the pump panel will be the following:

- Master Pump Drain Control

84-2 THROTTLE READY GREEN INDICATOR LIGHT

There will be a green indicator light integrated with the pressure governor and/or engine throttle installed on the pump operators panel that is activated when the pump is in throttle ready mode.

84-3 OK TO PUMP INDICATOR LIGHT

There will be a green indicator light installed on the pump operators panel that is activated when the pump is in Ok To Pump mode.

84-4 ALUMINUM HEAT ENCLOSURE

A heat enclosure will be installed, trapping hot air radiated from the engine exhaust system, which will warm the fire pump. The enclosure will consist of an aluminum understructure, with easily removable aluminum panels. Also a covering above the plumbing will be provided, so warm air cannot escape freely.

84-5 PUMP COMPARTMENT HEATER

A hot water heater will be installed in the pump compartment.

Controls for the heater will be located at the pump operator's panel.

A green indicator light will be provided in the switch or adjacent to the control to show when the heater is on.

The pump compartment will be enclosed at the top to retain the heat generated by the heater inside the pump compartment.

A shutoff valve will be installed on both the intake and discharge side of the heater.

84-6 VACUUM AND PRESSURE GAUGES

The pump vacuum and pressure gauges will be liquid filled and manufactured by Class 1 Incorporated ©.

The gauges will be a minimum of 4.50" in diameter and will have white faces with black lettering, with a pressure range of 30.00"-0-600#.

The pump pressure and vacuum gauges will be installed adjacent to each other at the pump operator's control panel.

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Test port connections will be provided at the pump operator's panel. One will be connected to the intake side of the pump, and the other to the discharge manifold of the pump. They will have 0.25 in. standard pipe thread connections and polished stainless steel plugs. They will be marked with a label.

85-1 PRESSURE GAUGES

The individual "line" pressure gauges for the discharges will be Class 1© interlube filled.

They will be a minimum of 2.00" in diameter and have white faces with black lettering.

Gauge construction will include a Zytel nylon case with adhesive mounting gasket and threaded retaining nut.

Gauges will have a pressure range of 30"-0-400#.

The individual pressure gauge will be installed as close to the outlet control as practical.

This gauge will include a 10 year warranty against leakage, pointer defect, and defective bourdon tube.

85-2 WATER LEVEL GAUGE

An electric water level gauge will be incorporated in the pressure controller that registers water level by means of 9 LEDs. They will be at 1/8 level increments with a tank empty LED. The LEDs will be a bright type that is readable in sunlight, and have a full 180-degree of clear viewing.

To further alert the pump operator, the gauge will have a warning flash when the tank volume is less than 25%, and will have "Down Chasing LEDs when the tank is almost empty.

The level measurement will be ascertained by sensing the head pressure of the fluid in the tank or cell.

There will be a light driver module with this installation to power additional water level gauge(s) included on the apparatus.

85-3 WATER LEVEL GAUGE

There will be two (2) additional water level indicator(s), Whelen®, Model PSTANK2, LED module with chrome trim, installed one (1) on the cab behind the right cab door and one (1) on the cab behind the left cab door.

This light module(s) will include four (4) colored levels, and function similar to the water level indicator located at the operators panel:

- First green module indicates a full water level
- Second blue module indicates a water level above 3/4 full
- Third amber module indicates a water level above 1/2 full
- Last red module indicates a water level above 1/4 full and empty
 - o Above 1/4 this light will be steady burning
 - o At empty this light will be flashing

The flash rate will be determined by the main water level tank sensor.

This module will be activated when the parking brake is applied.

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86-1 FOAM LEVEL GAUGE

An electronic foam level gauge will be provided on the operator's panel that registers foam level by means of five (5) colored LED lights. The lights will be durable, ultra-bright five (5) LED design viewable through 180 degrees. The foam level indicators will be as follows:

- 100 percent = Green
- 75 percent = Yellow
- 50 percent = Yellow
- 25 percent = Yellow
- Refill = Red

The light will flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights will flash sequentially when the foam tank is empty.

The level measurement will be based on the sensing of head pressure of the fluid in the tank.

