Chandler - Arizona
Where Values Make The Difference

PURCHASING ITEM FOR COUNCIL AGENDA

1. Agenda Item Number: 44

2. Council Meeting Date: December 13, 2007

TO: **MAYOR & COUNCIL**

THROUGH: **CITY MANAGER**

3. Date Prepared: November 21, 2007

4. Requesting Department: Fire

5. SUBJECT: Amendment No. 1 to agreement FA7-065-2327 for the purchase of two fire apparatus (engines) from Pierce Manufacturing Inc. in the amount of $1,162,574.

6. RECOMMENDATION: Recommend approval of Amendment No. 1 to agreement FA7-065-2327 for the purchase of two fire apparatuses (engines) from Pierce Manufacturing Inc. in the amount of $1,162,574.

7. HISTORICAL BACKGROUND/DISCUSSION: In the Fire Department's CIP there are plans for two additional fire stations in southeast Chandler over the next five years. In anticipation of the construction of the SanTan/Airport Fire Station we are ordering the engine for this station. This engine will be purchased using Impact Fees associated with this station. The Department is also requesting to replace a 15 year-old engine, this replacement is scheduled in the Fleet Management Replacement Program.

8. EVALUATION PROCESS: On October 26, 2006, Council awarded contract FA7-065-2327 for fire apparatus. The contract has provisions to extend the term for up to four additional years. Staff is recommending that the contract be extended for an additional year for the purchase of two fire apparatus. The City stipulated in the contract a 10% limit on price increases. The Department has stayed within this limit accounting for inflation, upgraded suspension, upgraded safety systems, and 2007 emissions compliance.

9. FINANCIAL IMPLICATIONS:

Cost: Not to exceed $1,162,574

Account Number	Fund Name	Program Name	CIP Funded	Amount
475.2250.0000.6310.8FI600	Fire Impact Fees	SE Fire Vehicles Airport Station	FY 07/08	$ 581,287
712.2210.0000.6310	Capital Asset Program		FY 07/08	$ 581,287

10. PROPOSED MOTION: Move to approve Amendment No. 1 to agreement FA7-065-2327 for the purchase of two fire apparatus (engines) from Pierce Manufacturing Inc. in the amount of $1,162,574.

APPROVALS

11. Requesting Department
Jim Johnson James E Johnson

12. Department Head
Jim Roxburgh James Roxburgh

13. Buyer/Contract Admin.
Mike Mandt

14. City Manager
W. Mark Pentz

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AMENDMENT NUMBER ONE,
TO AGREEMENT BETWEEN THE CITY OF CHANDLER AND PIERCE MFG INC. (FA7-065-2327)
FOR FIRE APPARATUS

This Amendment Number One to that certain Agreement Between the City Of Chandler (CITY) and Pierce Mfg Inc. (CONTRACTOR) for Fire Apparatus dated October 26, 2006 is entered into this day of , 2007.

WHEREAS, The CITY and CONTRACTOR entered into contract October 26, 2006

WHEREAS, the contract has provisions to extend and purchase additional fire apparatus;

NOW THEREFORE, the parties agree as follows:

1. Section 5.8 is hereby amended extending the term of the contract through October 26, 2008.

2. Section 5 is hereby amended to reflect an amount not to exceed one million one hundred and sixty two thousand five hundred and seventy four dollars ($1,162,574) for the purchase of two fire apparatus.

3. Exhibit A is hereby replaced with the attached Exhibit A/Amendment 1

4. Exhibit B is hereby replaced with the attached Revised Exhibit B/Amendment 1

5. All terms and conditions in the original Agreement not specifically amended herein shall be incorporated by reference in its entirety and shall remain in full force and effect.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names this _____ day of _____, 2007.

CITY OF CHANDLER:

By: _____
Mayor

CONSULTANT:

By: _____
Title: _____

APPROVED AS TO FORM:

_____
City Attorney

ATTEST:

_____
City Clerk

ATTEST: (If corporation)

_____
Secretary

WITNESS: (If individual or Partnership)

_____

[SEAL]

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4. Exhibit B is hereby replaced with the attached Revised Exhibit B/Amendment 1
5. All terms and conditions in the original Agreement not specifically amended herein shall be incorporated by reference in its entirety and shall remain in full force and effect.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names this _____ day of _____, 2007.

CITY OF CHANDLER:

By: _____
Mayor

CONSULTANT:

By: _____
Title: Pierce Sales Rep

APPROVED AS TO FORM:

_____
City Attorney

ATTEST:

_____
City Clerk

ATTEST: (If corporation)

_____
Secretary

WITNESS: (If individual or Partnership)

_____

[SEAL]

EXHIBIT A/AMENDMENT 1

FA7-065-2327

TECHNICAL SPECIFICATIONS REAR MOUNT PUMP FIRE ENGINE CAB, CHASSISAND DRIVE TRAIN

1.0 CAB AND CHASSIS

1.1 VELOCITY CHASSIS

The 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 and capacity for the intended load to be sustained and the type of service required.

1.2 SEATING CAPACITY

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

1.3 WHEELBASE

The wheelbase of the vehicle will be aprox 185.00 inches.

1.4 GVW RATING

The gross vehicle weight rating will be 45,000lbs.

1.5 CAB

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

The cab will be constructed of 5052-H32 aluminum skins on extruded aluminum framing. For increased structural integrity and occupant protection, the cab structure will include, directly forward of the driver and passenger areas, a .25" firewall plate and .50" lateral support plate that will tie the forward corner posts to the engine tunnel. The cab roof will include a heavy one-piece aluminum extrusion with wall thickness up to .12", and will extend from side to side, and attach to the upper forward corner posts by customized aluminum castings. The sub-structure will include a .38" wall extrusion under the crew cab floor for support while tilting the cab. To provide quality at the source and single source customer support, the cab will be built by the apparatus manufacturer in a facility located on the manufacturer's premises.

The cab will be a full-tilt style to 80 degrees to accommodate engine maintenance and removal. The cab pivots will be located 46" apart to provide stability while tilting the cab. The cab will be tilted by an electric over hydraulic pump that is connected to two (2) cab lift cylinders 2.25" in diameter. The cab will be locked down by a two-point automatic locking mechanism actuated after the cab has been lowered. A three-point cab mount system with

rubber isolators will improve ride quality by isolating chassis vibrations from the cab.

The crew cab will be a totally enclosed design with the interior area completely open to improve visibility and verbal communication between the occupants.

The forward cab section will have an overall height (from the cab roof to the ground) of approximately 102.00". The crew cab section will have a 10.00" raised roof, with an overall cab height of approximately 112.00". The overall height listed will be calculated based on a truck configuration with the lowest suspension weight ratings, 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 cab will have an interior width of not less than 93.50". The driver and passenger seating positions will have a minimum 24.00" clear width at knee level.

To reduce injuries to occupants in the seated positions, proper head clearance will be provided. The floor-to-ceiling height inside the forward cab will be no less than 60.25". The floor-to-ceiling height inside the crew cab will be no less than 62.95" in the center position and 68.75" in the outboard positions.

The crew cab will measure a minimum of 57.50" from the rear wall to the backside of the engine tunnel (knee level) for optimal occupant legroom.

1.7 GRILLE

A bright finished aluminum mesh grille screen, inserted behind a formed bright finished grille surround, will be provided on the front center of the cab, and serve as an air intake to the radiator.

1.8 FRONT CAB TRIM

Bright finished wrap-around housings will be provided on each side of the front cab face for mounting of the headlights and front directional lights. The housings will mate up to the side edge of the forward grille, and then extend around the front corners of the cab rearward, providing for a streamlined automotive appearance.

1.9 WARRANTY (See Item 151.0)

2.0 WARRANTY 3-YEAR CUSTOM CHASSIS (See Item 151.0)

3.0 CAB WARRANTY (See Item 151.0)

3.1 CAB INTEGRITY CERTIFICATION

The fire apparatus manufacturer will provide a cab integrity certification with this proposal. The certification will state that the cab has been tested and certified by an independent third-

party test facility. Testing events will be documented with photographs, real-time and high-speed video, vehicle accelerometers, cart accelerometers, and a laser speed trap. The fire apparatus manufacturer will provide a state-licensed professional engineer to witness and certify all testing events. Testing will meet or exceed the requirements below:

- European Occupant Protection Standard ECE Regulation No.29.

- SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

- SAE J2420 COE Frontal Strength Evaluation - Dynamic Loading Heavy Trucks.

- Roof Crush
The cab will be subjected to a roof crush force of 22,050 lbs. This value meets the ECE 29 criteria and is equivalent to the front axle rating up to a maximum of 10 metric tons.

- Additional Roof Crush
The same cab will be subjected to a roof crush force of 100,000 lbs. This value exceeds the ECE 29 criteria by nearly 4.5 times.

- Side Impact
The same cab will be subjected to dynamic preload where a 13,275 lb moving barrier slams into the side of the cab at 5.5 mph at a force of 13,000 ft-lbs. This test is part of the SAE J2422 test procedure and more closely represents the forces a cab will see in a rollover incident.

- Frontal Impact
The same cab will withstand a frontal impact of 32,600 ft-lbs of force using a moving barrier in accordance with SAE J2420.

- Additional Frontal Impact
The same cab will withstand a frontal impact of 65,200 ft-lbs 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.

4.0 CAB WINDOW GLASS AND WIPERS

4.1 PANORAMIC WINDSHIELD

A one-piece, safety glass windshield with more than 2,802 square inches of clear viewing area will be provided. The windshield will be full width and will provide the occupants with a panoramic view. The windshield will consist of three (3) layers; the outer light, the middle safety laminate, and the inner light. The .114" thick outer light layer will provide superior chip resistance. The middle safety laminate layer will prevent the windshield glass pieces from detaching in the event of breakage. The inner light will provide yet another chip

resistant layer. The cab windshield will be bonded to the aluminum windshield frame using a urethane adhesive. A custom frit pattern will be applied on the outside perimeter of the windshield for a finished automotive appearance.

4.2 WINDSHIELD WIPERS

Three (3) electric windshield wipers with a washer, in conformance with FMVSS and SAE requirements, will be provided. The wiper blades will be 21.65" long and together will clear a minimum of 1,783 square inches of the windshield for maximum visibility in inclement weather. The wiper system will be tested and certified to 2,953,000 cycles.

The windshield washer fluid reservoir will be located at the front of the vehicle and be accessible through the access hood for simple maintenance.

4.3 WIPER CONTROL

For simple operation and easy reach, the windshield wiper control will be an integral part of the directional light lever located on the steering column. The wiper control will include high and low wiper speed settings, a five (5) speed intermittent wiper control and windshield washer switch. The control will have a "return to park" provision, which allows the wipers to re-turn to the stored position when the wipers are not in use.

4.5 FAST SERVICE ACCESS FRONT TILT HOOD

A full-width access hood will be provided for convenient access to engine coolant, steering fluid, wiper fluid, cab lift controls, headlight power modules, and ember separator. The hood will also provide complete access to the windshield wiper motor and components. The hood will be contoured to provide a sleek, automotive appearance. The hood will be constructed of two (2) fiberglass panels bonded together and will include reinforcing ribs for structural integrity. The hood will include air cylinders to hold the hood in open and closed positions, and a heavy duty latch system that will meet FMVSS 113 (Hood Latch System). The spring-loaded hood latch will be located at the center of the hood with a double-action release lever located behind the "Pierce" logo. The two-step release requires the lever first be pulled to the driver side until the hood releases from the first latch (primary latch) then to the passenger side to fully release the hood (secondary latch).

4.6 SUNVISORS

Two (2) smoked Lexan sunvisors 7.75" x 28.12" long will be provided. The sunvisors will be located above the windshield with one (1) mounted on each side of the cab.

4.7 ELECTRIC WINDOW CONTROLS

Each cab entry door will be equipped with an electrically operated window. A window control panel will be ergonomically molded into the armrest of the door panel within easy reach of the respective occupant. 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 1/2 second. The driver control panel will contain a control switch for each cab door's window. All other door control panels will contain a single switch to operate the

window within that door.

4.8 WINDOW TINT

Crew cab and front cab door windows will be tinted with 44% light transmission tint. The following windows are included (First In to furnish darkest tint appliqué available:

- Front cab door, roll-up windows

- Crew cab door, roll-up windows

- Top fixed window in crew cab doors
(First In to furnish

5.0 CAB DOORS

5.1 DOORS

To enhance entry and egress to the cab, the forward cab doors will be a minimum of 43.59" wide x 76.46" 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 doors will measure a minimum of 37.87" wide x 85.50" high.

The forward cab and crew cab doors will be constructed of extruded aluminum with a nominal material thickness of .125". The exterior door skins will be constructed from .090" aluminum.

Each forward cab and crew cab entry door will contain a roll-down laminated window. The forward cab door windows will include a 7.50" high x 10.00" wide drop area at the front to enhance visibility.

A customized, vertical, pull-down type door handle will be provided on the exterior of each cab door. The exterior handle will be designed specifically for the fire service to prevent accidental activation, and will provide 4.00" wide x 2.00" deep hand clearance for ease of use with heavy gloved hands. Each door will also be provided with an interior flush, open style paddle handle that will be readily operable from fore and aft positions, and be designed to prevent accidental activation. The interior handles will provide 4.00" wide x 1.25" deep hand clearance for ease of use with heavy gloved hands.

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

A full length, heavy duty, stainless steel, piano-type hinge with a .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.

The inner cab door panels will be constructed of contoured, .118" thick low density, roto-molded polyethylene and be removable without requiring the disconnection of door and window mechanisms. The roto-molded door panels will include ultra-violet protectant in the material composition. Thin vacuum formed panels will not be acceptable.
The cab steps at each cab door location will be located inside the cab doors to protect the steps from weather elements.

5.2 GRAB HANDLE

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

A reinforced grab handle with 14.9" wide hand clearance will be designed as an integral part of the roto-molded dash panel, and will be located directly in front of the front passenger seat.

5.3 CAB DOOR SCUFFPLATES

For enhanced durability and aesthetics, all interior cab door roto-molded polyethylene panels will be provided with a polished stainless steel scuffplate insert.

5.4 STEPS

The forward cab and crew cab access steps will be a full size two-step design to provide largest possible stepping surfaces for safe ingress and egress. The bottom steps will be designed with a grip pattern punched into bright aluminum treadplate material to provide support, slip resistance, and drainage. The bottom steps will be a bolt-in design to minimize repair costs should they need to be replaced. The forward cab steps will be a minimum 31.00" wide, and the crew cab steps will be 24.25" wide with an 8.00" minimum depth. The inside cab steps will not exceed 18.00" in height and be limited to two (2) steps. Three (3) step entrance designs will not be acceptable due to safety concerns. A slip-resistant handrail will be provided adjacent to each cab door opening to assist during cab ingress and egress. The cab steps to be looked at during approval drawing trip.

6.0 ENGINE TUNNEL

To provide structural strength, the engine tunnel sidewalls will be constructed of .50" aluminum plate that is welded to both the .25" firewall and .38" heavy wall extrusion under the crew cab floor. To maximize occupant space, the top edges will be tapered.

The engine tunnel will be insulated on both sides for thermal and acoustic absorption. The underside of the tunnel will be covered with 1.00" thick polyether foam that is reinforced with an aluminized face. Thermal rating for this insulation will be -40 degrees Fahrenheit to 300 degrees Fahrenheit. The insulation will keep noise (dB) levels at or lower than the specifications in the current edition of the NFPA 1901 standards.

6.1 RECESSED POCKET WITH ELASTIC COVER

To provide organized storage (clutter control) in the cab for miscellaneous equipment, the

cab interior will be provided with recessed storage pockets. The pockets will be 6.50" wide x 2.12" high x 6.00" deep and will be constructed of rugged, impact resistant, roto-molded low density polyethylene. The pockets will be provided with a perforated elastic material cover to secure the equipment in the pocket. The pockets will be installed in all open mounting locations of the overhead console and instrument console.

6.2 INSTRUMENT CONSOLE WITH WORKING SURFACE

The center console will include an impact resistant, roto-molded, low density polyethylene extension. The console extension will contain one (1) large integral mounting location and two (2) smaller integral mounting locations for recessing optional accessories on each side of the console with easy accessibility for both driver and passenger. Mounting locations not used for accessories will be covered with plates.

To reduce clutter in the cab, two (2) vertically recessed areas will be provided integral to the top of the console for storage of handheld radios and/or miscellaneous equipment. For convenience, the console extension will provide a large flat work surface adjacent to the passenger.

6.3 CONSOLE EXTENSION WITH TRAYS

The center console will include an impact resistant, roto-molded, low density polyethylene extension designed to store miscellaneous equipment in the cab. For added convenience, the accessory module will include two (2) molded cup holder inserts (one on the driver side and one on the passenger side). For storage of maps or binders, two (2) 15" long x 4" wide storage trays will be provided. The trays will include dividers to allow each tray to be used in three (3) individual sections for mounting radios or similar miscellaneous equipment. Customer will look at this feature at approval drawing trip.

6.4 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 door will be 17.75" wide x 12.75" high and be flush with the wall of the engine tunnel.

The engine oil dipstick will allow for checking only. The transmission dipstick will allow for both checking and filling. An additional tube will be provided for filling the engine oil.

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

7.0 INTERIOR LIGHTING

7.1 CAB DOME LIGHTS

There will be two (2) Weldon Model 8081, incandescent dome lights installed in the cab providing an overall lower cost of ownership. The lights will be mounted above the inside

shoulder of the driver and officer. The forward, clear, light will be controlled by the door switch and the lens switch. The rear, red, light will be controlled by the lens switch only.

In addition, there will be two (2) adjustable map lights with an integral switch recessed into the cab ceiling. One (1) light will be located above the driver's seat and one (1) light will be located above the officer's seat.

7.2 CREW CAB DOME LIGHTS

There will be two (2) Weldon Model 8081, incandescent dome lights installed in the crew cab. The forward, clear, light will be controlled by the door switch and the lens switch. The rear, red, light will be controlled by the lens switch only.

7.3 MAP LIGHT

One (1) map light with goose neck with a switch control on base of light will be installed Officers side NEXT TO THE "A" PILLAR. The light will be a Sunnex, Model 742 with a 20.00" long flexible neck that exits the top of the chassis mount.

8.0 "DO NOT MOVE APPARATUS" INDICATOR

A Whelen, Model 50R00FRR, red flashing LED light (located in the driving compartment) will be illuminated automatically per NFPA (1996 addition, 9-11 or 1999 addition 11-11). The light will be labeled "Do Not Move Apparatus If Light Is On".

An audible alarm will be provided with the open door indicator light.

The alarm will be controlled by the parking brake, so that it will deactivate when the parking brake is set.

8.1 DO NOT MOVE TRUCK MESSAGES

Messages will be displayed on the gauge panel LCD located forward of the steering wheel directly in front 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.

Hatch Door Open

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.

9.0 ENGINE COMPARTMENT LIGHT

An engine compartment light will be installed under the engine hood, of which the switch is an integral part. Light will have a .125" diameter hole in its lens to prevent moisture retention.

10.0 HAND HELD SPOTLIGHT

There will be one (1) light Optronics Model KB-4003 hand held spotlight(s), with momentary switch installed officers side same as 17765.

The mounting bracket will be fabricated from stainless steel.

11.0 GLOVE BOX

A glove box, approximately 3.50" high x 8.00" wide x 11.00" long, will be installed ship loose.. It will be constructed of smooth aluminum and painted to match the cab interior.

Compartment has the following features:

- Easy "one handed" operation

- Non-locking latch.

12.0 STORAGE COMPARTMENT

There will be one (1) NFPA compliant storage compartment/s provided and installed within the cab. Compartment size will be 24.00"W x 12.50"D (front-to-back) x 24.00"H. The compartment/s will include a 5.00" notch to avoid interference with the seatbelt retractor. Compartment/s will be constructed of smooth aluminum and painted to match the cab interior. The compartment/s will be located ship loose..

Compartment/s has the following features:

- Easy "one handed" operation

- Compressed gas spring equipped lid that alerts user to lid not being securely latched

- Locking latch

- 40 lb. rated capacity

This storage compartment will be compliant per NFPA Standard for Automotive Fire Apparatus.