The display will be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design will provide complete protection from foam and environmental elements. An industrial pressure transducer will be mounted to the outside of the tank. The display will be able to be calibrated in the field and will measure head pressure to accurately show the tank level.

86-2 STEP/LIGHT SHIELD

There will be an aluminum treadplate stepping surface no less than 8.00" deep and properly reinforced to support a man's weight, installed over the pump operators panel.

- There will be 12 volt DC white LED lights installed under the step to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation of the apparatus. These lights will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.
- One (1) pump panel light will come on when the pump is in ok to pump mode.

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

There will be one (1) white LED, step light provided above this step. In order to ensure exceptional illumination, each step light will provide a minimum of 25 foot-candles (fc) covering an entire 15.00" x 15.00" square placed 10.00" below the light and a minimum of 1.5 fc covering an entire 30.00" x 30.00" square at the same 10.00" distance below the light. The step light will be activated by the pump panel light switch.

86-3 ADDITIONAL LIGHT SHIELD

An additional polished, 16 gauge stainless steel light shield will be provided above passenger's side pump panel.

- There will be 12 volt DC white LED lights installed under the light shield to illuminate the controls, switches, essential instructions, gauges, and instruments necessary for the operation

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of the apparatus. These lights will be activated by the pump panel light switch. Additional lights will be included every 18.00" depending on the size of the pump house.

87-1 AIR HORN SYSTEM

Two (2) Grover 2040 rectangular air horns will be provided. The horns will be mounted low through the lower bumper flange. The horn system will be piped to the air brake system wet tank utilizing 0.38" tubing. A pressure protection valve will be installed in-line to prevent the loss of air in the air brake system.

87-2 Air Horn Location

The air horns will be located on each side of the bumper, inside of the frame rails.

87-3 AIR HORN CONTROL

The air horns will be actuated by two (2) lanyard rope pull controls, one (1) within reach of the driver and one (1) within reach of the officer.

87-4 ELECTRONIC SIREN

A Whelen®, Model 295SLSA1, electronic siren with noise canceling microphone will be provided.

This siren to be active when the battery switch is on and that emergency master switch is on.

Electronic siren head will be recessed in the driver side inside switch panel.

Siren will be actuated by the horn button in the steering wheel. The driver will have the option to control the siren or the chassis horns from the horn button by means of a selector switch. A duplicate switch will also be located on the officers side.

87-5 SPEAKER

There will be two (2) Whelen, Model SA315P, black nylon composite, 100-watt, speaker with through bumper mounting brackets and painted grille provided. The speaker will be connected to the siren amplifier.

The speaker will be recessed in the left side of the front bumper, just outside of the frame rail.

87-6 AUXILIARY MECHANICAL SIREN

A Federal Q2B® siren will be furnished.

The control solenoid will be powered up after the emergency master switch is activated.

The mechanical siren will be recessed in the front grill in the center. The backside of the siren will be protected with a fabricated enclosure.

The mechanical siren will be actuated by two (2) switches, one (1) located on the officer's side console and one (1) incorporated in steering wheel.

A momentary rocker switch shall be included in the left side overhead switch panel to activate the siren brake.

There will be a red outline decal around the black rocker switch.

A momentary rocker switch shall be included in the right side officers side overhead switch panel

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to activate the siren brake.

There will be a red outline decal around the black rocker switch.

88-1 FRONT ZONE UPPER WARNING LIGHTS

The lightbar will include the following:

There will be (1) one 55.00" Freedom IV Light bar center of roof cab and (2) 23.3" Mini Freedom IV lightbars one mounted on the right side cab roof above the passenger door and one mounted on the left side roof cab above the driver side door.

There will be clear lenses included on the lightbar.

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

88-2 POWER SUPPLY, STROBE

There will be one (1) Whelen®, Model PE215 strobe power supply set to national standard high priority provided in the apparatus to power the traffic light controller strobe tube.

The power supply will be controlled by a cab switch with emergency master control.

There will be no momentary switch to activate the traffic light controller.

Power to this power supply will be deactivated when the parking brake is applied.

88-3 FRONT ZONE LOWER LIGHTS

There will be two (2) pair of Whelen, Model M6**, LED lights installed on the cab face above the headlights, in a common bezel matching the one for the headlamps. The housing and trim shall be chrome finished.