13.0 12-VOLT OULTETS

There will be three (3) pair of wires installed.

The above wires will have the following features:

Wires will be connected directly to the battery power.

Wires are protected to 15 amps.

Power and ground will end two at the officers end of the dash and one on the area of switch panel #2..

Termination is with 15 amp, power point plug with rubber cover.

Wires will be sized to 125% of the protection.

14.0 DRIVER SEAT

A Pierce PS6 seat will be provided in the cab for the driver. The seat design will be a cam action type with air suspension. To maintain optimal seat position and ride quality for a broader range of occupant sizes, the suspension will be provided with a height control valve that automatically positions the seat in the center of the suspension travel (1.88") when the occupant sits down. For increased convenience, the seat will include electric controls to adjust the rake (15 degrees), height (1.12" travel) and horizontal (7.75" travel) position. Electric controls will be located below the forward part of the seat cushion. To provide flexibility for multiple driver configurations, the seat will have a reclining back, adjustable from 20 degrees back to 45 degrees forward. Providing for maximum comfort, the seat back will be a high back style with manual lumbar adjustment lever, for lower back support, and will include minimum 7.50" deep side bolster pads for maximum support. The lumbar adjustment lever will be easily located at the lower outboard position of the seat cushion. For optimal comfort, the seat will be provided with 17.00" deep dual density 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, then retract the seat to its lowest travel position.
The seat will be furnished with a three-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the seat belt will have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue will be stored at waist position for quick

application by the seat occupant. The seat belt receptacle will be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position. The seat belt webbing will be red in color.

15.0 PASSENGER SEAT, FRONT

A Pierce PS6 seat will be provided in the cab for the passenger. The seat will be a cam action type, with air suspension. To maintain optimal seat position and ride quality for a broader range of occupant sizes, the suspension will be provided with a height control valve that automatically positions the seat in the center of the suspension travel (1.88") when the occupant sits down. 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 passenger configurations, the seat will have a reclining back adjustable from 20 degrees back to 0 degrees forward. The seat back will be a high back style with manual lumbar adjustment lever, and will include minimum 7.50" deep side bolster pads for maximum support. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat 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.

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 retract the seat to its lowest travel position.

The seat will be furnished with a three-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the seat belt will have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue will be stored at waist position for quick application by the seat occupant. The seat belt receptacle will be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position. The seat belt webbing will be red in color. The seat back will be an SCBA back style.

16.0 REAR FACING PASSENGER SIDE OUTBOARD SEAT

There will be one (1) rear facing, Pierce PS6 seat provided at the passenger side outboard position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat 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. The seat back will be an SCBA back style with 7.5 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

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

Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
A seat safety system will be included. When activated, this system will pretension the seat belt and firmly hold the occupant in the event of a side roll.
The seat will be furnished with a three-point, shoulder type seat belt. To provide quick, easy use for occupants wearing bunker gear, the seat belt will have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue will be stored at waist position for quick application by the seat occupant. The seat belt receptacle will be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position. The seat belt webbing will be red in color.

16.1 REAR FACING DRIVER SIDE OUTBOARD SEAT

There will be one (1) rear facing, Pierce PS6 seat provided at the driver side outboard position in the crew cab. For optimal comfort, the seat will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). To ensure safe operation, the seat will be equipped with seat belt sensors in the seat cushion and belt receptacle. It will activate an alarm indicating a seat is occupied but not buckled.

The seat back will be an SCBA back style with 7.5 degree fixed recline angle, and will include minimum 4.50" wide x 7.50" deep side bolster pads for maximum support. The SCBA cavity will be adjustable from front to rear in 1.00" increments, to accommodate different sized SCBA cylinders. Moving the SCBA cavity will be accomplished by unbolting, relocating, and re-bolting it in the desired location.

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

Side air curtain will be mounted integral to the outboard bolster of the seat back. The air curtain will be covered by a decorative panel when in the stowed position.
A seat safety system will be included. When activated, this system will pretension the seat belt around the occupant to firmly hold them in place in the event of a side roll.
The seat will be furnished with a three-point, shoulder type seat belt. To provide quick, easy

use for occupants wearing bunker gear, the seat belt will have a minimum 120.00" shoulder length and 55.00" lap length. The seat belt tongue will be stored at waist position for quick application by the seat occupant. The seat belt receptacle will be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belt will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position. The seat belt webbing will be red in color.

16.2 FORWARD FACING CENTER SEATS

There will be two (2) forward facing, Pierce PS6 seats provided at the center position in the crew cab. The seat backs will be a high back style with 7.5 degree fixed recline angle, and will include minimum 7.50" deep side bolster pads for maximum support. For optimal comfort, the seats will be provided with 17.00" deep dual density foam cushions designed with EVC (elastomeric vibration control). 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. Seats to be spaced 5" to 8" apart.

The seats will include the following feature incorporated into the side roll protection system.

A seat safety system will be included. When activated, this system will pretension the seat belts around the occupants to firmly hold them in place in the event of a side roll.

The seats will be furnished with three-point, shoulder type seat belts. To provide quick, easy use for occupants wearing bunker gear, the seat belts will have a minimum 130.00" shoulder length and 55.00" lap length. The seat belt tongue will be stored at waist position for quick application by the seat occupant. The seat belt receptacle will be provided on a cable conveniently nested next to the seat cushion, providing easy accessibility. The seat belts will be furnished with dual automatic retractors that will provide ease of operation in the normal seating position. The seat belt webbing will be red in color.

16.3 RADIO COMPARTMENT (See Item 64)

16.4 SEAT UPHOLSTERY

All Pierce PS6 seat upholstery will be gray woven with black Imperial 1200 material. Customer to look at seat mateial during approval drawing trip.

16.5 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 for up to a 30G force (dynamic sled test), and will exceed the NFPA standard of 9G by more than 3 times. Bracket designs with manual restraints (belts, straps, buckles) that could be inadvertently left unlocked and allow the SCBA to move freely within the cab during an accident, will not be acceptable.

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

The brand of SCBA bottles will be MSA, ISI, Interspiro.

The diameter of the SCBA bottles will be 6.33" to 7.25" in diameter.

16.6 SEAT BELTS (red)

All seating positions in cab and crew cab will have red seat belts.

Provided with the SCBA seats, will be back rest inserts which covers the SCBA cavity. The insert cover will be padded and covered with the same material as the seat. A total of three (3) inserts will be provided. The seat back insert is designed to support the fire fighters back, with or without the SCBA bottle in place. The insert is held in place with two (2) elastic cords.

16.7 INDICATOR LIGHT

The seat belt not stowed light and alarm will be designed so a seat must be occupied and the respective seat belt not buckled to activate the alerts.

A red indicator light located on the cab gauge panel will be furnished. The indicator light and alarm will operate as follows when an occupant is not buckled:

Parking brake engaged:

The indicator light will be active (steady)

The audible alarm will be inactive

The Seat Belt Screen will indicate the position(s) of unbelted occupants (manual selection of the Seat Belt Screen is required)

Ignition switch on and parking brake disengaged:

The Indicator Light will operate as follows:

Flash for the first 30 seconds

Remain active (not flashing) for the next 60 seconds

Continue by flashing quickly for 5 seconds at every 30-second interval until all occupants seat belts are buckled.

The Seat Belt Screen will indicate the seat position(s) of any occupant whose seat belt is not buckled. If a "Do Not Move Truck" condition does not exist, the Seat Belt Screen will activate automatically.

An audible alarm will chime quickly whenever the indicator light flashes quickly.

The alarm will repeat this process until all occupants are buckled

The indicator light and alarm will deactivate when all occupants seat belts are buckled.

There will be 6 seats that contain the seat belt not buckled feature.

16.8 SHOULDER HARNESS HEIGHT ADJUSTMENT

All seating positions furnished with three (3)-point shoulder type seat belts, will include a height adjustment. This adjustment will optimize the belts effectiveness and comfort for the seated firefighter.

A total of six (6) seating positions will have the adjustable shoulder harness.

The two (2) center forward facing crew cab seats will have approximately 8.00" of separation to provide additional room at each seat position.

16.10 SIDE ROLL PROTECTION PACKAGE

Firefighter safety is of utmost importance to Pierce Manufacturing, Inc. As part of our total commitment to the safety of the personnel, an advanced side roll protection system is being provided. This package is a supplemental restraint system that is designed for use with the seat belts. Pierce has designed this system to react to either a fast or a slow 90-degree roll to the side, in which the vehicle comes to rest on its side. The system will consist of the following key components:

A side roll sensor will be installed in the cab above the engine tunnel between the headliner and the cab roof skin. The sensor analyzes the vehicle's angle and rate of roll to activate the advanced occupant restraints 120 ms before the cab reaches 60 degrees from vertical. In the event of a side roll, the sensor will activate the advanced occupant restraints. The sensor does not activate in the event of a frontal impact, side impact, or any other incidents not involving a vehicle side rollover. If more than eight protective devices are required, a slave side roll sensor will be provided, with the capacity for additional protective devices. This sensor performs real time diagnostics of all critical subsystems and will record sensory inputs immediately before and during a side roll event.

A fault-indicating light will be provided on the vehicle's instrument panel.

In the event of a side roll, the system will activate the following components integrated into the cab seats.
A side air curtain will be mounted in the outboard bolster of outboard seat backs to provide a cushion between occupant and the cab wall.

Suspension seats will be retracted to lowest travel position, and seat belts will be pretensioned to firmly hold the occupant in place.

17.0 CAB INTERIOR

With safety as the primary objective, the wrap-around style, impact resistant, rugged, roto-molded cab instrument panel will be designed with unobstructed visibility to instrumentation. The dash layout will provide the driver with a quick reference to gauges that allows more time to focus on the road. The center console will be an impact resistant, roto-molded low density polyethylene, and will include an easily removable cover for the defroster. The

defroster cover will include louvers strategically located for optimal air flow and defrost capability to the windshield. The center console will also provide two (2) recessed pockets to be used for radio chargers, or storage for miscellaneous items. The passenger side dashboard will be constructed of roto-molded heavy duty polyethylene, with a stylish, automotive appearance. For enhanced versatility, the passenger side roto-molded dash will include a flat painted aluminum working surface. To provide optional (service friendly) control panels, switches and storage modules, a three (3) piece, 4mm thick polyethylene roto-molded overhead console will also be provided. To complete the cab front interior design, roto-molded polyethylene modesty panels will be provided under the dash on both sides of the cab. The driver side modesty panel will provide mounting for the battery switch and diagnostic connectors, while the passenger side modesty panel provides a lockable glove box, and ground access to the main electrical distribution panel via quick quarter turn fasteners.

To provide a deluxe automotive interior, the engine tunnel, side walls and rear wall will be covered by a leather grain vinyl that is resistant to oil, grease, and mildew.

For a customized appearance, the contoured inner door liners will be constructed of an impact resistant, roto-molded heavy duty polyethylene. The inner panels will include grab handles and control panels molded into the upper section of the door panel. The door panels will extend 36.5" down from the door window.

The headliner will be installed in both forward and rear cab sections. The crew cab headliner will be one piece. The headliner panel will be a composition of a corrugated high density polyethylene panel covered with a sound barrier and upholstery. For quick, easy access of electrical wiring, or to perform other maintenance needs without stripping screws, the headliner will be held in place by a dual lock fastening system that will require no tools for installation or removal.

The cab structure will include designated raceways for electrical harness routing from the front of the cab to the rear upper portion of the cab. Raceways will be extruded in the forward door frame, floor, walls and overhead in the area where the walls meet the ceiling. The raceways located in the floor will be covered by aluminum extrusion, while the vertical and overhead raceways will be covered by a decorative composite panel. The raceways will improve harness integrity by providing a continuous harness path that eliminates wire chafing and abrasion associated with exposed wiring or routing through drilled metal holes. Harnesses will be laid in place, not pulled through holes drilled in aluminum tubing. Once laid in place, all harnesses will be held in position by a hook and loop fastening system. The hook and loop system will allow for bracket fastener points to not puncture harnesses. The raceways will include removable covers, providing maintenance personnel with quick and easy access for trouble shooting, or the addition of accessories. Harnesses will be located within the raceway behind the wire way cover.

17.1 CAB INTERIOR UPHOLSTERY

The cab interior upholstery will be . All cab interior materials will meet FMVSS 302 (flammability of interior materials).

17.2 INTERIOR PAINT (Cab)

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

18.0 CAB FLOOR

The cab and crew cab floor areas will be covered with Polydamp™ acoustical floor mat consisting of a black pyramid rubber facing and closed cell foam decoupler.

The top surface of the material has a series of raised pyramid shapes evenly spaced, which offer a superior grip surface. Additionally, the material has a .25" thick closed cell foam (no water absorption), which offers a sound dampening material for reducing sound levels.

18.1 REAR WALL COVERING

The exterior surface of the rear wall of the cab will be overlaid with bright aluminum treadplate except for areas that are not typically visible when the cab is lowered.

19.0 INTERIOR CAB INSULATION

The cab walls, ceiling and engine tunnel will be insulated in all strategic locations to maximize acoustic absorption and thermal insulation. Headliners will be constructed from a .20" high density polyethylene corrugated material. Each headliner will be wrapped with a 0.25" thick foil faced poly damp low emissivity foam insulation barrier for acoustic and thermal control. For ease of installation and removal, all headliners will be held in place by a dual lock fastening system. Headliner installation requiring removal of mechanical fasteners will not be acceptable. Insulation is not installed in the four cab doors.

Designed for maximum sound absorption and thermal insulation, the cab walls will be insulated with a 1.50" thick open cell acoustical foam. The thermal protection of the foam will provide and R-value of 4 per 1.00" thickness.

20.0 CAB DEFROSTER

To provide maximum defrost and heating performance, a 54,961-BTU heater-defroster unit with 558 SCFM of air flow will be provided inside the cab. The defroster unit will be strategically located under the center forward portion of the roto-molded instrument panel. For easy access, a removable roto-molded cover will be installed over the defroster unit. The defroster will include an integral aluminum frame air filter, high performance dual scroll blowers, and ducts designed to provide maximum defrosting capabilities for the one piece windshield. The defroster ventilation will be built into the design of the cab dash instrument panel and will be easily removable for maintenance. The defroster will be capable of clearing 98% of the windshield and side glass when tested under conditions where the cab has been cold soaked at 0 degrees F 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 (minimum defrosting system performance requirements)

20.1 CAB/CREW CAB HEATER = DELETED

21.0 AIR CONDITIONING

A high-performance, customized air conditioning system will be furnished inside the cab and crew cab. A 19.1 cubic inch compressor will be installed on the engine.

The air conditioning system will be capable of cooling the cab from 100 degrees F to 64 degrees F in the forward section of the cab and 69 degrees F in the rear section of the cab at 50% relative humidity within 30 minutes. The cooling performance will be met only after the cab has been heat soaked at 100 degrees F for a minimum of 4 hours.

A roof-mounted condenser with a 63,000 BTU output that meets and exceeds the performance specification will be installed on the cab roof.

One (1) evaporator unit will be installed in the cab, located in the center of the cab ceiling over the engine tunnel. The evaporator will include two (2) high performance cores and plenums with multiple outlets, one plenum directed to the front and one plenum directed to the rear of the cab.

The evaporator unit will have a 49,000 BTU rating that meets and exceeds the performance specifications. Adjustable air outlets will be strategically located on the evaporator cover per the following:

Two (2) will be directed towards the drivers location.
Two (2) will be directed towards the officers location.
Six (6) will be directed towards crew cab area.

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

The air conditioner will be controlled by a single integral electronic control panel for the heater, defroster and air conditioner. For ease of operation, the control panel will include variable adjustment for temperature and fan control, and be conveniently located on the dash in clear view of the driver. The control panel will include highly visible, progressive LED indicators for both fan speed and temperature. For added convenience, an optional dual control for the passenger position will also be available.

22.0 CAB LIFT

A hydraulic cab lift system will be provided, consisting of an electric-powered hydraulic pump, fluid reservoir, dual lift cylinders, remote cab lift controls and all necessary hoses and valves. The hydraulic pump will have a backup manual override, for use in the event of an electrical failure.

The cab lift controls will be located at the driver side front of the cab, easily accessible under the full width front access hood. The controls will include a permanently mounted raise/lower switch. For enhanced visibility during cab tilt operations, a remote control tether with on/off switch will be supplied on a coiled cord that will extend from 2' (coiled) to 6' (extended).

The rear of the cab will be locked down by a two-point, automatic, hydraulic, double hook mechanism that fully engages after the cab has been lowered (self-locking). The dual 2 1/4" diameter hydraulic cylinders will be equipped with a velocity fuse that protects the cab from accidentally descending when the cab is in the tilt position.

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

22.1 INTERLOCK, CAB LIFT TO PARKING BRAKE

The cab lift safety 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.

23.0 WHEELWELL AND FENDERS

23.1 FENDER CROWNS

Stainless steel fender crowns will be installed at cab wheel openings.

23.2 FENDER LINERS

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

23.3 MUD FLAPS

Mud flaps with a Pierce logo will be installed behind the front and rear wheels.

24.0 MIRRORS

One (1) Ramco, Model 6000FFHR-750, polished aluminum mirror will be mounted on each of the cab doors. The mirrors will be 9.25" x 13.50", with a full flat face. An additional convex section will be bolted to the top of each mirror. The mirror head will have a highly polished aluminum finish.

The flat glass in each mirror will be heated and adjustable, with remote controls that are convenient to the driver.

The convex section in each mirror will be adjusted manually.

25.0 PAINT

The exterior custom cab and body painting procedure will consist of a six- (6) step finishing process as follows:

25.1 Manual Surface Preparation - All exposed metal surfaces on the custom cab and body will be thoroughly cleaned and prepared for painting. Surfaces that will not be painted include chrome plating, polished stainless steel, anodized aluminum and bright aluminum treadplate. Each imperfection on the exterior metal surface will be removed or filled and then sanded smooth for a smooth appearance. All seams will be sealed before painting.

25.2 Chemical Cleaning and Treatment - The aluminum surfaces will be properly cleaned using a 4-phase, high pressure and high temperature acid etching system. All steel surfaces will be properly treated using a 3-phase, high temperature, cleaning/phosphatizing system. Surfaces are chemically cleaned to remove all dirt, oil, grease and metal oxides to ensure the subsequent coatings bond well. The chemical treatment converts the metal surface to a passive condition to prevent corrosion. An ultra pure water final rinse of 25 parts per million solids or less, will be applied to final rinse all metal surfaces, (excluding undercarriage components), at the conclusion of the metal treatment process. This final rinse ensures all chemical residues are removed and that no minerals, (salts), from the water dry onto the metal surface and remain under the primers and topcoats. These salts can lead to blistering and under film corrosion. The pH of the final rinse drainage coming off the treated metal will be measured and within 1.0 pH of the pure water supply, (5.0 pH).

25.3 Primer/Surfacer Coats - A minimum of two (2) mil dry, (.002), of two component urethane primer/surfacer will be hand applied to the chemically treated metal surfaces to provide a strong corrosion protective base coat and to smooth out the surface. The primer is a high solids and low VOC paint.

25.4 Hand Sanding to Ultra Fine Finish - The primer/surfacer coat is lightly sanded with mild abrasive paper to an ultra smooth finish. This hand finish process is critical to produce the smooth mirror like finish in the topcoat.

25.6 Sealer Primer Coat - A two- (2) component sealer primer coat is applied over the sanded primer to again build toward the final smooth finish. This layer of primer sealer also gives additional corrosion protection.

25.7 Topcoat Paint - Two (2) coats of an automotive grade, two component acrylic urethane paint are applied to provide the lasting beauty and durability. The acrylic urethane topcoat contains a clear coat resin chemistry that creates the high gloss and depth of image. This type of topcoat provides the best resistance against acid rain and other more common chemicals. The paint finish will have a surface gloss of no less than 90.00 percent reflection measured on a 60-degree geometry.

A cyclic corrosion test, (General Motors test GM-9511P), of 20 cycles will be required before making changes to the exterior coating process. Exterior coating systems, (excluding the undercarriage components), must achieve a 1/16 or less maximum creep from the scribe for aluminum and an 1/8 or less maximum creep from the scribe for galvanneal after 20 cycles in the General Motors GM-9511P test. Traditional salt spray tests have been proven in multiple studies to not accurately predict real world corrosion performance.

Each batch of color topcoat, together with the finish painted vehicle, is tested for precise color match. Visual color match will be checked following ASTM D-1729, (American Standard Testing Methods), procedures using CIE, (International Commission on Illumination), D75 Northern Daylight light source. Instrumental color match will follow ASMT D-2244 procedures with a maximum delta E of 1.0 for whites, 1.4 for yellows, blues,

greens and 1.5 for reds.

All removable items such as brackets, compartment doors, door hinges, and trim will be removed and painted separately to insure paint behind all mounted items. Body assemblies that can not be finish painted after assembly will be finish painted before assembly.

The cab and the body will be painted Red #106.

Prior to reassembly and reinstallation of lights, handrails, door hardware and any miscellaneous items an isolation tape, gasket or dielectric material will be used to prevent damage to the finish painted surfaces. A nylon washer will be installed under each acorn nut or metal screw that is fastened directly to an exterior painted surface.

25.8 PAINT - ENVIRONMENTAL IMPACT

Pierce will meet or exceed our 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 means 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 mechanically on a continual basis to keep the water clean.

- Paint wastes will be disposed of in an environmentally safe manner.

- Empty metal paint containers will be crushed and recycled to recover the metal.

- Solvents used in cleanup operations will be collected, sent off-site for distillation and returned for reuse. Residue from the distillation operation will be used as fuel in off-site kilns.

Additionally, the finished apparatus will not be manufactured with or contain products that have ozone depleting substances. Pierce will, upon demand, present evidence that their manufacturing facility meets the above conditions and that it is in compliance with our State EPA rules and regulations.

25.9 WARRANTY - PAINT AND CORROSION (See Item 151.0)

25.10 WHEELWELL PAINT COLOR

The cab and body wheelwell liners will be painted black.

25.11 COMPARTMENT INTERIOR FINISH

The interior of the body compartments and compartment doorswill be left unpainted and have the natural finish.

26.0 REFLECTIVE BAND

Reflective stripes will be provided across the front of the vehicle and along the sides of the body. The reflective band will consist of a 1.00" white stripe at the top with a 1.00" gap and a 6.00" white stripe on the bottom. A 4.00" band will be provided at the rear of the apparatus.

The reflective band provided on the cab face will be below the headlights on the fiberglass.

26.1 OUTLINE, REFLECTIVE STRIPE = WILL DECIDE DURING APPROVAL DRAWING TRIP

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

26.2 ADDITIONAL REFLECTIVE STRIPING = = WILL DECIDE DURING APPROVAL DRAWING TRIP

Additonal 1.00" white reflective striping will be provided and install on the cab & body as desired and instructed by the customer.

26.3 REAR BULKHEAD REFLECTIVE STRIPE = WILL DECIDE DURING APPROVAL DRAWING TRIP

The reflective stripe will continue from the sides, wrap around the rear body corners, and continue on the rear compartment bulkheads.

26.4 REFLECTIVE STRIPE, CAB DOORS = WILL DECIDE DURING APPROVAL DRAWING TRIP

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.

27.0 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 have a 13.38" tall web over the front and mid sections of the chassis, with a continuous smooth taper to a 10.75" over the rear axle. Each rail will have a section modulus of 25.992 cubic inches and a resisting bending moment (rbm) of 3,119,040 inch pounds over the critical regions of the frame assembly, with a section modulus of 18.96 cubic inches with an rbm of 2,275,200 inch pounds over the rear axle. The frame rails will be constructed of 120,000 psi yield strength heat treated .38" thick steel, with 3.50" wide flanges.

27.1 CROSSMEMBERS WARRANTY

A Lifetime parts and labor warranty will be provided on all chassis frame crossmembers.

27.2 FRAME RAIL WARRANTY (See Item 151.0)

28.0 PAINTED CHASSIS FRAME ASSEMBLY

The chassis frame assembly will be painted red before the installation of the cab, body, engine, drive shafts and transmission assembly, air brake lines and electrical wire harnesses. The components included with the chassis frame assembly will be painted this color and are the frame rails, cross members, driveline, axles, suspension, steering gear, fuel tank, body substructure supports and miscellaneous mounting brackets.

29.0 FUEL TANK

A 65-gallon fuel tank will be provided and mounted at rear of chassis. The tank will be constructed of 12-gauge, hot rolled steel. It will be equipped with swash partitions and a vent. The fuel capacity will be shown on a label on the fill cover.

A .75" drain plug will be provided in a low point of the tank for drainage.

A fill inlet will be located on the driver's and passenger's side of the body and be covered with a hinged, spring loaded, stainless steel door that is marked "Diesel Fuel Only".

A .50" diameter vent will be provided running from top of tank to just below fuel fill inlets.

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

Servicing the fuel tank pick-up tubes and fuel gauge sending unit will be capable of being accomplished by draining fuel and dropping tank.

All fuel lines will be of the wire braided type.

The fuel filler cap will have a retaining chain.

30.0 BUMPER

A one (1) piece, ten (10)gauge, 304-2B type polished stainless steel bumper, a minimum 10.00" high will be attached to a bolted modular extension frame constructed of 50,000 psi tensile steel "C" channel mounted directly behind it to provide adequate support strength.

The bumper will be extended 26.00" from front face of cab.

Documentation will be provided, upon request to show that the options selected have been engineered for fit-up and approval for this modular bumper extension. A chart will be provided to indicate the option locations and will include but not be limited to the following options: air horns, mechanical sirens, speakers, hose trays (with hose capacities), winches, lights, discharge and suction connections.

30.1 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. The edges of the toe eyes to be radiused.

30.2 TRAY, HOSE REEL

A hose reel tray, constructed of aluminum, will be placed in the center of the bumper extension.

The tray will be 29.00" wide x 21.50" front to back x 13.00" deep.

30.3 BOOSTER HOSE REEL

A Hannay electric rewind booster hose reel shall be installed in the center of the front bumper extension.

The capacity and size of hose shall be 100 feet of 1.00" or about 150 feet of 0.75" hose.

Discharge control shall be provided at the pump operator's panel. Plumbing to the reel shall consist of a 1.50" Aeroquip hose and a 1.50" valve.

The reel shall be protected on the underside by an aluminum enclosure. The enclosure shall be a bolt on enclosure and be removeable for maintenance.

A bright aluminum treadplate cover shall be provided over the top of the booster reel.

A polished stainless steel roller and guide assembly shall be provided on all four (4) sides of the front opening.

There shall be a blow out valve provided using chassis air.

Reel motor will be protected from overload with a sized automatic reset circuit breaker.

Electric rewind control will be a rubber covered button adjacent to the reel.

Booster hose, 1.00" diameter and 100 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 100 feet of 1.00" booster hose.

30.4 GRAVEL PAN

A gravel pan, constructed of bright aluminum treadplate, will be furnished between the bumper and cab face.

The gravel pan will be properly supported from the underside to prevent flexing and vibration of the aluminum treadplate.

30.5 HOSE TRAY (right side)

A hose tray will be placed in the right side of the extended bumper.

The tray will have a capacity of 25' of 5.00" Dura-lite hose with Storz couplings and 5" Storz to 4.5"NH female swivel adapater.

Black rubber grating will be provided at the bottom of the tray. Drain holes will be provided.

30.6 TOW HOOKS

No tow hooks are to be provided. This truck will be equipped with a lift and tow package with integral tow eyes.

31.0 AIR HORN SYSTEM = MODEL 1510

Two (2) Grover air horns will be provided and located, in the front bumper, recessed both on the driver's side of the front bumper extension.. The horn system will be piped to the air brake system wet tank utilizing .38" tubing. A pressure protection valve will be installed in-line to prevent loss of air, in the air brake system.

31.1 AIR HORN CONTROL= TO BE REVIEWED DURING APPROVAL DRAWING TRIP

The air horn will be actuated by a chrome push button switch located on the officer side of the engine tunnel and by a foot switch on the driver's side.

32.0 ELECTRONIC SIRENS

32.1ELECTRONIC SIREN

A Federal, model PA-300MSC, electronic siren with noise canceling microphone will be provided.

32.2ELECTRIC SIREN, LOCATION,
Siren head will be mounted as per instrument layout.

The electronic siren will be controlled on the siren head only. No horn button or foot switches will be provided.

32.3 SPEAKER
There will be two (2) speakers provided and recessed in the bumper extension. Each speaker will be a Federal, Model MS100, 100 watt, bumper mount. Each speaker will use a Federal, Model MSFMT-EF, flush mount, bumper bracket with stainless steel grille. Each speaker will be connected to the siren amplifier.

32.4 MECHANICAL SIREN, (Auxiliary) = TO BE REVIEWED DURING APPROVAL DRAWING TRIP

A Federal Q2B siren will be furnished. A siren brake button will be installed on the switch panel.

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

32.5 SWITCHES, MECHANICAL SIREN= TO BE REVIEWED DURING APPROVAL DRAWING TRIP

The mechanical siren will be actuated by one (1) foot switch located on the driver's side and a push button switch on the officer's side of cab.

33.0 FRONT DRIVE AXLE

33.1 FRONT NON DRIVE AXLE
The Oshkosh TAK-4® front axle will be of the independent suspension design with a ground rating of 19,500 pounds.

Upper and lower control arms will be used on each side of the axle. Upper control arm castings will be made of 100,000-psi yield strength 8630 steel and the lower control arm casting will be made of 55,000-psi yield ductile iron.

The center cross members and side plates will be constructed out of 80,000-psi yield strength steel.

Each control arm will be mounted to the center section using elastomer bushings. These rubber bushings will rotate on low friction plain bearings and be lubricated for life. Each bushing will also have a flange end to absorb longitudinal impact loads, reducing noise and

vibrations.

There will be nine (9) grease fittings supplied, one (1) on each control arm pivot and one (1) on the steering gear extension.

The upper control arm will be shorter than the lower arm so that wheel end geometry provides positive camber when deflected below rated load and negative camber above rated load.

Camber at load will be zero degrees for optimum tire life.

The kingpin bearing will be of low friction design and be sealed for life.

Toe links that are adjustable for alignment of the wheel to the center of the chassis will be provided.

The wheel ends must have little to no bump steer when the chassis encounters a hole or obstacle.

The steering linkage will provide proper steering angles for the inside and outside wheel, based on the vehicle wheelbase.

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

33.2 SUSPENSION

Front Oshkosh TAK-4™ independent suspension will be provided with a minimum ground rating of 19,500 pounds.

The independent suspension system will be designed to provide maximum ride comfort. The design will allow the vehicle to travel at highway speeds over improved road surfaces, and at moderate speeds over rough terrain with minimal transfer of road shock and vibration to the vehicle's crew compartment.

Each wheel will have torsion bar type spring. In addition, each front wheel end will also have energy absorbing jounce bumpers to prevent bottoming of the suspension.

The suspension design will be such that there is at least 10.00" of total wheel travel and a minimum of 3.75" before suspension bottoms.

The torsion bar anchor lock system allows for simple lean adjustments, without the use of shims. One can adjust for a lean within 15 minutes per side. Anchor adjustment design is such that it allows for ride height adjustment on each side.

The independent suspension was put through a durability test that simulated 140,000 miles of

inner city driving.

33.3 WARRANTY, FRONT NON DRIVE AXLE (See Item 151.0)

34.0 FRONT TIRES
Front tires will be Michelin radials 385/65R22.5, 18 ply "all position" XZY 3 tread. The tires will be mounted on Alcoa 22.50" x 12.25" polished aluminum disc-type wheels with a ten (10) stud, 11.25" bolt circle.

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

36.0 SHOCK ABSORBERS

Heavy-duty telescoping shock absorbers (KONI) will be provided on the front suspension.

37.0 STEERING
Dual Sheppard M110 steering gears, with integral heavy-duty power steering, will be provided. For reduced system temperatures, the power steering will incorporate a Vickers V20F three line hydraulic pump with integral pressure and flow control.

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

A letter from the hydraulic pump manufacturer, stating they approve of the hydraulic pump selection, its operating temperature and flow, will be furnished with the bidder's proposal.

37.1 STEERING WARRANTY (See Item 151.0)

37.2 STEERING WHEEL

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

38.0 FRONT BRAKES
The front brakes will be Knorr/Bendix disc type with a 17.00" ventilated rotor for improved stopping distance.
The brake system will be certified, third party inspected, for improved stopping distance.

39.0 REAR AXLE
The rear axle will be a Meritor™, Model RS-26-185, with a capacity of 27,000 pounds.

39.1 REAR AXLE WARRANTY (See Item 151.0)

40.0 TOP SPEED OF VEHICLE

A rear axle ratio will be furnished to allow the vehicle to reach an approximate top speed of 64 to 67 MPH.

41.0 REAR BRAKES

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

42.0 ANTI-LOCK BRAKE SYSTEM

The vehicle will be equipped with a Wabco 4S4M, anti-lock braking system. The ABS will provide a four (4) channel anti-lock braking control on both the front and rear wheels. It will be a digitally controlled system that utilizes microprocessor technology to 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.

42.1 AUTOMATIC TRACTION CONTROL

An anti-slip feature will be included with the ABS. The Automatic Traction Control will be used for traction in poor road and weather conditions. The Automatic Traction Control will act as an electronic differential lock which will not allow a driving wheel to spin, thereby supplying traction at all times. The ABS electronic control unit (ECU) will work with the engine ECU, sharing information concerning wheel slip. Engine ECU will use information to control engine speed, allowing only as much throttle application as required for the available traction, regardless of how much the driver is asking for. A "mud/snow" switch will be provided on the instrument panel. Activation of the switch will allow additional tire slip to let the truck climb out and get on top of deep snow or mud.

42.2 ANTI-LOCK BRAKE SYSTEM & AUTOMATIC TRACTION CONTROL WARRANTY (See Item 151.0)

43.0 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 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.

44.0 REAR TIRES

Rear tires will be four (4) Michelin radials 315/80R22.50, 20 ply "all position" XZY 3 tread.

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. No wheel chocks are to be furnished.

45.0 OIL SEALS
Oil seals will be provided on the rear axle.

46.0 SUSPENSION, REAR
Rear suspension will be Reyco model 79KB with a ground rating of 27,000 pounds. Spring hangers and mounting components will be cast. The suspension utilizes two attaching points with variable rate spring cams and rubber bushed adjustable torque arms.

47.0 LUG NUT COVERS
Chrome plated lug nut covers will be installed on all lug nuts.

48.0 HUB COVERS (front)
Stainless steel hub covers will be provided on the front axle. An oil level viewing window will be provided.

49.0 HUB COVERS (rear)
A pair of stainless steel high hat hub covers will be provided on rear axle hubs.

50.0 BRAKE SYSTEM
The brake system will include:

- Bendix-Westinghouse dual brake treadle valve with vinyl covered foot surface.

- One heated automatic moisture ejector on air dryer.

- Total air system capacity of 4,362 cubic inches.

- Two (2) air pressure gauges with red warning light and audible alarm, that activates when air pressure falls below 60 psi.

- MGM spring set parking brake system.

- Parking brake operated by a Bendix-Westinghouse PP-1 control valve.

- A parking "brake on" indicator light on instrument panel.

- Bendix-Westinghouse SR-1 valve, in conjunction with a double check valve system, will provide an automatic spring-brake application at 40 psi.

- Wabco System Saver 1200 air dryer.

51.0 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.

52.0 AIR TANK, ADDITIONAL

An additional air tank with 1454 cubic inch displacement will be provided to increase the capacity of the air system. This tank will be dedicated for air horn use.

The output flow of the engine air compressor varies with engine RPM. Full compressor output is only achieved at governed engine speed. Engine speed may be limited by generators, pumps and other PTO driven options.

53.0 AIR COMPRESSOR, BRAKE SYSTEM

The air compressor will be a Bendix BA-921 with 15.8 cubic feet per minute output at 1250 RPM.

54.0 ENGINE

The chassis will be powered by a Detroit Diesel electronically controlled engine as described below:

- Model: Series 60, 14.0L (855 cubic inches)

- Maximum Horsepower: 515 bhp at 1800 rpm

- Peak Torque: 1650 lb-ft at 1200 rpm

- Governed Speed: 2000 rpm

- Bore and Stroke: 5.24" x 6.61"

- Number of Cylinders: Six (6)

- Compression Ratio: 17.25:1

Standard equipment on the engine will include the following:

- Governor: Limiting speed type

- Injectors: Cam operated, unit type, clean tip

- Starting Motor: 12-volt

- Turbocharger

- Air To Air Aftercooled

- Lube Oil Cooler

- Lube Oil Filter: Full flow

- Air Cleaner: Farr or equal

- Fuel Filters: Dual, with check valve

- Coolant Filter: Spin-on with shut off valves on the supply and return line (precharged with coolant inhibitor)

54.1 ENGINE WARRANTY (See Item 151.0)

54.2 ENGINE INSTALLATION CERTIFICATION
A letter stating Detroit Diesel approves of the engine installation will be provided at delivery. We will also be prepared to submit an engine manufacturers approval of the completed apparatus at time of delivery.

54.3 CONTROLS AND INDICATOR LIGHTS
The following amber indicator lights will be located on the driver's side of the cab to denote engine information:
- Diesel Particulate Filter (DPF)
- High Exhaust Temperature (HET)
- Malfunction Indicator Lamp (MIL)

A switch to initiate the diesel particulate filter regeneration cycle will be located on the driver's side instrument panel.

54.4 ENGINE AIR INTAKE
An air intake with an ember separator (to prevent road dirt, burning embers, and recirculating hot air from entering the engine) will be mounted at the front of apparatus, on the passenger side of the engine. The ember separator will be mounted in the air intake with a flame retardant, roto-molded polyethylene housing, and be easily accessible by the hinged access panel at the front of the vehicle.

55.0 FUEL SHUT-OFF AND PRIMER PUMP

55.1 FUEL COOLER
An air to fuel cooler will be installed, in the engine fuel return line.

55.2 AUXILIARY FUEL PUMP
An auxiliary electric fuel pump will be added to the fuel line for priming the engine. A switch located on the cab instrument panel will be provided to operate the pump.

55.3 LABEL, FUEL DOOR
two (2) label will be provided, ONE EACH SIDE ON FUEL DOOR, that states the capacity of the fuel tank.

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

55.5 FUEL SHUTOFF
A shutoff valve will be installed in the fuel line, on both sides of the fuel filters.

56.0 EXHAUST SYSTEM
The exhaust system will be 5.00" diameter.

The muffler will be mounted vertically between the fram rails ahead of the water tank.

The tail pipe will be routed out the throgh the driver's side front cargo compartment ahed of the foam cell dome. side of the upper body sheet with a chrome pipe extending out the body 2".

A hole will be provided in the sheet large enough that the paint will not be burned, and include a stainless steel trim plate.

Exhaust tubing will be aluminized steel.

Heat deflector shields will be provided as required.

The exhaust outlet will be equipped with a chrome plated elbow.

57.0 NOT USED

58.0 FAN CLUTCH LOCKUP
The radiator fan will run at all times. The fan will have a bolt provided through the clutch and fan so the fan can operator whenever the engine is running.

59.0 AUTOMATIC CHASSIS LUBRICATION
A Vogel Automatic Lubrication System will be provided. The lubrication will be supplied while the vehicle ignition switch is active to allow a uniform application of grease to the locations listed. The electronic control unit that forms part of the system, will activate the pump after an adjustable interval time. The unit will control and monitor pump operation and report any faults via an indicator light on the driver's dashboard of the cab.
The lubrication system reservoir which requires a 15.00" wide x 14.50" high x 6.25" deep mounting area, will be located cargo compartment area. on the apparatus.

- TAK- 4 Control Arm Pivot Points

-Steering Miter Box

-Cab Hinge Pins

-Rear Axle Slack Adjusters

Two (2) PTO openings will be located on left side and top of converter housing (positions 8 o'clock and 1 o'clock).