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

- The driver's side front inside warning light to be red
- The passenger's side front inside warning light to be red
- The passenger's side front outside warning light to be red
- The color of the lenses will be clear

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

88-4 CAB EXTERIOR UPPER STROBE WARNING LIGHTS

There will be (2) two sets of 3 mini mini strobe warning lights on the right side and left side above the crew cab doors.

88-5 ROTO RAY LIGHT

There will be one (1) Roto Ray, Model 4000W rotating warning light provided on the front of the cab mounted through the top section of the front grille.

This warning light will include the following:

- Two (2) PAR46 lights with red LEDs and clear lenses
- One (1) PAR46 light with white LEDs and a clear lens

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There will be (2) switches in the cab on the switch panel one on the driver's side and one on the officer's side to control this light.

The rotation motor and the warning lights will be deactivated when the parking brake is applied.

89-1 MARS-888

One (1) located on front left One (1) located on front right both red.

89-2 HEADLIGHT FLASHER

The high beam headlights will flash alternately between the left and right side.

There will be a switch installed in the cab on the switch panel to control the high beam flash. This switch will be live when the battery switch and the emergency master switches are on.

The flashing will automatically cancel when the hi-beam headlight switch is activated or when the parking brake is set.

89-3 SIDE ZONE LOWER LIGHTING

There will be six (6) Whelen®, Model M6*C, flashing LED warning lights with chrome trim installed per the following:

- Two (2) lights, one (1) each side on the front cab corner. The side front lights to be red.
- Two (2) lights, one (1) each side of cab rearward of crew cab doors. The side middle lights to be red.
- Two (2) lights, one (1) each side above rear wheels. The side rear lights to be red.
- The lights will include clear lenses.

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

89-4 INTERIOR CAB DOOR WARNING LIGHTS

There will be four (4) Whelen®, Model M4** LED flashing warning lights with black trim provided, one (1) on each cab and crew cab door pan.

The color will be amber.

The warning light lens color(s) to be clear.

Each light will be activated by the door jamb switch of the associated door.

A reflective stop sign will be mounted on all (4) interior cab doors.

89-5 REAR ZONE LOWER LIGHTING

There will be two (2) Whelen®, Model M6*C, LED flashing warning lights located at the rear of the apparatus.

- The driver's side rear light to be blue
- The passenger's side rear light to be red

Both lights will include a lens that is clear.

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

90-1 REAR OF HOSEBED WARNING LIGHTS

There will be two (2) Whelen®, Model B63M7**, LED Rota-Beam, beacons with Model M7**, lower LED flashing lights provided in a single polished aluminum housing at the rear of the truck.

There will be one (1) installed on the driver's side with the lower light to the rear:

- The driver's side beacon to include red LED's.
- The rear lower light on the driver's side to be blue.

There will be one (1) installed on the passenger's side with the lower light to the rear:

- The passenger's side beacon to include red LED's.
- The rear lower light on the passenger' side to be red.

The warning light lens color(s) to be clear.

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

The lower light may be load managed when the parking brake is applied.

The left side rear warning light will be mounted on top of the compartmentation with all wiring totally enclosed. The clearance/marker light will be mounted to the side of the compartment ridge.

The right side rear warning light will be mounted on a low mount stainless steel bracket with all wiring totally enclosed. This brackets will also support the clearance/marker light.

The rear deck lights will be mounted on the beavertail flange to keep the overall height as low as possible.

90-2 TRAFFIC DIRECTING LIGHT

There will be one (1) Whelen®, Model TAL65, 36.00" long x 2.87" high x 2.25" deep, amber LED traffic directing light installed at the rear of the apparatus.

The Whelen, Model TACTL5, control head will be included with this installation.

The controller will be energized when the battery switch is on.

The auxiliary flash not activated.

This traffic directing light will be recessed with a stainless steel trim plate at the rear of the apparatus as high as practical.

The traffic directing light control head will be located in the driver side overhead switch panel in the right panel position.

WARNING LIGHTS AND SCENE LIGHTS

All warning and scene light switches on the driver's side will also be duplicated on the officer's side upper switch panel.