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

The transmission retarder control will be (RET3) activated 50% by letting off the accelerator pedal or 100% by applying the brake pedal. A second on/off switch is provided to activate and deactivate the auto apply portion. To be reviewed during approval drawing trip.

The transmission will have the 1600 ft. lb. torque (medium) spring setting for retardation force.

The transmission retarder will have a master "on/off" switch on the instrument panel. A red indicator light will be provided to warn that the transmission is being overworked.

The retarder will be wired to the brake lights so they are energized when the retarder is slowing the vehicle down.

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

61.1 TRANSMISSION, SHIFTER
A six (6)-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 - 3.51 to 1.00, 2nd - 1.91 to 1.00, 3rd - 1.43 to 1.00, 4th - 1.00 to 1.00, 5th - 0.75 to 1.00, 6th - 0.64 to 1.00, R - 4.80 to 1.00.

61.2 TRANSMISSION COOLER
An exclusive shell and tube transmission oil cooler will be provided, using engine coolant to control the transmission oil temperature. The cooler will have an aluminum shell, and copper tubes. The cooler will be assembled using two (2) pressed in rubber tube sheets (one on each end), creating a reliable mechanical seal between the coolant and the oil. No brazed, soldered, or welded connections will be used to separate the coolant from the oil.

61.3 TRANSMISSION COOLER WARRANTY (See Item 151.0)

61.4 TRANSMISSION WARRANTY (See Item 151.0)

62.0 DRIVELINE
Drivelines will be a heavy duty metal tube and be equipped with Spicer 1810 universal joints.

The shafts will be dynamically balanced before installation.

A splined slip joint will be provided in each driveshaft, slip joint will be coated with Glidecoat or equivalent.

63.0 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".

64.0 RADIO CARGO STORAGE = TO BE REVIEWED DURING APPROVAL DRAWING TRIP.

The radio storage box by the rear facing Air Conditioning unit will have knock outs in the sides and door, to aid in the cooling of the radio equipment

65.0 PREWIRE FOR RADIO EQUIPMENT

65.1 SPARE CIRCUIT

There will be two (2) pair of wires installed.

The above wires will have the following features:

- Wires will be connected directly to the battery power.
- Wires are protected to 60 amps.
- Power and ground will end in storage compartment above the AC unit..
- Termination is with 3/8" studs and plastic covers.
- Wires will be sized to 125% of the protection.

65.2 SPARE CIRCUIT

There will be one (1) pair of wires installed.

The above wires will have the following features:

- Wires will be connected directly to the battery power.
- Wires will be protected to 20 amps.
- Power and ground will end in the storage compartment.
- Termination will be with heat shrinkable butt splicing.

Wires will be sized to 125% of the protection.

65.3 CUSTOMER RADIO WIRING= TO BE REVIEWED DURING APPROVAL DRAWING TRIP.

Wiring for radios antennas and intercom system shall be installed prior to installation of the cab interior. Wiring shall terminate at the radio box with a minimum excess length of 24". All antenna coax and intercom wiring shall be CFD supplied. Locations of three AVL, four

voice/data antennas and six intercom jacks are TBD at pre-build conference. The wiring for the radios shall consist of three 4-gauge wires. One for ignition hot, battery hot and ground.

65.5 ANTENNA INSTALLATION

Five (5) antennas customer supplied antenna(s) will be sent to **Precision Installations, Inc** to be intalled on the roof. The antenna coax cable will be run from the antenna to cab roof. The antenna(s) will be used to recive reception for determined at mid inspection.
Pierce Manufacturing will NOT accept any customer supplied items.

All components **Must** be shipped to **Precision Installations, Inc.**
located:

Precision Installations, Inc
3021 W. Prospect Ave. Unit #5
Appleton,WI 54914

Contact Person:
Jim Lang - Installation Manager
(920) 475-7508
pi-inc@charter.net

Shipping Requirements from Precision Installations, Inc:
- An inventory of all items MUST accompany the box (inside box).
- All equipment will be installed in the most logical location unless otherwise noted by end user. Installation instructions and equipment locations are appreciated.
- A knowledgeable contact person's name and contact information from the end user MUST be included (inside box)
- The city name and truck number must be included on the OUTSIDE of the box.
- All equipment and installation/location information must be received no later than 30-days prior to customer pick-up. Any deviations from the 30 day rule must be pre-approved by a **Precision Installations, Inc** Manager.

Preferred by **Precision Installations, Inc**, no fee consultations with dealer rep/end user during the pre-construction and at post-paint Visits are available and highly recommended.

Pierce Manufacturing is not responsible for any customer supplied options shipped to Precision Installations, Inc.

65.6 GPS ANTENNA

Three (3) antennas GPS antenna(s) will be supplied and installed. The cable will be run from the antenna to cab roof. The make and model of GPS will be .

67.0 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 insure radiated and

conducted electromagnetic interference (EMI) or radio frequency interference (RFI) emissions are suppressed at their source.

The apparatus will have the ability to operate in the electromagnetic environment typically found in fire ground operations to ensure clean operations. The electrical system will meet, without exceptions, electromagnetic susceptibility conforming to SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter. The vehicle OEM, upon request, will provide EMC testing reports from testing conducted on an entire apparatus and will certify that the vehicle meets SAE J551/2 and SAE J1113/25 Region 1, Class C EMR for 10KHz-1GHz to 100 Volts/Meter requirements. Component and partial (incomplete) vehicle testing is not adequate as overall vehicle design can impact test results and thus is not acceptable by itself.
EMI/RFI susceptibility will be controlled by applying appropriate circuit designs and shielding. The electrical system will be designed for full compatibility with low-level control signals and high-powered two-way radio communication systems. Harness and cable routing will be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

68.0 MANUALS AND PARTS LIST

68.1 MANUAL, FIRE APPARATUS PARTS

Two (2) custom parts manuals for the complete fire apparatus will be provided in hard copy with the completed unit.

One (1) compact disc (CD) will also be provided that will include all of the information from the above manual.

The manual 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 a parts

The 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.

68.2 SERVICE PARTS INTERNET SITE

The service parts information included in this manual is 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.

68.3 MANUALS, CHASSIS SERVICE

Two (2) chassis service manuals containing parts and service information on major components will be provided with the completed unit.

One (1) compact disk (CD) will also be provided that will include all of the information from the above manual.

The manuals 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.

68.4 MANUALS, CHASSIS OPERATION

Two (2) chassis operation manuals will be provided.

One (1) compact disk (CD) will also be provided that will include all of the information from the above manual.

DATA PLAQUE

A fluid data plaque containing required information (i.e. capacities/recommended types) shall be provided based on the applicable components for this chassis, meeting current NFPA 1901 Standards as follows:

Engine oil
Engine coolant
Drive transmission fluid
Pump transmission lubricant
Drive axle lubricant
Air conditioning refrigerant
Power steering fluid
Transfer case fluid
All generator system lubricants

Location shall be in the driver's compartment of the chassis cab.

69.0 ELECTRICAL HARNESSING INSTALLATION

All 12-volt wiring and harnessing installed by the apparatus manufacturer will conform to specification PM-QA W-101: Pierce manufacturing Wiring Harness Specification.

To ensure rugged dependability, all wiring harnesses installed by the apparatus manufacturer will conform to the following specifications:

SAE J1128 - Low tension primary cable
SAE J1292 - Automobile, truck, truck-tractor, trailer and motor coach wiring
SAE J163 - Low tension wiring and cable terminals and splice clips
SAE J2202 - Heavy duty wiring systems for on-highway trucks
NFPA 1901 - Standard for automotive fire apparatus
FMVSS 302 - Flammability of interior materials for passenger cars, multipurpose passenger vehicles, trucks and buses
SAE J1939 - Serial communications protocol
SAE J2030 - Heavy-duty electrical connector performance standard
SAE J2223 - Connections for on board vehicle electrical wiring harnesses
NEC - National Electrical Code
SAE J561 - Electrical terminals - Eyelet and spade type
SAE J928 - Electrical terminals - Pin and receptacle type A

For increased reliability and harness integrity, harnesses will be routed throughout the cab and chassis in a manner which allows the harnessing to be laid into it's mounting location. Routing of harnessing which requires pulling of wires through tubes will not be allowed.

Wiring will be run in loom or conduit where exposed, and have grommets or other edge protection where wires pass through metal. Wiring will be color, function and number coded. Wire colors will be integral to each wire insulator and run the entire length of each wire. Harnessing containing multiple wires and uses a single wire color for all wires will not be allowed. Function and number codes will be continuously imprinted on all wiring harness conductors at 2.00" intervals. All wiring installed between the cab and into doors will be protected by an expandable rubber boot to protect the wiring. 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 wire ends not placed into connectors will be sealed with a heat shrink end cap. Wires without a terminating connector or sealed end cap will not be allowed.
(2) All holes made in the roof will be caulked with silicon (no exception). Large fender washers, liberally caulked, will be used when fastening equipment to the underside of the cab roof.
(3) 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.

(4) For low cost of ownership, electrical components designed to be removed for maintenance will be quickly accessible. For ease of use, a coil of wire will be provided behind the appliance to allow them to be pulled away from the mounting area for inspection and service work.

(5) Corrosion preventative compound will be applied to non-waterproof electrical connectors 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.

(6) Any lights containing non-waterproof sockets in a weather-exposed area will have corrosion preventative compound added to the socket terminal area.

(7) All electrical terminals in exposed areas will have DOW 1890 protective Coating applied completely over the metal portion of the terminal.

(8) Rubber coated metal clamps will be used to support wire harnessing and battery cables routed along the chassis frame rails.

(9) Heat shields will be used to protect harnessing in areas where high temperatures exist. Harnessing passing near the engine exhaust will be protected by a heat shield.

(10) Cab and crew cab harnessing will not be routed through enclosed metal tubing. Dedicated wire routing channels will be used to protect harnessing therefore improving the overall integrity of the vehicle electrical system. The design of the cab will allow for easy routing of additional wiring and easy access to existing wiring.

(11) All braided wire harnesses will have a permanent label attached for easy identification of the harness part number and fabrication date.

(12) All standard wiring entering or exiting the cab will be routed through sealed bulkhead connectors to protect against water intrusion into the cab.

69.1 BATTERY CABLE INSTALLATION

All 12-volt battery cables and battery cable harnessing installed by the apparatus manufacturer will conform to the following requirements:

SAE J1127 - Battery Cable
SAE J561 - Electrical terminals, eyelets and spade type
SAE J562 - Nonmetallic loom
SAE J836A - Automotive metallurgical joining
SAE J1292 - Automotive truck, truck-tractor, trailer and motor coach wiring
NFPA 1901 - Standard for automotive fire apparatus

Battery cables and battery cable harnessing will be installed utilizing the following guidelines:

(1) All battery cables and battery harnesses will have a permanent label attached for easy identification of the harness part number and fabrication date.

(2) Splices will not be allowed on battery cables or battery cable harnesses.

(3) For ease of identification and simplified use, battery cables will be color coded. All

positive battery cables will be red in color or wrapped in red loom the entire length of the cable. All negative battery cables will be black in color.

(4) For ease of identification, all positive battery cable isolated studs throughout the cab and chassis will be red in color.

(5) For increased reliability and reduced maintenance, all electrical buss bars located on the exterior of the apparatus will be coated to prevent corrosion.

69.2 ELECTRICAL COMPONENT INSTALLATION

All lighting used on the apparatus will be, at a minimum, a two (2) wire light grounded through a wired connection to the battery system. Lights using an apparatus metal structure for grounding will not be allowed.

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.

70.0 INSTRUMENTATION

70.1 CAB INSTRUMENTATION

The cab instrument panel will consist of gauges, an LCD display, telltale indicator lights, audible warning and control switches. The function of instrument panel controls and switches will be identified by a label adjacent to each item. Actuation of the headlight switch will illuminate the label wording for after dark operation. Telltale indicator lamps will not be illuminated unless necessary. The cab instruments and controls will be conveniently located within the forward cab section directly forward of the driver. Gauges and emergency vehicle switches will be installed on removable panels for ease of service and low cost of ownership.

70.2 GAUGES

The gauge panel will include the following nine (9) ivory faced gauges with chrome bezels to monitor vehicle performance:

Voltmeter gauge

Tachometer

Speedometer

Fuel level gauge

Engine oil pressure gauge

Front air pressure gauge

Rear air pressure gauge

Transmission oil temperature gauge

Engine coolant temperature gauge

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

70.3 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 located dead front and illuminated if active. The colored indicator lights will have descriptive text or symbols. The following amber telltale lamps will be present:

Low coolant

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)

HET (engine high exhaust temperature)

ABS (antilock brake system)

MIL (engine emissions system malfunction indicator lamp)

Side roll fault

The following red telltale lamps will be present:

Warning (stop sign symbol)

Seat belt

Parking brake

Stop engine

Rack down

The following green telltale lamps will be provided:

Left turn

Right turn

Battery on

The following blue telltale lamp will be provided:

High beam

Indicator lamps will perform prove out at initial power-up to ensure proper performance.

71.0 SWITCH CONTROLS

71.1 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.

Ignition switch: For ease of use in low light conditions, the switch will contain a red indicator light which will activate when the battery switch is on and a green indicator light which will activate whenever the ignition switch is on.

Momentary engine start switch: For ease of use in low light conditions, an integral red indicator light will activate with the battery switch.

Heater and defroster controls

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

Turn signal arm:

Self canceling turn signal

Wiper controls:

Wash function

Hi/Low/Intermittent (4 speeds)

Hazard switch will be incorporated into the steering column.

Parking brake control

Chassis horn control will be provided in the center of the steering wheel

Audible steady tone warning alarm

Audible pulsing tone caution alarm: Any active audible alarms will be silenced by holding the ignition switch at the top position for 3-5 seconds. For improved safety, silenced audible alarms will intermittently chirp every 30 seconds until the alarm conditions no longer exist. The intermittent chirp will act as a reminder to the operator that a caution or warning condition still exists. For added convenience, any new warning or caution conditions will re-enable the steady or pulsing tones respectively.

71.2 DIAGNOSTIC PANEL

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

Engine diagnostic port

Transmission and ABS diagnostic port

Roll sensor diagnostic port

Command Zone USB diagnostic port

Engine diagnostic switch (blink codes)

ABS diagnostic switch (blink codes)

71.3 CAB LCD DISPLAY

An integral digital 4 row by 20 character dot matrix display will be incorporated into the gauge panel. The display will be capable of showing simple graphical images as well as text. The display will be split into 3 sections. For ease of use each section will have a dedicated function. Section one (1) will provide informational messages such as the odometer. Section two (2) will display user friendly caution and warning text messages. The text messages will automatically activate anytime an audible caution or warning tone exists to provide information to the operator of the caution or warning condition. The LCD will be capable of displaying multiple text messages should more than one caution or warning condition exist. Section three (3) will indicate additional information such as outside temperature.

71.4 SWITCHES

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 overhead console on the driver's side, up to four (4) switch panels in the engine tunnel console facing the driver, up to four (4) switch panels in the overhead console on the officer's side and up to two (2) switch panels in the engine tunnel console facing the officer.

- High Air Restriction Warning Indicator Light: LCD message with amber warning indicator and audible alarm.

71.5 SPEEDOMETER – OFFICER SIDE

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

71.6 SWITCH PANELS

The emergency light switch panel will have a master switch for ease of use plus individual switches for selective control. Each switch panel will contain eight (8) membrane-type switches each rated for one million (1,000,000) cycles. Documentation will be provided by the manufacturer indicating the rated cycle life of the switches. The switch panel(s) will be located on the driver's side overhead to allow for easy access. For ease of use, an additional emergency light master switch will be located to the left of the steering column below the gauge panel and work in conjunction with all other emergency master switches.

The switches will be membrane-type and also act as an integral indicator light. For quick, visual indication the entire surface of the switch will be illuminated white whenever backlighting is activated and illuminated red whenever the switch is active. For ease of use, a 2-ply, scratch resistant laser engraved Gravoply label indicating the use of each switch will be placed in the center of the switch. The label will allow light to pass through the letters for ease of use in low light conditions.

71.7 ELECTRICAL POWER CONTROL SYSTEM

The primary power distribution will be located forward of the officer's seating position and be easily accessible while standing on the ground for simplified maintenance and troubleshooting. Additional electrical distribution centers will be provided throughout the vehicle to house the vehicle's electrical power, circuit protection, and control components. The electrical distribution centers will be located strategically throughout the vehicle to minimize wire length. For ease of maintenance, all electrical distribution centers will be easily accessible. All distribution centers containing fuses, circuit breakers and/or relays will be accessible without the need for additional tools.

Distribution centers located thought the vehicle will contain battery powered studs for surrounding and 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% of the maximum current for which the circuit is protected per NFPA.

71.8 COMMAND ZONE 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. Designs which incorporate modules and other electronic components into one or two locations will not be allowed. 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 this vehicle's configuration
- Factory and field reprogrammable to accommodate changes to the vehicles 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 Command Zone control system modules will meet the following specifications:

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

72.0 CIRCUIT PROTECTION AND CONTROL DIAGRAM

Copies of all job-specific, computer network input and output (I/O) connection 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.

73.0 ON-BOARD ADVANCED/VISUAL ELECTRICAL SYSTEM DIAGNOSTICS

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

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

All control system modules, with the exception of the main control module, will contain on-board visual diagnostic LEDs that assist in troubleshooting. The LEDs will be enclosed within the sealed, transparent module housing near the face of the module. One LED for each input or output will be provided and will illuminate whenever the respective input or output is active. Color coded labels within the modules will encompass the LEDs for ease of identification. The LED indicator lights will provide point of use information for reduced troubleshooting time without the need for an additional computer.

74.0 ADVANCED DIAGNOSTICS

An advanced, Windows-based, diagnostic software program will be provided. The software will provide troubleshooting tools to service technicians equipped with an IBM compatible computer.

The service and maintenance software will be easy to understand and use, have the ability to view system input/output (I/O) information, and include a USB cable for connection from a

computer to the vehicle.

74.1 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.

74.2 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.

74.3 DEDICATED RADIO EQUIPMENT CONNECTION POINTS

There will be four (4) studs provided in the primary power distribution center located in front of the officer for two-way radio equipment.

The studs will consist of the following:

12-volt 40-amp battery switched power
12-volt 100-amp ground
12-volt 60-amp ignition switched power
12-volt 60-amp direct battery power

74.4 ENHANCED SOFTWARE

The Command Zone 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.

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.

74.5 INFORMATION CENTER

An information center employing a 7" diagonal 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 F
- An Optical Gel will be placed between the LCD and protective lens
- Five weather resistant user interface switches
- Black enclosure with gray decal
- Sunlight Readable

- Linux operating system
- Minimum of 400nits rated display

74.6 OPERATION

The information center will be designed for easy operation for everyday use.

The page button will cycle from one screen to the next screen in a rotating fashion.

A video button will allow a NTSC signal into the information center to be displayed on the LCD. Pressing any button while viewing a video feed will return the information center to the vehicle information screens.

A menu button will provide access to maintenance, setup and diagnostic screens.

All other button labels will be specific to the information being viewed.

74.7 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.

Every screen will include the following:

- Exterior Ambient Temperature
- Time (12 or 24 hour mode)
- Text Alert Center:
  - 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 then 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.
  - Button Labels: 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.

PAGE SCREENS

The Information center will include the following screens:

Load Manager Screen: A list of items to be load managed will be provided. The list will provide:

- Description of the load

- Individual load shed priority: The lower the priority number the earlier the device will be shed should a low voltage condition occur.
- Load Status: The screen will indicate if a load has been shed (disabled) or not shed.

"At a Glance" color features are utilized on this screen

Do Not Move Truck: The Do Not Move Truck 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)
- Any other device that is opened, extended, or deployed that creates a hazard or is likely to cause damage to the apparatus if the apparatus is moved, will cause an "Alert Center" message if the parking brake is disengaged.

Chassis Information: The following information will be shown:

- Engine RPM
- Fuel Level
- Battery Voltage
- Engine Coolant Temperature
- Engine Oil Pressure

"At a Glance" color features are utilized on this screen

Active Alarms List: This screen will show a list of all active text messages. The list items text will match the text messages shown in the "Alert Center". The date and time the message occurred is displayed with each message in the list.

MENU SCREENS

The following screens will be available through the Menu button:

View System Information: A detailed list of vehicle information:

- Battery Volts
- Pump Hours
- Transmission Oil Temperature
- Pump Engaged
- Engine Coolant Level
- Engine Oil Level
    - Oil level will only be shown when the engine is not running
- Power Steering Level

Set daytime and nighttime Display Brightness:
- Brightness: Increase and decrease
    - Default setting button

Configure Video Mode:
- Set Video Contrast
- Set Video Color
- Set Video Tint

Set Startup Screen:
- Choose the screen that will be active at vehicle power-up

Set Date & Time:
- 12 or 24 hour format
- Set time
- Set date

View Active Alarms:
- Shows a list of all active alarms
    - Date and time of the occurrence is shown with each alarm
- Silence alarms
    - All alarms are silenced

System Diagnostics:
- Module type and ID number
- Module version
- Module diagnostics information:
    - Input or output number
    - Circuit number connected to that input or output
    - Circuit name (item connected to the circuit)
    - Status of the input or output
    - Power and Constant Current module diagnostic information

Button functions and button labels may change with each screen.

75.0 ELECTRONIC LOAD MANAGER

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

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

The system will include the following features:

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

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

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

75.1 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)
Crew Cab Air Conditioning (if applicable)
Exhaust Fans (if applicable)
Third Evaporator (if applicable)

75.2 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:

1) Documentation of the electrical system performance tests.

2) A written load analysis, which will include the following:
   A) The nameplate rating of the alternator.

   B) The alternator rating under the conditions specified per: Applicable NFPA 1901 or 1906 (Current Edition).

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

   D) Additional loads that, when added to the minimum continuous load, determine the total connected load.

   E) 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).

76.0 ALTERNATOR

A C.E. Niehoff, Model C656 alternator will be provided. It will have a rated output current of 400 amp as measured by SAE method J56. It will have a high volume air cooling fan and fan guard. It will also have a custom three (3)-set point voltage regulator, manufactured by C. E. Niehoff. The alternator will be connected to the power and ground distribution system with heavy-duty cables sized to carry the full rated alternator output.

77.0 BATTERY SYSTEM

Six (6) Delphi 12 volt, 700 CCA, 180 reserve capacity, high cycle, maintenance-free group 31 batteries with a system rating of 4200 CCA at 0 degrees Fahrenheit and 1080 minutes of

reserve capacity. The batteries will be provided with threaded posts.

78.0 BATTERY SYSTEM
A single starting system will be provided.

An ignition switch and starter button will be located on the instrument panel.

78.1 MASTER BATTERY SWITCH
A master battery switch, to activate the battery system, will be provided inside the cab within easy reach of the driver.

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

79.0 BATTERY COMPARTMENTS
The batteries will be stored in well-ventilated compartments that are located under the cab and bolted directly to the chassis frame. The battery compartments will be constructed of 10 gauge steel, and be designed to accommodate a maximum of three (3) group 31 batteries in each compartment. The compartments will include formed fit heavy duty roto-molded polyethylene battery tray inserts on each side of the frame rails. The batteries will be mounted inside of the roto-molded trays.

80.0 JUMPER STUDS
One (1) set of battery jumper studs with plastic color coded covers will be installed on the battery box on the driver's side. This will allow enough room for easy jumper cable access. A tag will be provided for positive/negative terminals.

81.0 BATTERY CHARGER/ AIR COMPRESSOR
A Kussmaul Pump Plus 1200 091-9-1200-S KIT with 15-amp red single output battery charger/air compressor system will be provided. A display bar graph indicating the state of charge will be mounted driver's side of the cab above the forward wheel well.

The automatic charger will maintain one (1) set of batteries with a maximum output current of 40 amps.

The 12-volt air compressor will be installed to maintain the air system pressure when the vehicle is not in use. A selector switch will be provided on the charger to operate the air compressor either as a DC compressor or as an AC compressor. If the selector switch is in the DC position the compressor will operate whenever the pressure switch senses low system pressure, however if in the AC position the shoreline inlet will be plugged in before compressor will operate.

The battery charger/compressor will be wired to the 120-volt shoreline to activate automatically when power is connected.

Battery charger/compressor will be behind drivers seat.

81.1 AUTO-EJECT RECEPTACLE

For the battery system, one (1) receptacle receptacle/s will be provided and located REAR OF THE DRIVERS CAB DOOR ABOVE THE DRIVERS SIDE FRONT WHEEL.. The receptacle/s will be a Kussmaul Auto-Eject 15 WP.

The Auto-Eject will be connected to the vehicle start buttons so when the engine is started, the Auto-Eject drives the shoreline connection from the inlet. The electrical inlet will include a red spring loaded cover to prevent water from entering the receptacle when the shoreline is not connected.

The electrical receptacle/s will be a 120-volt, 15 amp (NEMA 5-20P) and be wired to the battery charger with no less than 4-gauge wire properly supported and shielded from injury.

The Kussmaul Auto-Eject will be supplied by Kussmaul with an appropriately rated mating female plug.

82.0 HEADLIGHTS AND TURN LAMPS

82.1 EXTERIOR LIGHTING

Exterior lighting will comply with Federal Department of Transportation, Federal Motor Vehicle Safety Standards and National Fire Protection Association requirements in effect at time of proposal.

Front headlights will be round halogen lights mounted in the front trim housing. Headlights will consist of two (2) lights mounted in the front trim on each side of the cab grill. The outside light on each side will contain a low and high beam. The inside light on each side will contain of a high beam light only.

The following LED lighting package will provide long life lights for a lower cost of ownership:

- One (1) Whelen 600 series LED warning light and a Tomar 46 turn signal in a commaon bezel to be furnished each side above the headlights.

- Three (3) Ri-Tar LED clearance lamps will be installed in the center of the cab on the trim above the windshield.

- Four (4) Ri-Tar LED identification lamp will be installed, one (1) each side, facing forward and one (1) each side, facing the side on the trim above the windshield.

82.2 DAYTIME RUNNING LIGHTS (HEADLIGHTS)

The headlights will include a feature for daytime running lights which will be automatically activated when the truck is running and parking brake is released. The daytime running light feature will be deactivated when the primary headlight switch is turned on or when other headlight options are activated. The running lights will be wired through the low beam head

lights.

83.0 STEP LIGHTS

For reduced overall maintenance costs compared to incandescent lighting, there will be four (4) Ritar, Model M27HW2, LED step lights provided. The lights will be installed at each cab and crew cab door, one (1) per step, in the driver side front doorstep, driver side crew cab doorstep, passenger side front doorstep and passenger side crew cab doorstep.

The lights will be activated when the adjacent door is opened.

84.0 BACK-UP ALARM

An ECCO, Model SA917-PM2, 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 five (5) dBa above surrounding environmental noise levels.

85.0 REAR VISION SYSTEM

A Safety Vision single backup camera will be provided.

The camera will be located at the rear of truck, as close to the center as possible.

This rear vision system will be activated with the video button on the Command Zone color display or automatically when the apparatus is put into reverse. The backup camera image will be displayed on the apparatus 7" diagonal color screen in view of the driver.

An additional external audio speaker and control box will be installed near the Command Zone display for the audio portion of the package. This will enable the personnel in the cab to hear any sounds at the rear of the vehicle when the back up camera is activated.

The following components will be included:

One (1) SV-620 color camera.
Two (2) cables.
One (1) speaker with volume control.

86.0 CAB AND BODY EMERGENCY RESPONSE LIGHTING

86.1 LIGHTS, FRONT ZONE LOWER

One (1) pair of Tomar, Model: RECT-46LW-*WP, LED wide beam lights shall be provided with . The warning lights shall be housed in the same common bezel as the directional lights and be located above the headlights

The flash pattern shall be controlled by a Tomar "T-LED" flasher

One (1) switch located in the cab on the switch panel shall control this lights.

86.2 SIDE ZONE LOWER LIGHTING

Eight (8) Tomar, Model RECT-37LWS flashing LED warning lights will be installed in the following positions:

Two (2) lights, one each side on the bumper extension.

Two (2) lights, rear of the crew cab doors each side..

Two (2) lights, centered over the wheel wells.

Two (2) lights, To the rear of P1 & D1 compsrtment doors at the lower rear mounted in the vertical position..

The color of the lights will be as follows:

The driver side lights starting from the most forward light on that side will be blue, red, blue, red.

The passenger side lights starting from the most forward light on that side will be red, blue, red, blue.

One (1) switch located in the cab on the switch panel will control these lights.

The above lights will be programmed to flash the entire LED light at the same time. They will also be connected and programmed so that the front and rear lights flash together. The middle lights should alternate with the front and rear lights.

These lights will be installed with three (3) pair of flange kits.

86.3 REAR ZONE LOWER LIGHTING

Two (2) Tomar, Model: RECT-79LW*WP, N/A LED wide beam flashing lights will be located at the rear of the apparatus and will be required to meet the lower level optical warning and optical power requirements of NFPA.

The light shall be provided, with out a flange

The lights will be flashed by an external Tomar "TLED" LED flasher

The lights will be controlled by a lighted switch on the cab instrument panel.

86.4 WARNING LIGHTS (Rear and Side upper zone)

Six (6) Tomar model RECT-79LWS-**, LED, warning lights will be provided in the following locations:

Two (2) LED as high as possible at the rear of the truck facing the rear.
The color of these lights will be red LED/red lens.
One (1) LED each side at the rear upper side of the body facing the side.

The color of these lights will be red LED/red lens.
One (1) LED each side at the front upper side of the body facing the side.
The color of these lights will be Red LED/red lens.

The lights will be provided .

These lights will be required to meet or exceed the NFPA optical warning light requirements for the rear/side upper zone

One (1) switch located in the cab on the switch panel will control these lights.

The flash pattern of these lights will be controlled by an internal flasher.

86.5 WARNING LIGHT (Cab Roof)
One (1) 80" Tomar, model 930L-8009/PRE2, LED lightbar with traffic light controller will be mounted on the cab roof.

The lightbar will be furnished with the following:
- Four (4) RECT-37L red driver side front facing flashing LED modules.
- Four (4) RECT- 37L blue passenger side front facing flashing LED modules.
- One (1) RECT-43L red driver side corner flashing LED module.
- One (1) RECT-43L blue passenger side corner flashing LED module.
- One (1) RECT-37L red driver side end, side facing flashing LED module.
- One (1) RECT-37L red pass side end, side facing flashing LED module.
- One (1) traffic light controller to the front in the center.

To meet NFPA requirements, the traffic light controller will be deactivated when the parking brake is applied.

Two (2) switches located inside the cab on the switch panel will control this lightbar:
- One (1) switch for the warning lights.
- One (1) switch for the traffic light controller.

This lightbar will include the same color lens as the colored LED warning lights.

86.6 HEADLIGHT FLASHER
The high beam headlights will flash alternately between the left and right side, with a control switch located on the cab instrument panel.

Alternating function will be controlled by the programming of the ECU.

The flash mode will automatically cancel when the hi-beam headlight switch is activated and when the parking brake is set.

86.7 LIGHT, TRAFFIC DIRECTING
A Federal Signalmaster SML-6 will be recess mounted on the rear of the vehicle. A control

head SMC-5 will be used to actuate the light. This control head will be located in the cab within easy access to the driver.

The control unit will simulate the action of the lights on the rear of the vehicle. The light will be capable of four (4) warning patterns. They will consist of Arrow Right, Arrow Left, Center Out, and Alternating Flash. The light is 2.70" high X 41.80" wide X 3.30" deep. The rear amber park wired to the SCM-5 control will be utilized as part of the NFPA required lighting at the rear upper zone. If this option is wired into the park brake the SML-8 will be actuated in the Warning Mode, but the slide switch can override this feature.

87.0 REAR MOUNT PUMP

87.1 REAR MOUNT FIRE PUMP

Fire pump will be a Hale RME1500, with a 1250 GPM UL rating, single stage, centrifugal type located at the rear of the vehicle.

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, both suction and discharge passages, will be hydrostatically tested to a pressure of 500 psi (35.5 bar).

Pump will be fully tested at the pump manufacturer's factory to the performance requirements as outlined by the latest NFPA pamphlet #1901, and will be free from objectionable pulsation and vibration.

The 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. Pumps utilizing castings made of lower tensile strength cast iron not acceptable.

Pump body will be vertically split, on a single plane,.

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, and be of sufficient size and design to provide ample reserve capacity utilizing minimum horsepower.

Impeller clearance rings will be bronze, easily renewable without replacing impeller or pump volute body.

Pump shaft will be electric furnace, heat-treated, corrosion resistant stainless steel. Pump shaft must be sealed with double oil seal to keep road dirt and water out of drive unit.

88.0 PUMP MOUNTING AND ENCLOSURE

88.1 PUMP COMPARTMENT

The pump compartment will be located at the rear of the body, between the compartment sides. The body will be designed to accommodate the pump, manifolds and plumbing.

88.2 PUMP MOUNTING

The pump will be mounted at the rear of the truck in a manner designed to withstand the maximum stresses exerted on the pump. The pump will be mounted so that the drive shafts and components attain the proper angles and support and allow for component longevity.

89.0 INTAKE RELIEF VALVE

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

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

Outlet will terminate below the framerails with a 2.50" National Standard hose thread adapter and will have a "do not cap" warning tag.

Control will be located behind an access door at the right (passenger's) side pump panel.

90.0 PRESSURE GOVERNOR

N/A pressure sensing governor (PSG) system will be provided. The PSG system will eliminate the need for a discharge pressure relief valve.

The pressure governor system will be connected directly to the engine mounted Electronic Control Module (ECM) or may be an integral part of the engine ECM. A pressure transducer will be installed in the water discharge manifold on the pump. The transducer continuously monitors pump pressure sending a signal to the pressure governor. The pressure governor then sends a signal to the engine ECM, which modulates fueling in order to maintain a set pressure or engine speed (within engine/pump operating capabilities). There will be no user serviceable items or maintenance required on the PSG system. The PSG system will not require a mechanical drive, oil, or air supply for a means of control.

The pressure sensor governor system will be operable only after the vehicle parking brake has been set, the transmission is the pumping mode, and the fire pump has been engaged.

The pressure sensor governor system will have two (2) modes of operation: pressure mode or rpm mode.

When in the pressure mode, the PSG system will automatically maintain the discharge pressure set by the operator regardless of flow (within engine/pump operating capabilities).

In the rpm mode, the PSG system will automatically maintain a set engine speed, regardless of engine load (within engine operation capabilities).

A pump cavitation protection feature will be provided which will return the engine to idle should the pump cavitate.

A VHS videotape describing the operation, of the pressure governor, and troubleshooting procedures will also be provided with the apparatus.

91.0 HALE ESP PRIMING PUMP

Priming pump will be a positive displacement vane type, electrically driven, and conforming to standards outlined in NFPA pamphlet #1901.

One (1) priming control will both open the priming valve and start the priming motor.

Primer will be environmentally safe, self lubricating style.

92.0 MECHANICAL SEAL ON PUMP

Only one (1) mechanical seal will be required on the suction (inboard) side of the pump. The mechanical seal will be two (2.00) inches 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.

93.0 AUXILIARY COOLING SYSTEM

A supplementary heat exchange cooling system will be provided to allow the use of water from the discharge side of the pump for cooling the engine water. The heat exchanger will be cylindrical type and will be a separate unit. The heat exchanger will be installed in the pump or engine compartment with the control located on the pump operator's control panel. Exchanger will be plumbed to the master drain valve. The engine water lines will be run inside plastic conduit.

93.1 RECIRCULATING LINE, WITH CHECK VALVE

A .50" diameter recirculating line, from the pump to the water tank, will be furnished with a control installed at the pump operator's control panel. A check valve will be provided in this line to prevent the back flow of water from the tank to the pump if the valve is left in the open position.

94.0 PUMP SHIFT AND TRANSMISSION

94.1 PUMP TRANSMISSION = WATEROUS TC10

Pump transmission will be made of a three (3)-piece, aluminum, horizontally split casing. Power transfer to pump will be through a Morse HY-VO drive chain.

Drive shafts will be a minimum of 2.35" diameter hardened and ground alloy steel. All

shafts will be ball bearing supported. The case will be designed as to eliminate the need for water cooling.

The chassis frame crossmembers will be designed with a center drop to allow the drive shaft to be contained with-in the frame rails. A drive shaft installed above the frame that will require the water tank to be raised or notched is not acceptable.

94.2 AIR PUMP SHIFT

Pump shift engagement will be made by a two (2) position sliding collar, actuated pneumatically (by air pressure), with a three (3) position air control switch located in the cab. A manual back-up shift control will also be located in the drivers side front compartment.

Two (2) indicator lights will be provided adjacent to the pump shift inside the cab. One (1) green light will indicate the pump shift has been completed and be labeled "pump engaged". The second green light will indicate when the pump has been engaged, and that the chassis transmission is in pump gear. This indicator light will be labeled "OK to pump".

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

94.3 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.

94.4 PUMP WARRANTY (See Item 151.0)

94.5 PUMP MANUALS

Two (2) pump manuals from the pump manufacturer will be furnished with the apparatus. The manuals will cover pump operation, maintenance, and parts.

95.0 PLUMBING

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

Where vibration or chassis flexing may damage or loosen piping or where a coupling is required for servicing, the piping will be equipped with victaulic or rubber couplings.

Plumbing manifold bodies will be ductile cast iron or stainless steel.

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

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

95.1 PUMP PLUMBING WARRANTY (See Item 151.0)

95.2 THERMAL RELIEF VALVE = HALE

A thermal relief valve will be provided on the pump to monitor pump water temperature. This valve will automatically relieve water from the pump and dump to ground when the temperature of the pump water exceeds the temperature setting of the valve.

96.0 HUSKY 12 FOAM SYSTEM

A Pierce Husky 12 foam proportioning system will be provided that is an on demand, automatic proportioning, single point, direct injection system suitable for all types of Class "A" & "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 balance and proportion foam solution at rates from 0.1% to 9.9% regardless of variations in water pressure and flow, up to the maximum rated capacity of the foam concentrate pump.

The design of the system will allow operation from draft, hydrant, or relay operation. This will provide a versatile system to meet the demands at a fire.

96,1 System Capacity

The system will have the ability to deliver the following minimum foam solution flow rates at accuracy's that meet or exceed NFPA requirements at a pump rating of 250 PSI.

200 GPM @ 6%
400 GPM @ 3%
1200 GPM @ 1%

Class A foam setting in .1 % increments from .1% to 1%. Typical settings of 1%, .5% and .3% (Maximum capacity will be limited to the plumbing and water pump capacity)

96.2 Control System

The system will be equipped with a digital electronic control display located on the pump operator's panel. Push button controls will be integrated into the panel to turn the system on/off, control the foam percentage, direct which foam to use on a multi-tank system, and to set the operation modes (automatic, manual, draft, calibration, or flush).

The percent of injection will have presets for class A and class B foam. These presets 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.

In order to minimize the use of abbreviations and interpretations, system information will be displayed on the panel by way of .50 tall LEDs that total fourteen characters (two lines of 7 each). System on and foam pump on indicator lights will also be included. Information displayed will include mode of operation (automatic, manual, draft, calibration, or flush),

foam supply selected (Class A or Class B), water total, foam total, foam percentage, remaining gallons, and time remaining.

The control display will direct 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 contaminating the water pump.

96.3 Low Level, Foam Tank

The control head will display a warning message when the foam tank in use is below a quarter tank.

96.4 Hydraulic Drive System

The foam concentrate pump will be powered by a hydraulic drive system, which is automatically activated, whenever the vehicle water pump is engaged. A system that drives the foam pump via an electric motor will not be acceptable. A large parasitic electric load used to power the foam pump can cause an overload of the chassis electrical system.

Hydraulic oil cooler will be provided to automatically prevent overheating of the hydraulic oil, which is detrimental to system components. The oil/water cooler will be designed to allow continuous system operation without allowing hydraulic oil temperature to exceed the oil specifications.

The hydraulic oil reservoir will be of four (4) gallons minimum capacity and will also be of sufficient size to minimize foaming and be located to facilitate checking oil level or adding oil without spillage or the need to remove access panels.