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91-1 LOOSE EQUIPMENT

The following equipment will be furnished with the completed unit:

- One (1) bag of chrome, stainless steel, or cadmium plated screws, nuts, bolts and washers, as used in the construction of the unit.

91-2 BLACK OUT

The following items will be blacked out powder coat.

- Chassis
 - o Top of bumper
 - o Headlight housing
 - o All front grills
 - o Wheel well trim
 - o Can steps
 - o Tire rims
- Pump Module
 - o Pump panels/Trim
 - o Panels
 - o Running boards
- Body
 - o Wheel Wells Trim
 - o Top of compartment
 - o Diamond Plate
 - o Front of body diamondplate
 - o Tailboard

91-3 PAINT

The exterior custom cab and body painting procedure will consist of a seven (7) step finishing process as follows: All black painted surfaces will be powder coated unless specified differently.

1. Manual Surface Preparation - All exposed metal surfaces on the custom cab and body will be thoroughly cleaned and prepared for painting. Imperfections on the exterior surfaces will be removed and sanded to a smooth finish. Exterior seams will be sealed before painting. Exterior surfaces that will not be painted include; chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate.
2. Chemical Cleaning and Pretreatment - All surfaces will be chemically cleaned to remove dirt, oil, grease, and metal oxides to ensure the subsequent coatings bond well. The aluminum surfaces will be properly cleaned and treated using a high pressure, high temperature 4 step Acid Etch process. The steel and stainless surfaces will be properly cleaned and treated using a high temperature 3 step process specifically designed for steel or stainless. The chemical treatment converts the metal surface to a passive condition to help prevent corrosion.
3. Surfacer Primer - The Surfacer Primer will be applied to a chemically treated metal surface to provide a strong corrosion protective basecoat. A minimum thickness of 2 mils of Surfacer Primer is applied to surfaces that require a Critical aesthetic finish. The Surfacer Primer is a two-component high solids urethane that has excellent sanding properties and an extra smooth finish when sanded.
4. Finish Sanding - The Surfacer Primer will be sanded with a fine grit abrasive to achieve an ultra-

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smooth finish. This sanding process is critical to produce the smooth mirror like finish in the topcoat.

5. Sealer Primer - The Sealer Primer is applied prior to the Basecoat in all areas that have not been previously primed with the Surfacer Primer. The Sealer Primer is a two-component high solids urethane that goes on smooth and provides excellent gloss hold out when topcoated.
6. Basecoat Paint - Two coats of a high performance, two component high solids polyurethane basecoat will be applied. The Basecoat will be applied to a thickness that will achieve the proper color match. The Basecoat will be used in conjunction with a urethane clear coat to provide protection from the environment.
7. Clear Coat - Two (2) coats of Clear Coat will be applied over the Basecoat color. The Clear Coat is a two-component high solids urethane that provides superior gloss and durability to the exterior surfaces. Lap style and roll-up doors will be Clear Coated to match the body. Paint warranty for the roll-up doors will be provided by the roll-up door manufacturer.

After the cab and body are painted, the color will be verified to make sure that it matches the color standard. Electronic color measuring equipment will be used to compare the color sample to the color standard entered into the computer. Color specifications will be used to determine the color match. A Delta E reading will be used to determine a good color match within each family color.

All removable items such as brackets, compartment doors, door hinges, and trim will be removed and painted separately if required, to ensure paint behind all mounted items. Body assemblies that cannot be finish painted after assembly will be finish painted before assembly.

The paint finish quality levels for critical areas of the apparatus (cab front and sides, body sides and doors, and boom lettering panels) are to meet or exceed Cadillac/General Motors GMW15777 global paint requirements. Orange peel levels are to meet or exceed the #6 A.C.T. standard in critical areas. These requirements must be met in order for the exterior paint finish to be considered acceptable. The manufacture's written paint standards will be available upon request.