96.5 Foam Concentrate Pump

The foam concentrate pump will be of positive displacement, self-priming; linear actuated design, driven by the hydraulic motor. 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 12 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.

96.6 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. The external foam pick-up will be designed to allow use with training foam or colored water for training purposes.

96.7 Panel Mounted Strainer / External Pick-Up Connection
A bronze body strainer / connector unit will be provided. The unit will be mounted to the pump panel. The external foam pick-up will be one (1) - 1.00" male connection with chrome-plated cap integrated to a 2.00" strainer cleanout cap. A check valve will be installed in the pick-up portion of the cleanout cap. A basket style stainless steel screen will be installed in the body of the strainer / connector unit. Removal of the 2.00" cleanout cap will be all that is required to gain access to and remove the stainless steel basket screen. The strainer / connector unit will be ahead of the foam concentrate pump inlet port to insure that all agent reaching the foam pump has been strained.

96.8 Pick-Up Hose
A 1.00" flexible hose with an end for insertion into foam containers will be provided. The hose will be supplied with a 1.00" female swivel NST thread swivel connector. The hose will be shipped loose.

96.9 Discharges
The foam system will be plumbed to five discharges. The discharges capable of dispensing foam will be speedlays, deck gun, #3 discharge, and front bumper..

96.10 System Electrical Load
The foam proportioning will not impose an electrical load on the vehicle electrical system any greater than five (5) amps at 12VDC.

96.11 Tank Selector
Electric valves will be used for the foam supply. The foam supply valves will be controlled at the foam system control head for ease of operation. The supply valves will be electric, remote controlled, to eliminate air pockets in the foam tank supply hose.

96.12 Maintenance Message
A message will be displayed on the control head to advise when system maintenance needs to be performed. The message will display interval for cleaning the foam strainer, cleaning for the water strainers, and changing the hydraulic oil.

96.13 Flush System
The system will be designed such that a flush mode will be provided to allow the system to flush all foam concentrate with clear water. The flush circuit control logic will ensure the foam tank supply valve is closed prior to opening the flush valve. The

flush valve will be operated at the foam system control head for ease of operation. The valve will be electrically controlled and located as close to the foam tank supply valve as possible. A manual flush drain valve will be labeled and located under the driver's side running board.

97.0 CAFS SYSTEM

97.1 FOAM GENERATING SYSTEM, CAFS

A Hercules 140 cfm capacity compressed air foam, will be provided. The system will supply five (5) discharges with compressed air foam. It will be capable of providing foam solution or compressed air foam from any of the specified CAFS discharges simultaneously. In addition, the consistency of the compressed air foam (wet to dry) from each discharge will be adjustable. All CAF capable discharges will have the discharge valve control, air injection control, and discharge pressure gauge mounted in a group on the operator's panel. Each CAF capable discharge will feature a check valve to prevent reverse flows of compressed air foam that is integrated into the discharge valve. The wafer check valve will be a type and design approved by the manufacturer of the discharge valve. With manual CAFS air controls.

97.2 DISCHARGES TO CAF CAPABLE

The speedlays, deck gun, #3 discharge, and front bumper. discharges will be capable of discharging compressed air foam. There is no second pump on the vehicle

97.3 AIR COMPESSOR, HYDRAULIC DRIVEN

An oil flooded rotary screw compressor rated for at least 140cfm @ 150psig will be provided. The compressor will be mounted in an area that allows for proper service and maintenance of the components. The compressor will be driven by a hydraulic drive system. The hydraulic drive system will be driven by the vehicle transmission through a PTO. All components of the system will be sized and rated for the system to deliver compressed air, uninterrupted, for up to 2 hours at a time without undue stresses, vibrations, or overheating. The air compressor will be capable of delivering the rated capacity of the compressor when the fire pump is delivering 250gpm @120psi from tank or draft.

The hydraulic compressor drive system will be comprised of a variable displacement piston type hydraulic pump supplying a fixed displacement piston hydraulic motor. The displacement of the hydraulic pump will be controlled by a fixed orfice type, load sensing, hydraulic circut. The hydaulic system will have a properly sized reservior, cooler, filter(s) and accessory components. The components will be mounted in the vehicle body to facilitate routine maintenance operations. The hydraulic drive design will be certified by manufacturer of the primary components as suitable for the intended use and duty cycle.

All components of the air compressor and drive system will be readily available on the domestic air compressor / hydraulic market (USA). The compressor will be designed and assembled by the apparatus manufacturer, using standard components available to air compressor OEM's. The hydraulic drive system will be assembled by the apparatus

manufacturer using standard mobile hydraulic components. The hydraulic drive system will drive the foam proportioner, in addition to the air compressor.

The PTO will be a 10 bolt SAE type mounted to the PTO opening of the vehicle's Allison transmission. The PTO will be rated for at least 20 percent more torque throughput than the air compressor dirve system will demand.

The air/oil separator for the compressor system will be easily serviced. The separator will be inside a cast iron compressor base, receiver combination. The separator will consist of two stages. The first stage being a centrifuge arrangement engineered into the compressor base. The second stage will be a cartridge arrangement inside an enclosure featuring an "inside to outside" flow of the air through the cartridge. The cartridge will be servicable by the removal of the compressor system minimum pressure valve. The separation system will be capable of at least 140 SCFM flow at 40 psi tank pressure. The allowable oil carry over will be no more than 10 parts per million oil in air.

A cast iron air/oil receiver tank, will be provided. The tank will be constructed and tested to the applicable standards as addressed by NFPA 1901 for CAF system air compressor tanks. The tank will be mounted in a manner that allows easy access to the fill opening and the level sight gauges. The tank will be of the vertical type with the minimum pressure valve of the compressor system integrated into the top of the tank. The minimum pressure valve will be rotatable to facilitate different discharge arrangements from the tank.

The compressor lubricant will be filtered by spin on type filter. The filter will have a 25 Micron rating and a safety bypass valve. The filter assembly will be mounted and located in a manner that allows easy service. A thermostat valve will be integrated into the oil filter and compressor base housing. The thermostat will route lubricant to the oil cooler to maintain the compressors temperature between minimum and maximum limits.

An water/oil cooler will be provided to cool the compressor. The cooler will be sized to meet the duty cycle requirements as specified.

A heavy duty, automotive type, dry element air cleaner will be provided. The air cleaner will be mounted in such a manner as to be easily serviced. The air cleaner will be mounted, or the inlet of the filter routed, in such a manner that the air cleaner intakes fresh air from outside the vehicle body. In addition, the compressor air intake will be screened to prevent debris from entering the filter housing.

The system will have the following safety or monitoring devices.

- Minimum pressure valve
- Compressor lube temperature gauge
- Compressor system pressure gauge
- Air flow meter
- Compressor lube temperature warnings, audible and visible
- High pressure relief valve on receiver tank

- Applicable warning and information decals

The air compressor will be controlled by a modulating inlet valve mounted on the air compressors inlet port. A controller will be provided that senses air pressure and controls the delivery volume of the air compressor while maintaining a constant pressure. The controller will feature an automatic balancing system to maintain the air pressure within plus or minus 5% of the discharge pressure of the fire pump, throughout a pressure range of 60psi to 150psi.

The compressor system will have operators controls at the pump panel for the following functions.

- Automatic pressure regulation, to match the compressor discharge pressure to the pump discharge pressure.
- Fixed pressure regulation, to set the air pressure at on pressure for the use of air tools, etc.
- PTO engagement switch
- PTO engaged indicator light

97.4 REFILL, FOAM TANKS

The foam system's proportioning pump will be used to fill the Class A 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 stating TANK A FILL. While the proportioner pump is filling the tank, the controller will display FILL TANK A. When the tank is full, as determined by the float switch in the tank dome, the pump will stop and the controller will display TANK A FULL.

A separate air operated fill pump, controlled by the foam system controller, will be provided for filling the Class B foam tank. A separate inlet connection, mounted on the pump panel will be provided for this fill system. 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 connection will be the same as the foam intake connection, in order to allow the use of the foam pick-up hose as the fill hose. The fill operation will be controlled by a mode in the foam system controller stating TANK B FILL. To fill the tank, the controller will start and run the air operated pump. While the pump runs, the controller will display FILL TANK B. When the tank is full, as determined by the float switch in the tank dome, the pump will stop and the controller will display TANK B FULL.

The fire department will order one vehicle with this foam system. A demonstration will be provided at the fire department, on the operation of the foam system.

This demonstration will include:
- Review of the foam system manual, highlighting key areas.

- A walk around review of the system components, on the finished truck.

- A hands on foam system start-up and foam discharge session.

- Instructions on the use of the manual overrides.

- The proper way to shutdown and flush the foam system.

98.0 MASTER DRAIN VALVE AND BLEEDER VALVES

98.1 INLET BLEEDER VALVE

A .75" ball type bleeder valve will be provided for each gated rear inlet. The valves will have a handwheel type knob for the control. The water, that is discharged by the valve, will be routed below the chassis.

98.2 OUTLET BLEEDERS

A .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.

99.0 AKRON VALVES AND CONTROLS

All ball valves will be Akron Brass. The Akron valves will be the 8000 series heavy-duty style with a stainless steel ball and a simple two-seat design. No lubrication or regular maintenance is required on the valve.

The location of the valve for the one (1) inlet will be behind rear wall.

100.0 MASTER INTAKE VALVE

100.1 INLET VALVE/DUMP

One (1) Hale MIV will be provided on the main pump inlet(s). The inlet valve will be a combination butterfly valve and pressure relief valve with a .75" bleeder valve. The pressure relief valve will have a range of 75 to 250 psi. The pressure relief valve will be factory set to 160 psig. The valve, less relief valve, will be rated for 600 psi hydrostatic pressure and 26 in hg of vacuum.

The valve will be fully recessed behind the body panel.

The valve will be operated by an electric 12 vdc motor. A control panel with the electric switch and three (3) status indictor lights will be provided on the pump operator's panel. A manual override handwheel will be provided next to each inlet valve.

101.0 MAIN PUMP INLETS

One (1) 6.00" pump manifold inlets with male NST threads will be provided at the rear 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.

The main pump inlets will have National Standard Threads with a long handle chrome cap.

The cap will be the Pierce VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected.

101.1 ADAPTER, INLET

One (1) adapter for the inlet will be furnished for the main pump inlet(s) with 6.00"" female NST threads converting to 5.00" Storz. A 5.00" Storz cap will be provided to match the adapter.

101.2 ANODE, INLET

A pair of sacrificial zinc anodes will be provided in the water pump inlets to protect the pump from corrosion.

101.3 INLET CONTROL

Control for the rear inlet(s) will be located at the pump panel.

101.4 INLET (Rear)

A 3.00" rear inlet will be provided with the control located at the operator's panel.

The inlet will be located at the rear of the body on the driver's side.

The inlet will be furnished with a National Standard hose thread, chrome plated, swivel and plug.

102.0 TANK TO PUMP

The booster tank will be connected to the intake side of the pump with heavy duty 4.00" piping and a quarter turn 3.00" valve with the control remotely located at the operator's panel. 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.

103.0 TANK REFILL

A 2.00" 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.

104.0 SPEEDLAYS WITH TRAY

At the front of the body will be two (2) 1.75" speedlay hose beds. Each bed will have a 2.00" preconnect line with a 2.00" quarter-turn ball valve and terminate with a 1.50" National Standard hose thread 90 degree swivel. The swivel will be located at the top of the speedlay compartment to allow easy removal of the hose.

Individual controls for the speedlays will be at the pump operator's panel.

Each compartment will be capable of carrying 200' of 1.75" trays to be 10 wide by 10" high I.D. feet of 1.75" double jacketed hose with the one (1) compartment located above the other.

A removable tray will be provided for each speedlay hosebed. The speedlay trays will be constructed of black poly to provide a lightweight sturdy tray. Two (2) hand holes will be in the floor and additional hand holes will be provided in the sides for easy removal and installation from the compartment. The floor of the trays will be perforated to allow for drainage and hose drying. The bottom of the speedlay compartments will be lined with stainless steel to allow the tray to slide with ease. Scuffplates will be provided on both sides, at the sides and bottom of each opening to protect the paint.

A compartment will be provided below the speedlays, each side, with a highed door.

104.1 CROSSLAY/SPEEDLAY HOSE RESTRAINT

An elastic netting will be provided across the top and on the ends of two (2) crosslay(s)/speedlay(s) to secure the hose during travel.

105 DISCHARGE OUTLET (Rear)

There will be three (3) discharge outlets piped to the rear of the hose bed, below the pump access door installed so proper clearance is provided for spanner wrenches or adapters. Plumbing will consist of 3.00" piping along with a 3.00" full flow ball valve with the control from the pump operator's panel.

105.1 DISCHARGE CAPS

Chrome plated, rocker lug, caps with chains will be furnished for all side discharge outlets.

The caps will be the VLH, which incorporates a patent pending thread design to automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

105.2 ELBOWS, REAR OUTLETS

The 3.00" discharge outlets, located at the rear of the apparatus, will be furnished with a 3.00"(F) National Standard hose thread x 2.50"(M) National Standard hose thread, chrome plated, 30 degree elbow.

The elbow will be the VLH, which incorporates a patent pending thread design to

automatically relieve stored pressure in the line when disconnected. (NO EXCEPTIONS)

105.3 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.

No handwheel control valve are to be used unless specifically approved in writing, the control would be a minimum of a 3.9" diameter chrome plated handwheel with a dial position indicator built in to the center of the handwheel.

106.0 MATSER DISCHARGE

106.1 DELUGE RISER WITH BYPASS

A 3.00" deluge riser will be recessed in the rear of the driver's side hatch compartments. Piping will be installed securely so no movement develops when the line is charged. The riser will be gated and controlled at the pump operator's panel. This outlet will have two (2) supply lines teed together to allow proper water flow in the water only operation and the water/foam operation. The water only piping will consist of a 3.00" ball valve with a handwheel control located on the pump panel. The water/foam piping will include a 2.50" ball valve and it will be plumbed into the foam system.

106.2 MONITOR

An Akron Model #3440 "Deck Master" waterway monitor will be properly installed on the deluge riser.

The monitor will be painted to match the body.

This monitor will include all electric 12 VDC controls for the monitor.

The monitor will include the automatic stow feature.

A remote control will be installed on the pump operator's panel with an additional remote tether control mounted in the pump panel area.

There will be one (1) provided.

A position sensor will be provided on the monitor that will activate the "do not move vehicle" light inside the cab when the monitor is in the raised position.

106.3 NOZZLE, DELUGE

An Akron #1577 SaberMaster1250gpm Master Stream Nozzle with 2.50" swivel will be provided. The nozzle will have a range of 250 to 1250 gpm. The nozzle will be capable of smooth bore or fog with-out changing tips.

The deluge riser will have a 3.00" four (4)-bolt stainless steel flange for mounting the

monitor.

107.0 PUMP OPERATOR PANEL

107.1 PUMP CONTROL PANELS (Driver's Side Rear Control)

All pump controls and gauges will be located at the left (driver's) side of the apparatus and properly marked. They will be contained in the rear side compartment.

The gauge and control panels will be designed for ease of maintenance.

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.

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 in individual chrome plated castings with the identification tag recessed in the casting below the gauge. All remaining identification tags will be mounted on the pump panel in chrome plated bezels. Mounting of the castings and identification bezels will be done with a threaded peg cast on the back side of the bezel or screws.

107.2 VALVE TAGS

Color coded tags to match the pump panel controls will be supplied on the plumbing valves. The tags will be attached to small plates on the valve, that corresponds to the control at the pump panel.

107.3 PUMP PANEL ILLUMINATION

Illumination of the pump operator's panel will be accomplished with the compartment interior lighting.

The lighting will be controlled by the opening and closing of the compartment door(s).

107.4 PUMP PANEL CONFIGURATION

The pump panel configuration will be laid out per the following special instructions Build as close as practical to the photo's in The R:Drive 19360.

107.5 Pump Panel Configuration

The pump panel configuration will be neat and orderly.

107.6 PUMP AND GAUGE PANEL

The pump and gauge panels will be constructed of stainless steel with a polished finish. A polished aluminum trim molding will be provided on both sides of the pump panel.

107.7 PUMP ACCESS

A hinged lift-up door with lift & turn latches will provide access to the pump and plumbing from the rear of the truck.

108.0 PUMP PANEL GAUGES AND CONTROLS

The following will be provided on the pump and gauge panels in a neat and orderly fashion:

- Engine Oil Pressure Gauge: With visual and audible warning

- Engine Water Temperature Gauge: With visual and audible warning

- Tachometer: Electric

- Master Pump Drain Control

- Voltmeter

- High Engine Temperature/Low Coolant Indicator Light and LCD message

- Stop Engine Warning Indicator Light and LCD message

- Check Engine Warning Indicator Light and LCD message

- "Deluge not down" Indicator Light

- A pump RPM test port

109.0 GAUGES, VACUUM and PRESSURE

The pump vacuum and pressure gauges will be silicone filled and manufactured by Class 1, Inc.

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.

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.

109.1 PRESSURE GAUGES

The individual "line" pressure gauges for the discharges will be interlube filled and

manufactured by Class 1.

The gauges will be a minimum of 3.50" in diameter and will have white faces with black markings.

Gauges will be compound type with a vacuum/pressure range of 0-300 psi..

The individual pressure gauge will be installed as close to the outlet control as practical.

110.0 WATER LEVEL GAUGE

An electronic water level gauge will be provided on the operator's panel, that registers water level by means of five colored LED lights. The lights will be durable, ultra-bright five LED design viewable through 180 degrees. The water level indicators will be as follows:

- 100% = Green
- 75% = Yellow
- 50% = Yellow
- 25% = Yellow
- Refill = Red

The light will flash when the level drops below the given level indicator to provide an eighth of a tank indication. To further alert the pump operator, the lights will flash sequentially when the water tank is empty.

The level measurement will be based on the sensing of head pressure of the fluid in the tank.

The display will be constructed of a solid plastic material with a chrome plated die cast bezel to reduce vibrations that can cause broken wires and loose electronic components. The encapsulated design will provide complete protection from water and environmental elements. An industrial pressure transducer will be mounted to the outside of the tank. The field calibratable display measures head pressure to accurately show the tank level.

110.1 WATER LEVEL GAUGE, ADDITIONAL

An additional water level gauge will be provided. An Ernst sight tube water level indicator with a floating red ball will be mounted on the gauge panel with an unrestricted view for the operator.

111.0 FOAM LEVEL GAUGE

An electronic foam level gauge will be provided on the operator's panel for each foam tank, that registers foam level by means of five colored LED lights. The lights will be durable, ultra-bright five LED design viewable through 180 degrees. The foam level indicators will be as follows:

- 100% = Green
- 75% = Yellow
- 50% = Yellow

- 25% = 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 field calibratable display measures head pressure to accurately show the tank level.

112.0 AIR TOOL OUTLET

A 1.00" air outlet supplied by the foam system compressor will be provided on one of the pump panels. This outlet will have a chrome plated 1.0" FNST swivel fitting at the panel and a valve behind the pump panel. The outlet will be capable of supplying the capacity of the compressor. A mating 1.0" MNST x 1.0" NPT fitting will be supplied with loose equipment.

113.0 BOOSTER AND FOAM TANKS

113.1 WATER TANK

Booster tank will have a capacity of 520 gallons of water and be constructed of polypropylene plastic by United Plastic Fabricating, Incorporated.

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 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 is 8.00" long x 8.00" wide x 6.00" deep 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.

113.2 WATER TANK WARRANTY (See Item 151.0)

113.3 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 brand of foam stored in this tank will be Fire - Trol. The foam cell will reduce the capacity of the water tank. The foam cell will have a screen in the fill dome and a breather in the lid. A label showing the foam tank capacity and type of foam to be furnished.

113.4 FOAM TANK DRAIN

A system of 1.00" foam tank drains will be provided, integrated into the foam systems strainer and tank to foam pump valve management system. The tank to pump hoses running from the tank(s) to the panel mounted strainer will 1.00" diameter. The foam system

controller will have a mode that allows for a given foam valve to be opened at will. Flow of foam from the tank valve to the strainer will be usable as a tank drain mode.

An adaptor will be supplied, that allows the 1.00" foam intake screen to assembly to be used as a drain outlet. The standard supplied, 1.00" foam pick up hose will be attached to the screen assembly by way of the adapter. The drain mode will allow the operator to open and close the tank valve as required from the control head, to drain foam and re-fill foam containers through the connected hose, without foam spillage beneath the vehicle.

113.5 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 "B" foam. The brand of foam stored in this tank will be Angus Tridol AR-AFFF. The foam cell will reduce the water capacity of the tank. The foam cell will have a screen in the fill dome and a breather in the lid. A label showing the foam tank capacity and type of foam to be furnished.

113.6 FOAM TANK DRAIN

A system of 1.00" foam tank drains will be provided, integrated into the foam systems strainer and tank to foam pump valve management system. The tank to pump hoses running from the tank(s) to the panel mounted strainer will 1.00" diameter. The foam system controller will have a mode that allows for a given foam valve to be opened at will. Flow of foam from the tank valve to the strainer will be usable as a tank drain mode.

An adaptor will be supplied, that allows the 1.00" foam intake screen to assembly to be used as a drain outlet. The standard supplied, 1.00" foam pick up hose will be attached to the screen assembly by way of the adapter. The drain mode will allow the operator to open and close the tank valve as required from the control head, to drain foam and re-fill foam containers through the connected hose, without foam spillage beneath the vehicle.

113.7 SPECIAL TAG

There will be two (2) special tags provided. The tags will read INSIDE AND OUTSIDE OF WATER TANK FILL COVER TO READ "WATER ONLY - 520 GALLON CAPACITY.

114.0 BODY DESIGN AND CONSTRUCTION

114.1 COMPARTMENTATION

Body and compartments will be fabricated of 304L stainless steel.

Side compartments will be an integral assembly with the rear fenders.

Circular fender liners will be provided. For prevention of rust pockets and ease of maintenance the fender liners will be formed from brush finished 304L stainless steel, be unpainted, and removable for maintenance.

Compartment flooring will be of the sweep out design with the floor higher than the compartment door lip.

Drip protection will be provided above the doors by means of bright aluminum extrusion, formed bright aluminum treadplate or polished stainless steel.

The top of the compartment will be covered with bright aluminum treadplate rolled over the edges on the front, rear and outward side. These covers will have the corners "TIG" welded.

Side compartment covers will be separate from the compartment tops.

All screws and bolts which are not Grade 8 will be stainless steel and where they protrude into a compartment will have acorn nuts on the ends to prevent injury.

114.2 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 body support system will begin with the chassis frame rails which is the strongest component of the chassis and is designed for sustaining maximum loads. The support system will include lateral frame rail extensions that are formed from .375" 80k steel and bolted to the chassis frame rails with .625" diameter Grade 8 bolts. The vertical and horizontal members of the frame rail extensions are to be reinforced with welded gussets and extend to the outside edge of the body.

A stainless steel body structure will be mounted on the top of these supports to create a "floating substructure" which will result in a 800 pound equipment support rating per lower compartment and provide up to 0.25" accumulative floor thickness.

The "floating substructure" will be separated from the lateral frame extensions with neoprene elastomer isolators. These isolators will reduce the natural flex stress of the chassis from being transmitted to the body.

The 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.

A design with body compartments simply hanging/sitting on the chassis in an unsupported (cantilever) fashion will not be acceptable.

114.3 AGGRESSIVE WALKING SURFACE

All exterior surfaces designated as stepping, standing, and walking areas will comply with the required average slip resistance of NFPA section 13-7.3.

114.4 LOUVERS

All body compartments will have a minimum of one (1) set of automotive style, dust resistant louvers pressed into a wall to provide one way airflow out of the compartment that prevents water and dirt from gaining access to the compartment.

114.5 TESTING OF BODY DESIGN

Body structural analysis will be fully tested. Proven engineering and test techniques such as finite element analysis, model analysis, and strain gauging have been performed with special attention given to fatigue, life and structural integrity of the body and substructure.

The body will be tested while loaded to its greatest in-service weight.

The criteria used during the testing procedure will include:

- Raising opposite corners of the vehicle tires 9.00" to simulate the twisting a truck may experience when driving over a curb.

- Making a 90 degree turn, while driving at 20 mph to simulate aggressive driving conditions.

- Driving the vehicle on at 35 mph on a "washboard" road.

- Driving the vehicle at 55 mph on a smooth road.

- Accelerating the vehicle fully, until reaching the approximate speed of 45 mph on rough pavement.

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

114.6 BODY WARRANTY (See Item 151.0)

114.7 COMPARTMENTATION, DRIVER'S SIDE

A full height, double lap door compartment ahead of the rear wheels will be provided. The interior dimensions of this compartment will be 62.00" wide x 61.50" high x 26.00" deep. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 58.00" wide x 60.25" high.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

A vertically hinged, double door compartment over the rear wheels will be provided. The interior dimensions of this compartment will be 60.00" wide x 29.50" high x 26.00" deep. The depth of the compartment will be calculated with the compartment door closed. The clear door opening of this compartment will be 58.00" wide x 27.50" high.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and

will easily be accomplished with one hand.

A full height, roll-up door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will be 52.00" wide x 61.50" high x 26.00" deep in the lower 54.50" of the compartment and 13.63" deep in the remaining upper portion. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 49.00" wide x 54.50" high.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

114.8 COMPARTMENTATION, PASSENGER'S SIDE

A full height, double lap door compartment ahead of the rear wheels will be provided. The interior dimensions of this compartment will be 62.00" wide x 61.50" high x 26.00" deep. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 58.00" wide x 60.25" high.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

A vertically hinged, double door compartment over the rear wheels will be provided. The interior dimensions of this compartment will be 60.00" wide x 29.50" high x 26.00" deep. The depth of the compartment will be calculated with the compartment door closed. The clear door opening of this compartment will be 58.00" wide x 27.50" high.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

A full height, double lap door compartment behind the rear wheels will be provided. The interior dimensions of this compartment will be 52.00" wide x 61.50" high x 26.00" deep. The depth of the compartment will be calculated with the compartment door closed. The compartment interior will be fully open from the compartment ceiling to the compartment floor and designed so that no permanent dividers are required between the upper and lower sections. The clear door opening of this compartment will be 48.00" wide x 60.25" high.

Closing of the door will not require releasing, unlocking, or unlatching any mechanism and will easily be accomplished with one hand.

114.9 REAR PUMP ACESS

A bolt on panel will be provided for access to service the plumbing on the rear sheet.

115.0 DOORS, SIDE COMPARTMENTS

All hinged compartment doors will be lap style with double panel construction and fabricated of .09"-5052H34 aluminum. Doors will be a minimum of 1.50" thick with a full interior panel. To provide additional door strength, a "C" section reinforcement will be installed between the outer and interior panels.

Doors will be provided with a closed cell rubber gasket around the surface that laps onto the body. A second heavy-duty automotive rubber molding with a hollow core will be installed on the door framing that seals onto the interior pan, to ensure a weather resisting compartment.

All compartment doors will have polished stainless steel continuous hinge with a pin diameter of .25", that is bolted or screwed on with stainless steel fasteners.

All door lock mechanisms will be fully enclosed within the door panels to prevent fouling of the lock in the event equipment inside shifts into the lock area.

Doors will be latched with recessed, polished stainless steel "D" ring handles and Eberhard 106 locks.

To prevent corrosion caused by dissimilar metals, compartment door handles will not be attached to outer door panel with screws. A rubber gasket will be provided between the "D" ring handle and the door.

Roll-up doors will be provided on One (1) compartment door. These doors will be furnished with a job color painted finish, double faced, aluminum construction and manufactured by A&A Manufacturing (Gortite).

Lath sections will be an interlocking rib design and will be individually replaceable without complete disassembly of door.

Between each slat at the pivoting joint will be a PVC inner seal to prevent metal to metal contact and prevent dirt or moisture from entering the compartments. Seals will allow door to operate in extreme temperatures ranging from plus 180 to minus 40 degrees Fahrenheit. Side, top and bottom seals will be provided to resist ingress of dirt and weather and be made of Santoprene.

All hinges, barrel clips and end pieces will be nylon 66. All nylon components will withstand temperatures from plus 300 to minus 40 degrees Fahrenheit. Hardened plastic will not be acceptable.

A polished stainless steel lift bar will be provided for opening door. Lift bar will be located at the bottom of door and have latches on the outer extrusion of the doors frame. A ledge will be supplied over lift bar for additional area to aid in closing the door.

Door(s) will be constructed from an aluminum box section. The exterior surface of each slat will be flat. The interior surfaces will be concave to provide strength and prevent loose

equipment from jamming the door from inside.

To conserve space in the compartment(s), the spring roller assembly will not exceed 3.00" in diameter. A roll-up door that retracts below the compartment ceiling (garage door style) will not acceptable.

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.

116.0 COMPARTMENT ACCESSORIES

116.1 PULL-OUT TRAY

There will one (1) slide-out tray, with 2" sides, and a capacity of 500 pounds provided. Capacity rating will be in the extended position.

The tray will be constructed of .19" aluminum and have a drain hole in each corner.

Slides will be General Device ball bearing type for ease of operation and years of dependable service.

Automatic locks will be provided for both the "in" and "out" positions. The trip mechanism for it will be located at the front of the tray for ease of use with a gloved hand.

Tray location will be P1.

A heavy-duty assembly will support the body under the compartment floor. It will be attached to the chassis frame for load transfer and to reduce stress on body.

116.2 SLIDE-OUT/TILT-DOWN TRAY

There will be one (1) slide-out tray provided.

The capacity rating (in the extended position) will be 215 pounds minimum.

Approximately two-thirds of the tray will slide-out from its stored position and will tilt 30 degrees down from horizontal. The vertical position within the compartment will be adjustable.

Construction will consist of .188" thick aluminum for the tray bottom and end, and special aluminum extrusions for the tray sides, front and tracks.

The tray corners will be welded for strength and rigidity.

The tray will be equipped with ball bearing rollers for smooth operation.

Two spring loaded locks will be provided at the front of the tray, one on each end.

Rubber padded stops will be provided for both the in out tray position.

The tray(s) will be located in D2..

116.3 PARTITION, VERTICAL COMPARTMENT

One (1) partition will be bolted in D3 24" from the forward wall.. Each partition will be the full vertical height of the compartment.

116.4 SLIDE OUT TOOL BOARD

A slide out aluminum tool board will be provided.

It will be a minimum of .188" thick with NO PEGBOARD HOLES.

A 1.00" x 1.00" aluminum tube frame will be welded to the edge of the sheet aluminum.

The board will be mounted on a General Device track on the bottom to allow easy extension and retraction with a maximum tool load of 250 lb.

The slide will be mounted to a shelf type track to allow side adjustment of the tool board.

The board will have positive lock in the stowed and extended position.

There will be One (1) partition provided.

D3 forward of the divider.

116.5 ADJUSTABLE SHELVES

There will be nine (9) shelves, with a minimum capacity of 500 pounds provided. The shelf construction will consist of brushed aluminum with 2.00" sides. Each shelf will be infinitely adjustable by means of a threaded fastener, which slides in a track.

The location of the ten (10) shelves will be 2 in D3, rear of the partition. 2 upper P3, 1 lower P3, 1 in P2, 2 upper P1. and 1 lower P1 ..

116.6 MOUNTING TRACKS

There will be recessed tracks installed vertically to support the adjustable shelf(s).

The tracks will be provided in each compartment except for the one that contains the pump operator's panel.

116.7 PLATFORM, SLIDE-OUT

One (1) slideout platform will be provided. The capacity rating will be 500# in the extended position. 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. Each platform will be made of .12 polished aluminum treadplate with a Morton Cass insert to provide a non-skid surface.

The location will be P1.

117.0 UPPR BODY COMPARTMENTS

117.1 COMPARTMENT

One (1) 191.00" long x 28.00" wide x 28.00" maximum depth will be provided above the passenger's side compartments, with two (2) lift-up top opening hatch doors.

Compartment will extend the full length of the side body compartmentation.

Sides of the compartment will be constructed of the same material as the body and painted job color on the outside panels.

Top of the compartment will be constructed of bright aluminum treadplate.

Two (2) lift-up, bright aluminum treadplate doors will be provided on the top of the compartment, each with a chrome grab handle.

Doors will have lipped edges with a rubber seal for weather resistance, and an inner pan.

Doors will be hinged on the outboard side and will be held open with pneumatic stay arms.

One (1) socket and plunger type latch will be provided with each door to hold the doors in the closed position.

Interior lighting will be provided that is activated upon opening either lift-up door.

Compartment will drain to an area below the body.

117.2 HATCH COMPARTMENT

A hatch compartment 191.00" long x 28.00" wide x 28.00" maximum depth will be provided above the driver's side compartments, with two (2) lift-up top opening hatch doors.

Compartment(s) will extend the full length of the side body compartmentation except for a 19" recessed step area at the rear of the driver's side compartment. In addition, the driver's side compartment will be configured for a master stream device at the rear of the compartment, ahead of the step area.

Sides of the compartment(s) will be constructed of the same material as the body and painted job color on the outside panels.

Top of the compartment(s) will be constructed of bright aluminum treadplate.

Two (2) lift-up, bright aluminum treadplate doors will be provided on the top of the compartment(s), each with a chrome grab handle.

Doors will have lipped edges with a rubber seal for weather resistance, and an inner pan.

Doors will be hinged on the outboard side and will be held open with pneumatic stay arms.

One (1) socket and plunger type latch will be provided with each door to hold the doors in the closed position.

Compartment will drain to an area below the body.

118.0 ENCLOSED LADDER AND EQUIPMENT STORAGE

118.1 GROUND LADDERS

The following Duo-Safety ladders will be furnished and must meet or exceed the latest NFPA standards:

- 24', two (2) section, aluminum, Series 900-A

- 14' roof, aluminum, Series 775-A

118.2 LADDER STORAGE

The ladders will be stored inside the upper section of the passenger's side compartments. This ladder rack will reduce the depth of the upper section in the side compartments.

A partition will be installed inside the compartment on the side of the rack to allow for equipment storage and to conceal the ladders.

The ladders will be banked in separate storage troughs.

The ladder storage assembly will be fabricated of stainless steel track angles to aid in loading and removal of ladders.

Rear of the ladder storage area will have a vertically hinged door with lift-and-turn latches to contain the ladders.

118.3 BACKBOARD STORAGE

Provisions for storage of two backboards will be provided.

The backboard storage area will be fabricated of stainless steel track angels and will measure 2.50" wide x 22.80" high x 75.5" long.

118.4 FOLDING LADDER

One (1) 10' aluminum, Series 585-A Duo-Safety folding ladder will be installed in a U-shaped trough inside the ladder storage compartment.

One (1) 14' aluminum, Series 35-B Duo-Safety jackknife A and folding ladder will be installed by the customer. Ladder and mounting clips shall be shipped with loose equipment..

118,5 PIKE POLE, 8'
Two (2) pike poles, 8' long Nupla with a fiberglass I-beam handle will be provided and located in the ladder compartment.

118.6 PIKE POLE, 10 FOOT
Two (2) pike poles, 10 foot long Nupla, with a fiberglass I-beam handle, will be provided and located in the ladder compartment..

118.7 PIKE POLE STORAGE
Aluminum tubing will be used for the storage of four (4) pike poles and will be located in the ladder compartment. If the head of a pike pole can come in contact with a painted surface, a stainless steel scuffplate will be provided.

118.8 COMPARTMENT, FOLDING STRETCHER
One (1) folding stretcher will be stored in a compartment at the rear. The compartment will be located on the passenger's side of the pump/plumbing area, and accessed through the rear mount pump access door.

The size of the folding stretcher will be Ferno 107 stretcher when folded 39" x 20" x 9" Streacher will be installed to the passenger's side of the compartment vertically in the compartment.

119.0 SCBA COMPARTMENTS

119.1 AIR BOTTLE STORAGE (Single)
A total of four (4) air bottle compartments will be provided. 2-each side. The air bottle compartment will be 15.00" wide x 7.50" tall x 26.00" deep. A stainless steel door with a chrome plated latch will be provided to contain the air bottle. A dielectric barrier will be provided between the door hinge, hinge fasteners and the body sheet metal. To be 28" deep if feasible.

119.2 AIR BOTTLE STORAGE INSERT
A total of four (4) inserts will be provided for the air bottle storage compartments.

The inserts will be "V" shaped and be formed from composite materials.

120 HOSE BED

The hose body will be fabricated of 12-gauge 304L stainless steel.

The sides will not form any portion of the fender compartments.

Hose body width will be a minimum of 68.00" inside.

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 .50" x 4.50" with spacing between slats for hose ventilation.

Hose bed will accommodate 1000' of 5" and 500' of 3".

Two (2) adjustable hosebed dividers will be used to separate the hose.

Each divider will be constructed of a .125" brushed aluminum sheet fitted and fastened into a slotted, 1.50" diameter radiused extrusion along the top, bottom and rear edge.

Partition will be fully adjustable by sliding in tracks, located at the front and rear of the hose bed.

Divider will be held in place by tightening bolts, at each end.

Acorn nuts will be installed on all bolts in the hose bed, which have exposed threads.

120.1 CUTOUT, HANDHOLD

A cutout with raduised corners will be provided at the rear of the two (2) hose bed divider(s).

121.0 REAR FENDERS AND MUDFLAPS

121.1 BODY FENDER CROWNS

Stainless steel fender crowns will be provided around the rear wheel openings.

A rubber welting will be installed between the body and the crown to seal the seam and restrict moisture from entering.

A dielectric barrier will be provided between the fender crown fasteners (screws) and the fender sheet metal to prevent corrosion.

122.0 TAILBOARD

Rear step will also be constructed of .125" bright aluminum treadplate and spaced .50" from the body, as well as supported by a structural steel assembly.

The rear tailboard will be 20.00" deep and will be designed to accommodate use of a hard suction hose on the rear pump inlet.

The exterior side will be flanged down and in.

The trailing edge will have an aggressive tread pattern.

Entire rear surface will be covered with bright aluminum treadplate to protect the painted surface when removing hose.

122.1 HOSE TRAY
A bright aluminum tread plate bin for storage of a 100' roll of 1.75" hose and an Elkhart SM20 nozzle will be installed on the rear tailboard.

Rubber matting will be installed on the floor of the tray to provide proper ventilation.

The tray will be provided with elastic netting across the top to secure the hose during travel.

123.0 LADDER, HOSE BED ACCESS
A hose bed access ladder, constructed of aluminum rungs and extruded aluminum rails, will be provided on the left side rear of the apparatus. A grab handle may be added during the approval drawing trip.

124.0 RUB RAIL
Bottom edge of the side compartments will be trimmed with a bright aluminum extruded rub rail.

Trim will be 3.00" high with 1.50" flanges turned outward for rigidity.

The rub rails will not be an integral part of the body construction, which allows replacement in the event of damage.

Rub rails will be attached with bolts and spaced from the body with isolators that will help to absorb any moderate impact without damaging the body.

125.0 TOW EYES
Two (2) rear painted "tow" eyes will be located at the rear of the apparatus and will be mounted directly to the chassis frame rails. The edges of the toe eyes to be radiused.

126.0 COMMAND ZONE WARRANTY (See Item 151.0)

127.0 ELECTRICAL WIRING DIAGRAMS
Three (3) compact discs containing "As-Built" electrical wiring diagrams specifically

prepared for the chassis and body will be provided. The diagrams will consist of information pertaining to the 12 VDC systems only. Two (2) CDs will be shipped with the loose equipment with each truck. One (1) CD will be included with the job folder at Pierce Manufacturing for future reference.

Each CD will include the following capabilities:

The capability of viewing each separate diagram.
The capability of zooming in on any section of each separate diagram.
The capability of printing each separate diagram.
The capability of printing each zoomed in area of each separate diagram.