92-1 PAINT - ENVIRONMENTAL IMPACT

Contractor will meet or exceed all current state regulations concerning paint operations. Pollution control will include measures to protect the atmosphere, water and soil. Controls will include the following conditions:

- Topcoats and primers will be chrome and lead free.
- Metal treatment chemicals will be chrome free. The wastewater generated in the metal treatment process will be treated on-site to remove any other heavy metals.
- Particulate emission collection from sanding operations will have a 99.99% efficiency factor.
- Particulate emissions from painting operations will be collected by a dry filter or water wash process. If the dry filter is used, it will have an efficiency rating of 98.00%. Water wash systems will be 99.97% efficient
- Water from water wash booths will be reused. Solids will be removed on a continual basis to keep the water clean.
- Paint wastes are disposed of in an environmentally safe manner.
- Empty metal paint containers will be recycled to recover the metal.
- Solvents used in clean-up operations will be recycled on-site or sent off-site for distillation and returned for reuse.

Additionally, the finished apparatus will not be manufactured with or contain products that have ozone

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depleting substances. Contractor will, upon demand, present evidence that the manufacturing facility meets the above conditions and that it is in compliance with his state EPA rules and regulations.

93-1 CAB TWO-TONE PAINT

The cab will be painted two-tone with the upper section painted #101 black and the lower section painted #90 red. There will be a standard two-tone cab paint break provided.

There will be a standard cab shield provided.

93-2 BODY PAINT

The body will be painted to match the lower section of the cab.

93-3 GALVANIZED CHASSIS FRAME ASSEMBLY

The chassis frame assembly will be hot dip galvanized before the installation of the cab and body, and before installation of the engine and transmission assembly, air brake lines, electrical wire harnesses, etc.

Components that are included with the chassis frame assembly that will be hot dip galvanized are:

- Frame rails
- Cross members
- Front frame extension

All galvanized components are inspected for compliance with ASTM specifications.

Battery boxes will be stainless steel.

All components that are not galvanized will be painted primer and gloss paint to match the lower job color.

93-4 AXLE HUB PAINT

All axle hubs will be painted black #101.

93-5 HOT DIP GALVANIZED WATER TANK CRADLE

The water tank cradle will be treated through a hot dip galvanizing process. The cradle will be immersed in molten zinc to provide a coating that will help protect against the effects of corrosion.

Hardware to assemble galvanized components will be Dacromet® coated.

93-6 HOT DIP GALVANIZED PUMP HOUSE AND RUNNING BOARD SUBSTRUCTURE

The pump house and running board substructure will be treated through a hot dip galvanizing process. These components will be immersed in molten zinc to provide a coating that will help protect against the effects of corrosion.

Hardware to assemble galvanized components will be Magni black coated.

93-7 HOT DIP GALVANIZED TOW EYES/HOOKS/BARS AND HITCH RECEIVER TUBE

The tow eyes/hooks/bars and hitch receiver tube will be treated through a hot dip galvanizing process. These components will be immersed in molten zinc to provide a coating that will help protect against the effects of corrosion.

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94-1 HOT DIP GALVANIZED BUMPER EXTENSION SUBSTRUCTURE

The bumper extension substructure will be treated through a hot dip galvanizing process. These components will be immersed in molten zinc to provide a coating that will help protect against the effects of corrosion.

94-2 HOT DIP GALVANIZED BODY SUBSTRUCTURE

The compartment substructure will be treated through a hot dip galvanizing process. These components will be immersed in molten zinc to provide a coating that will help protect against the effects of corrosion.

Hardware to assemble galvanized components will be Dacromet® coated.

94-3 COMPARTMENT INTERIOR PAINT

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

94-4 REFLECTIVE STRIPES

Three (3) reflective stripes will be provided across the front of the vehicle and along the sides of the body. The reflective band will consist of a 1.00" black stripe at the top with a 1.00" gap then a 6.00" black stripe with a 1.00" gap and a 1.00" black stripe on the bottom.

The reflective band provided on the cab face will be at the headlight level.

94-5 REAR CHEVRON STRIPING

There will be alternating chevron striping located on the rear-facing vertical surface of the apparatus. The rear surface, excluding the rear compartment door, will be covered.

The colors will be red and fluorescent yellow green diamond grade.

Each stripe will be 6.00" in width.

This will meet the requirements of the current edition of NFPA 1901, which states that 50% of the rear surface will be covered with chevron striping.

94-6 CHEVRON STRIPING ON THE FRONT BUMPER

There will be alternating chevron striping located on the front bumper.