Each CD will include the following items:

Title page, identifying the job number and chassis model.
Table of contents.
Truck specific electrical compartment and instrument layouts for the chassis.
Truck specific electrical compartment layouts for the body.
Applicable drawings from the appropriate standard wiring diagrams.
All truck specific wiring diagrams (special drawings).
Harness drawings for all wiring harnesses used on the chassis.
Harness drawings for all wiring harnesses used on the body.
All truck input and output programming sheets (multiplexed trucks only).

There will be three (3) hard copies of these diagrams required for this unit.

Single truck ordered (no credit) in this order for multiple order credit.

128.0 REAR FMVSS LIGHTING

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

Two (2) Whelen model 60R00BRR red LED stop/tail lights.
Two (2) Whelen, Model 60A00TAR, amber LED populated arrow turn light.

These lights will be installed at the rear of the truck in a polished housing.

Four (4) red reflectors will be provided.

A Weldon, Model 23882-2600-00, license plate bracket will be mounted on the driver's side above the warning lights. A Weldon, Model 9186-23882-30, step lamp will illuminate the license plate.

Two (2) Whelen, Model: 60J000CU backup lights will be provided.

The three (3) identification lights located at the rear will be installed per the following:

Truck-Lite, Model 26, LED
As close as practical to the vertical centerline.
Centers spaced not less than six (6) inches or more than twelve (12) inches apart.
Red in color.

All at the same height.

The four (4) clearance lights located at the rear will be installed per the following:
Truck-Lite, Model 26, LED
To indicate the overall width of the vehicle.
One (1) each side of the vertical centerline.
All at the same height.
As near the top as practical.
To be visible from the rear and the side.
One (1) each side, facing the side.
One (1) each side, facing the rear.

Per FMVSS 108 and CMVSS 108 requirements.

129.0 COMPARTMENT LIGHTING

Super Bright compartment lights will be provided in each compartment. One (1) strip will be mounted vertically along each side of the door framing. There will be Six (6) pair pair provided, two (2) in each compartment.

Opening the compartment door, will automatically turn the compartment lighting on.

130.0 PUMP COMPARTMENT LIGHT

A pump compartment light will be provided inside the right side pump enclosure and accessible through a door on the pump panel.

A .125" weep hole will be provided in each light lens, preventing moisture retention.

131.0 STEP LIGHTS

There will be two (2) Ri-Tar, Model M27HW2, LED step lights will be provided at the rear to illuminate the tailboard/step area.

These step lights will be actuated with the perimeter scene lights.

132.0 PERIMETER SCENE LIGHTS, CAB

There will be a Truck-lite, model 44042C, 4.00", LED, grommet mount weatherproof light provided for each cab door. Lighting will be designed to provide illumination on areas under the driver, officer, and crew cab riding area exits, which will be activated automatically when the exit doors are opened, by the door jam switch and by the same means as the body perimeter lights.

The lighting will be capable of providing illumination at a minimum level of one (1) foot-candle on ground areas within 30.00" of the edge of the apparatus in areas which personnel climb in or out of the apparatus or descend from the apparatus to the ground level.

133.0 PERIMETER SCENE LIGHTS, BODY

There will be a total of four (4) Truck-Lite, Model 44042C, LED lights provided on the apparatus. Each light will consist of a 4.00" weatherproof LED light, rubber mount, and pigtail kit.

The lights will be mounted in the following locations:

Two (2) lights will be provided under the rear step area.

One (1) light will be provided each side under the pump panel running boards.

The lighting will be capable of providing illumination at a minimum level of one (1) footcandle on ground areas within 30.00" of the edge of the apparatus in areas designed for personnel to climb onto the apparatus or descend from the apparatus to the ground level.

The lights will be activated by a parking brake.

134.0 TOMAR SCENE LIGHTS

134.1 REAR SCENE LIGHTS

A pair of Tomar 79HWB-C w/15 Degree Angle Mtg Bkt rear scene lights shall be provided. The lights shall be controlled by a rocker switch in the cab, within reach of the driver and a seperate rocker switch within reach of the officer.

134.2 SCENE LIGHTS

Three (3) pair of Tomar RECT-79HWB-C dual halogen floodlights will be installed 1 pair each side on the body front and rear and 1 pair at the crew cab forward of the crew cab doors.. The lights will have a clear lens and be mounted at a 15 degree angle downward, using Tomar RECT-79-15-DEG mounting brackets. The lights will be controlled by a N/A.

134.3 LIGHTING BEZEL

Two (2) Whelen, Model Cast 3, three (3) light aluminum housings will be provided for the rear tail, directional and scene lights.

135.0 MARKER LIGHTS

There will be One (1) pair of amber and red marker lights with rubber arm, located one each side at the rear of the unit.. The amber lens will face the front and the red lens will face the rear of the truck.

These lights will be activated with the running lights of the vehicle.

135.1 LIGHT, INTERMEDIATE

There will be one (1) pair, of Truck-Lite, Model: 30080Y flange mounted amber LED light kits will be furnished, one (1) each side of the rear fender panel, in place of the standard directional/marker intermediate light. The light will double as a turn signal and marker light.

This installation will include a stainless steel cover.

136.0 ELECTRICAL SYSTEM GENERAL DESIGN for ALTERNATING CURRENT

The following guidelines will apply to the 120/240 VAC system installation:

136.1 General
Any fixed line voltage power source producing alternating current (ac) line voltage will produce electric power at 60 cycles plus or minus five (5) cycles.

Except where superseded by the requirements of NFPA 1901, all components, equipment and installation procedures will conform to NFPA 70, National Electrical Code (herein referred to as the NEC).

Line voltage electrical system equipment and materials included on the apparatus will be listed and installed in accordance with the manufacturer's instructions. All products will be used only in the manner for which they have been listed.

136.2 Grounding
Grounding will be in accordance with Section 250-6 "Portable and Vehicle Mounted Generators" of the NEC. Ungrounded systems will not be used. Only stranded or braided copper conductors will be used for grounding and bonding.

An equipment grounding means will be provided in accordance with Section 250-91 (Grounding Conductor Material) of the NEC.

The grounded current carrying conductor (neutral) will be insulated from the equipment grounding conductors and from the equipment enclosures and other grounded parts. The neutral conductor will be colored white or gray in accordance with Section 200-6 (Means of Identifying Grounding Conductors) of the NEC.

In addition to the bonding required for the low voltage return current, each body and driving or crew compartment enclosure will be bonded to the vehicle frame by a copper conductor. This conductor will have a minimum amperage rating of 115 percent of the nameplate current rating of the power source specification label as defined in Section 310-15 (amp capacities) of the NEC. A single conductor properly sized to meet the low voltage and line voltage requirements will be permitted to be used.

All power source system mechanical and electrical components will be sized to support the continuous duty nameplate rating of the power source.

136.3 Operation
Instructions that provide the operator with the essential power source operating instructions, including the power-up and power-down sequence, will be permanently attached to the apparatus at any point where such operations can take place.

Provisions will be made for quickly and easily placing the power source into operation. The control will be marked to indicate when it is correctly positioned for power source operation. Any control device used in the drive train will be equipped with a means to prevent the

unintentional movement of the control device from its set position.

A power source specification label will be permanently attached to the apparatus near the operator's control station. The label will provide the operator with the information detailed in Figure 19-4.10.

Direct drive (PTO) and portable generator installations will comply with Article 445 (Generators) of the NEC.

136.4 Overcurrent protection

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device will not exceed 144 inches. (3658 mm) in length.

For fixed power supplies, all conductors in the power supply assembly will be type THHW, THW, or use stranded conductors enclosed in nonmetallic liquid tight flexible conduit rated for a minimum of 194 degrees Fahrenheit (90 degrees Celsius).

For portable power supplies, conductors located between the power source and the line side of the main overcurrent protection device will be type SO or type SEO with suffix WA flexible cord rated for 600-volts at 194 degrees Fahrenheit (90 degrees Celsius).

136.5 Wiring Methods

Fixed wiring systems will be limited to the following:

- Metallic or nonmetallic liquid tight flexible conduit rated at not less than 194 degrees Fahrenheit (90 degrees Celsius)

or

- Type SO or Type SEO cord with a WA suffix, rated at 600 volts at not less than 194 degrees Fahrenheit (90 degrees Celsius)

Electrical cord or conduit will not be attached to chassis suspension components, water or fuel lines, air or air brake lines, fire pump piping, hydraulic lines, exhaust system components, or low voltage wiring. In addition the wiring will be run as follows:

- Separated by a minimum of 12 inches (305 mm), or properly shielded, from exhaust piping

- Separated from fuel lines by a minimum of six (6) inches (152 mm) distance.

Electrical cord or conduit will be supported within six (6) inches (152 mm) of any junction box and at a minimum of every 24 inches (610 mm) of continuous run. Supports will be made of nonmetallic materials or corrosion protected metal. All supports will be of a design that does not cut or abrade the conduit or cable and will be mechanically fastened to the

vehicle.

136.6 Wiring Identification
All line voltage conductors located in the main panel board will be individually and permanently identified. The identification will reference the wiring schematic or indicate the final termination point. When prewiring for future power sources or devices, the unterminated ends will be labeled showing function and wire size.

136.7 Wet Locations
All wet location receptacle outlets and inlet devices, including those on hardwired remote power distribution boxes, will be of the grounding type provided with a wet location cover and installed in accordance with Section 210-7 "Receptacles and Cord Connections" of the NEC.

All receptacles located in a wet location will be not less than 24 inches (610 mm) from the ground. Receptacles on off-road vehicles will be a minimum of 30 inches (762 mm) from the ground.

The face of any wet location receptacle will be installed in a plane from vertical to not more than 45 degrees off vertical. No receptacle will be installed in a face up position.

136.8 Dry Locations
All receptacles located in a dry location will be of the grounding type. Receptacles will be not less than 30 inches (762 mm) above the interior floor height.

All receptacles will be marked with the type of line voltage (120-volts or 240-volts) and the current rating in amps. If the receptacles are direct current, or other than single phase, they will be so marked.

136.9 Listing
All receptacles and electrical inlet devices will be listed to UL 498, Standard for Safety Attachment Plugs and Receptacles, or other appropriate performance standards. Receptacles used for direct current voltages will be rated for the appropriate service.

136.10 Electrical System Testing
The wiring and associated equipment will be tested by the apparatus manufacturer or the installer of the line voltage system.

The wiring and permanently connected devices and equipment will be subjected to a dielectric voltage withstand test of 900 volts for one (1) minute. The test will be conducted between live parts and the neutral conductor, and between live parts and the vehicle frame with any switches in the circuit(s) closed. This test will be conducted after all body work has been completed.

Electrical polarity verification will be made of all permanently wired equipment and receptacles to determine that connections have been properly made.

136.11 Operational Test per NFPA 1901 Chapter 19-14.4
The apparatus manufacturer will perform the following operation test and will certify that the power source and any devices that are attached to the line voltage electrical system are properly connected and in working order.

The prime mover will be started from a cold start condition and the line voltage electrical system loaded to 100 percent of the nameplate rating.

The power source will be operated at 100 percent of its nameplate voltage for a minimum of two (2) hours unless the system meets category certification as defined in NFPA 1901 chapter 19-14.5.

Where the line voltage power is derived from the vehicle's low voltage system, the minimum continuous electrical load as defined in NFPA 1901 Chapter 9 will be applied to the low voltage electrical system during the operational test.

137.0 GENERATOR

The apparatus will be equipped with a complete electrical power system. The generator will be a Harrison Model 10.0MAS 10.0 kW Hydraulic unit. The wiring and generator installation will conform to the present National Electrical Codes Standards of the National Fire Protection Association. The installation will be designed for continuous operation without overheating and undue stress on components.

137.1 Generator Performance

- Continuous Duty Rating: 10,000 watts
- Nominal Volts: 120/240
- Amperage: 83 @ 120 volts, 41 @ 240 volts
- Phase: Single
- Cycles: 60 hertz
- Engine Speed at Engagement: Idle
- Pump RPM range: 900 to 3,300

137.2 Generator Dimensions

- Length: 24.00 inches, 30 inches with reservoir
- Width: 18 inches
- Height: 14.00 inches

- Weight: 273 pounds, 297 with reservoir

The output of the generator will be controlled by an internal hydraulic system. An electrical instrument gauge panel will be provided for the operator to monitor and control all electrical operations and output.

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

The generator will include an electrical control inside the cab. The hydraulic engagement supply will be operational at any time (no interlocks).

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

137.3 Generator Instruments and Controls
To properly monitor the generator performance a digital meter panel will be furnished and mounted next to the circuit breaker panel. The meter will indicate the following items:

- Voltage

- Amperage for both lines

- Frequency

- Generator run hours

- Over current indication

- Over temperature indication

- "Power On" indication

- Two (2) fuse holders with two (2) amp fuses (for indicator light protection)

The meter and indicators will be installed near eye level in the compartment. Instruments will be flush mounted in an appropriate sized weatherproof electrical enclosure. All instruments used will be accurate within +/- two (2) percent.

137.4 Generator Wiring:
The system will be installed by highly qualified electrical technicians to assure the required level of safety and protection to the fire apparatus operators. The wiring, electrical fixtures and components will be to the highest industry quality standards available on the domestic market. The equipment will be the type as designed for mobile type installations subject to vibration, moisture and severe continuous usage. The following electrical components will be the minimum acceptable quality standards for this apparatus:

137.5 Wiring:
All electrical wiring will be fine stranded copper type. The wire will be sized to the load and circuit breaker rating; ten (10) gauge on 30 amp circuits, 12 gauge on 20 amp circuits and 14 gauge on 15 amp circuits. The cable will be run in corner areas and extruded aluminum pathways built into the body for easy access.

137.6 Load Center:
The main load center will be a Cutler Hammer with circuit breakers rated to load demand.

137.7 Circuit Breakers:
Individual breakers will be provided for all on-line equipment to isolate a tripped breaker from affecting any other on-line equipment.

138.0 GENERATOR LOCATION
The generator will be mounted in the cargo area at the front of the body in cargo area.. The flooring in this area will be either reinforced or constructed, in such a manner, that it will handle the additional weight of the generator.

139.0 GENERATOR START
A switch will be located on the cab instrument panel to engage the generator.

140.0 GENERATOR REMOTE FIELD SWITCH
A remote switch will be provided near the circuit breaker box to engage the field of the hydraulic generator. A light will be provided to indicate that the generator field is active.

141.0 CIRCUIT BREAKER PANEL
The circuit breaker panel will be located HIGH AND FORWARD ON THE BACK WALL IN THE DRIVERS SIDE FRONT COMPARTMENT "D3"..

142.0 120 VOLT LIGHTING
A Fire Research Model S50 Focus 500 watt light will be provided. The light will be mounted on a special bracket on the front of the cab roof with drain holes. The light fixture will be a single 500 watt, 120 volt Focus Series. The light will draw 4.2 amps.

A total of Two (2) will be provided.

143.0 120 VOLT LIGHTING
A Kwik-Raze Model 436-I Magnafire light will be provided.

The light will be bottom raising with an inner telescoping pole with an up indicator switch. The telescoping pole will be as long as is practical to fit in the location it is mounted.

The light will be installed with thru-body mounting brackets and have a Magnafire 3000 head.

The light fixture will be a single 750 watt 120 volt MagnaFire 3000 Series head.

The light head will have a minimum of 19,200 lumens, 6.25 amps.

A total of Two (2) will be provided rear outside corner of the crew cabs..

144.0 15 AMP RECEPTACLE

Wired to the power supply will be two (2) receptacles that are 120 volt 15 amp three wire twist-lock NEMA L5-15 type with weather resisting cover located ONE IN THE CENTER OF THE CAB & 1 IN D2 ON THE FORWARD WALL WIRED TO THE GENERATOR AND SHORELINE..

145.0 POWER OUTLET STRIP

A six (6) place power outlet strip will be provided. The outlet strip will contain 120 volt 20 amp straight blade receptacles.

A total of one (1) receptacle will be provided rear in Compt D3 and shall be powered by generator and shoreline.

146.0 120 VOLT EXTERIOR RECEPTACLE

Receptacle will be a NEMA 5-20, 120 volt, 20 amp, three (3) wire duplex household type with a weather resistant cover connector to the generator.

There will be two (2) receptacles provided.

ONE EACH SIDE ON THE REAR OF THE UNIT PER PRINT..

147.0 SUB FEED CIRCUIT BREAKER BOX (shoreline)

A Cutler Hammer sub feed box will be supplied to protect the on board circuits when an auxiliary power source is used.

The box will be installed in the near ther breaker panel..

The sub feed box will distribute power to specific circuits in the vehicle.

A directory for each breaker will be provided adjacent to the circuit breaker panel.

Identification of circuits will be done in a durable manner that provides years of service.

148.0 SWITCH, AUTO TRANSFER

To protect either the generator or external power source from back feed, an automatic relay system will be installed to switch the on line device between the generator and the external power source plug when it is connected for use.

The transfer switch will power THE RECEPTACLE IN COMPARTMENT "D3", D2 AND AND RECEPTACLE IN THE CAB..

149.0 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.

One (1) set of reflective emergency triangles will be provided.

- Soft suction hose provided by the Fire Department that meets required NFPA specifications as outlined under the general requirements of Chapters 5 - 12 at time of contract execution.

- Hard suction hose strainer provided by Fire department as required per NFPA 1901 specifications as outlined in Chapters 5 - 12

- One (1) extinguisher, 2.50# "ABC" D.O.T. extinguisher will be shipped loose.

- One (1) hosebed style divider 22" x 14" will be shipped loose.

150.0 INSPECTION TRIP(S)

The bidder will provide three (3) factory inspection trip(s) for Four (4) customer representative(s). The inspection trip(s) will be scheduled at times mutually agreed upon between the manufacturer's representative and the customer. All costs such as travel, lodging and meals will be the responsibility of the bidder.

151.0 Warranty

Copies of the manufacturer's warranties shall be provided. All components covered by separate suppliers shall maintain the warranty as provided. The manufacturer chosen shall provide copies of separate supplier warranties. Consumables are not covered by warranties.
Bumper to Bumper Standard Warranty Three (3) years Unlimited Miles Parts and Labor
Frame Warranty (Including cross members) L i f e t i m e Unlimited Miles Parts and Labor
Drive Axles, Suspension and Brakes Five (5) Years Unlimited Miles Parts and (3) Years Labor
The suspension system shall have a 5-year parts and labor warranty.
The Oshkosh TAK-4 system will have a three (3) year parts and labor warranty. This warranty applies to the TAK-4 suspension components only. All steering linkages, pumps etc., are covered under our standard chassis warranty (exception steer gears).
Anti-Lock Braking System Three (3) year 100,000 miles Parts and Labor
The brake system shall have a 5-year parts and labor warranty (except consumables).
Body and Cab Paint Warranty Ten (1 0) Years Against Peel, Crack, Blister, Fading & Color Retention.
Corrosion Lifetime Corrosion Perforation
Cab Structural Warranty Ten (10) Years I Parts and Labor
Body Structural Ten (10) Years Parts and Labor

All mechanical components of the rollup door will be warranted to be free from defects in materials and workmanship for the lifetime of the vehicle. All parts covered under this warranty will be to the original owner.
Electrical System Five (5) Years Parts and Labor
The Command Zone modules, membrane switches, and display(s) will be warranted against defective materials or workmanship for a period of **five (5) years** from the date of delivery to the original purchaser. The warranty will also include a standard repair time for covered components.
Engine Parts and Labor Five (5) Years/100,000 Miles
Transmission Five (5) Years Unlimited Miles Parts and Labor
Champ transmission cooler in addition, a collateral damage warranty will also be in effect for the first three (3) years of the Champ warranty coverage, and will not exceed $10,000 per occurrence.
Fire Pump Three (3) Years Parts and Labor
Pump valves will have a ten (10) year warranty.
CAFS Two (3) Years /Parts and Labor
Plumbing Components Stainless Steel / Brass Ten (10) Years / Parts
Pump Pressure and Vacuum Gauges Seven (7) Years Replacement
Polypropylene Water Tank(s) Lifetime /Parts and Labor

Exhibit B/Amendment 1
FA7-065-2327

$	536,738.00	Pierce Velocity
$	44,549.25	Tax 8.3%
$	581,287.25	Total
$	1,162,574.51	Total for 2 units