The colors will be fluorescent yellow green and red diamond grade.

The size of the striping will be 4.00".

94-7 CAB DOOR REFLECTIVE STRIPE

A 6.00" x 16.00" white reflective stripe will be provided across the interior of each cab door. The stripe will be located approximately 1.00" up from the bottom, on the door panel.

This stripe will meet the NFPA 1901 requirement.

94-8 LETTERING

The lettering will be totally encapsulated between two (2) layers of clear vinyl.

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95-1 LETTERING

One hundred forty-one (141) to one hundred sixty (160) genuine gold leaf lettering, 4.00" high, with highlight and double shade will be provided.

95-2 LETTERING/NUMERALS ON CAB GRILLE

Two (2) painted letters/numerals with outline, as determined by the fire department, will be provided on the cab grille.

95-3 UNDERCOATING, CAB & BODY

The apparatus will be properly treated by an authorized Ziebart dealer.

The underside of the apparatus will be undercoated with an asphalt petroleum based material, dark in color.

The undercoating material utilized on the apparatus will be formulated to resist corrosion and deaden unwanted sound or road noise.

Coating texture will appear firm, flexible, and resistant to abrasion. Minimum dry film thickness will be in the range of 8.00 to 12.00 mils.

The material will be applied to the following areas:

Body and cab wheel well fender liners, on the back side only.

Underside of body and cab sheet metal, and structural components.

Underside and vertical sides of all sheet metal compartmentation, including support angles.

Structural support members under running boards, rear platforms, battery boxes, walkways, etc.

Inside surfaces of the pump heat enclosure, (when installed).

95-4 FIRE APPARATUS PARTS MANUAL

There will be one (1) custom parts manual(s) in USB flash drive format for the complete fire apparatus provided.

The manual(s) will contain the following:

- Job number
- Part numbers with full descriptions
- Table of contents
- Parts section sorted in functional groups reflecting a major system, component, or assembly
- Parts section sorted in alphabetical order
- Instructions on how to locate parts

Each manual will be specifically written for the chassis and body model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

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96-1 Service Parts Internet Site

The service parts information included in these manuals are also available on the Pierce website. The website offers additional functions and features not contained in this manual, such as digital photographs and line drawings of select items. The website also features electronic search tools to assist in locating parts quickly.

96-2 CHASSIS SERVICE MANUALS

There will be one (1) chassis service manuals on USB flash drives containing parts and service information on major components provided with the completed unit.

The manual will contain the following sections:

- Job number
- Table of contents
- Troubleshooting
- Front Axle/Suspension
- Brakes
- Engine
- Tires
- Wheels
- Cab
- Electrical, DC
- Air Systems
- Plumbing
- Appendix

The manual will be specifically written for the chassis model being purchased. It will not be a generic manual for a multitude of different chassis and bodies.

96-3 CHASSIS OPERATION MANUAL

The chassis operation manual will be provided on one (1) USB flash drive.

96-4 ONE (1) YEAR MATERIAL AND WORKMANSHIP

A Pierce basic apparatus limited warranty certificate, WA0008, is included with this proposal.

96-5 ENGINE WARRANTY

A Cummins **five (5) year** limited engine warranty will be provided. A limited warranty certificate, WA0181, is included with this proposal.

96-7 STEERING GEAR WARRANTY

A TRW **one (1) year** limited steering gear warranty will be provided. A copy of the warranty certificate will be submitted with the bid package.

96-8 FIFTY (50) YEAR STRUCTURAL INTEGRITY

The custom chassis frame limited warranty certificate, shall be included with this proposal.

96-9 FRONT AXLE FIVE (5) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor™ Axle 5 year limited warranty will be provided.

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97-1 SINGLE REAR AXLE FIVE (5) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor™ Axle 5 year limited warranty will be provided.

97-2 ABS BRAKE SYSTEM THREE (3) YEAR MATERIAL AND WORKMANSHIP WARRANTY

A Meritor Wabco™ ABS brake system limited warranty certificate, WA0232, is included with this proposal.

97-3 TEN (10) YEAR STRUCTURAL INTEGRITY

The custom cab limited warranty certificate, shall be included with this proposal.

97-4 TEN (10) YEAR PRO-RATED PAINT AND CORROSION

A cab limited pro-rated paint warranty certificate shall be included with this proposal.

97-5 FIVE (5) YEAR MATERIAL AND WORKMANSHIP

The Command Zone electronics limited warranty certificate shall be included with this proposal.

97-6 CAMERA SYSTEM WARRANTY

Provided a warranty certificate for the camera system.

97-7 COMPARTMENT LIGHT WARRANTY

The compartment lights will not offer an extended warranty.

97-8 TRANSMISSION WARRANTY

The transmission will have a **five (5) year/unlimited mileage** warranty covering 100 percent parts and labor. The warranty will be provided by Allison Transmission.

Note: The transmission cooler is not covered under any extended warranty you may be getting on your Allison Transmission. Please review your Allison Transmission warranty for coverage limitations.

97-9 TRANSMISSION COOLER WARRANTY

The transmission cooler will carry a five (5) year parts and labor warranty (exclusive to the transmission cooler). In addition, a collateral damage warranty will also be in effect for the first three (3) years of the warranty coverage and will not exceed \$10,000 per occurrence. A copy of the warranty certificate will be submitted with the bid package.

97-10 WATER TANK WARRANTY

A UPF poly water tank limited warranty certificate shall be included with this proposal.

97-11 TEN (10) YEAR STRUCTURAL INTEGRITY

The apparatus body limited warranty certificate shall be included with this proposal.

97-12 ROLL UP DOOR MATERIAL AND WORKMANSHIP WARRANTY

An AMDOR roll-up door limited warranty will be provided. The roll-up door will be warranted against manufacturing defects for a period of **ten (10) years**. A **five (5) year** limited warranty will be provided on painted roll up doors.

The limited warranty certificate shall be provided with this proposal.

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98-1 PUMP WARRANTY

A Hale pump limited warranty certificate shall be included with this proposal.

98-2 VEHICLE STABILITY CERTIFICATION

The fire apparatus manufacturer will provide a certification stating the apparatus complies with NFPA 1901, current edition, section 4.13, Vehicle Stability. The certification will be provided at the time of bid.

98-3 ENGINE INSTALLATION CERTIFICATION

The fire apparatus manufacturer will provide a certification, along with a letter from the engine manufacturer stating they approve of the engine installation in the bidder's chassis. The certification will be provided at the time of delivery.

98-4 POWER STEERING CERTIFICATION

The fire apparatus manufacturer will provide a certification stating the power steering system as installed meets the requirements of the component supplier. The certification will be provided at the time of bid.

98-5 CAB INTEGRITY CERTIFICATION

The fire apparatus manufacturer will provide a cab crash test certification with this proposal. The certification will state that a specimen representing the substantial structural configuration of the cab has been tested and certified by an independent third party test facility. Testing events will be documented with photographs, real-time and high-speed video, vehicle accelerometers, cart accelerometers, and a laser speed trap. The fire apparatus manufacturer will provide a state licensed professional engineer to witness and certify all testing events. Testing will meet or exceed the requirements below:

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

98-6 Roof Crush

The cab will be subjected to a roof crush force of 22,500 lb. This value meets the ECE 29 criteria, and is equivalent to the front axle rating up to a maximum of ten (10) metric tons.

98-7 Side Impact

The same cab will be subjected to dynamic preload where a 13,275-lb moving barrier is slammed into the side of the cab at 5.50 mph, striking with an impact of 13,000 ft-lb of force. This test is part of the SAE J2422 test procedure and more closely represents the forces a cab will see in a rollover incident.

98-8 Frontal Impact

The same cab will withstand a frontal impact of 32,600 ft-lb of force using a moving barrier in accordance with SAE J2420.

98-9 Additional Frontal Impact

The same cab will withstand a frontal impact of 65,200 ft-lb of force using a moving barrier. (Twice the force required by SAE J2420)

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

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99-1 CAB DOOR DURABILITY CERTIFICATION

Robust cab doors help protect occupants. Cab doors will survive a 200,000 cycle door slam test where the slamming force exceeds 20 G's of deceleration. The bidder will certify that the sample doors similar to those provided on the apparatus have been tested and have met these criteria without structural damage, latch malfunction, or significant component wear.

99-2 WINDSHIELD WIPER DURABILITY CERTIFICATION

Visibility during inclement weather is essential to safe apparatus performance. Windshield wipers will survive a 3 million cycle durability test in accordance with section 6.2 of SAE J198 *Windshield Wiper Systems - Trucks, Buses and Multipurpose Vehicles*. The bidder will certify that the wiper system design has been tested and that the wiper system has met these criteria.

99-3 ELECTRIC WINDOW DURABILITY CERTIFICATION

Cab window roll-up systems can cause maintenance problems if not designed for long service life. The window regulator design will complete 30,000 complete up-down cycles and still function normally when finished. The bidder will certify that sample doors and windows similar to those provided on the apparatus have been tested and have met these criteria without malfunction or significant component wear.

99-4 SEAT BELT ANCHOR STRENGTH

Seat belt attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat belt anchor design will withstand 3000 lb of pull on both the lap and shoulder belt in accordance with FMVSS 571.210 Seat Belt Assembly Anchorages. The bidder will certify that each anchor design was pull tested to the required force and met the appropriate criteria.

99-5 SEAT MOUNTING STRENGTH

Seat attachment strength is regulated by Federal Motor Vehicle Safety Standards and should be validated through testing. Each seat mounting design will be tested to withstand 20 G's of force in accordance with FMVSS 571.207 Seating Systems. The bidder will certify, at time of delivery, that each seat mount and cab structure design was pull tested to the required force and met the appropriate criteria.

99-6 TEN (10) YEAR PUMP PLUMBING WARRANTY

The apparatus plumbing limited warranty certificate shall be included with this proposal.

99-7 FOAM SYSTEM WARRANTY

The Husky 3 foam system limited warranty certificate shall be included with this proposal.

99-8 TEN (10) YEAR PRO-RATED PAINT AND CORROSION

A body limited pro-rated paint warranty certificate shall be included with this proposal.

99-9 THREE (3) YEAR MATERIAL AND WORKMANSHIP

Goldstar gold leaf lamination limited warranty limited warranty certificate shall be included with this proposal

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100-1 PERFORMANCE CERTIFICATIONS

100-2 Cab Air Conditioning

Good cab air conditioning temperature and air flow performance keeps occupants comfortable, reduces humidity, and provides a climate for recuperation while at the scene. The cab air conditioning system will cool the cab from a heat-soaked condition at 100 degrees Fahrenheit to an average of 78 degrees Fahrenheit in 30 minutes. The bidder will certify that a substantially similar cab has been tested and has met these criteria.

100-3 Cab Defroster

Visibility during inclement weather is essential to safe apparatus performance. The defroster system will clear the required windshield zones in accordance with SAE J381 Windshield Defrosting Systems Test Procedure And Performance Requirements - Trucks, Buses, And Multipurpose Vehicles. The bidder will certify that the defrost system design has been tested in a cold chamber and passes the SAE J381 criteria.

100-4 Cab Auxiliary Heater

Good cab heat performance and regulation provides a more effective working environment for personnel, whether in-transit, or at a scene. An auxiliary cab heater will warm the cab 77 degrees Fahrenheit from a cold-soak, within 30 minutes when tested using the coolant supply methods found in SAE J381. The bidder will certify, at time of delivery, that a substantially similar cab has been tested and has met these criteria.

100-5 AMP DRAW REPORT

The bidder will provide, at the time of bid and delivery, an itemized print out of the expected amp draw of the entire vehicle's electrical system.

The manufacturer of the apparatus will provide the following:

- Documentation of the electrical system performance tests.
- A written load analysis, which will include the following:
 - o The nameplate rating of the alternator.
 - o The alternator rating under the conditions specified per:
 - Applicable NFPA 1901 or 1906 (Current Edition).
 - o The minimum continuous load of each component that is specified per:
 - Applicable NFPA 1901 or 1906 (Current Edition).
 - o Additional loads that, when added to the minimum continuous load, determine the total connected load.
 - o Each individual intermittent load.

All of the above listed items will be provided by the bidder per the applicable NFPA 1901 or 1906 (Current Edition)