Fire Apparatus and Custom Fabricators

SPECIFICATIONS

FOR

A LIGHT RESCUE VEHICLE

FOR

RAINELLE FIRE DEPARTMENT

11 Sperti Drive ● P.O. Box 17128 ● Edgewood, KY 41017
Phone (859) 331 – 0360 Fax (859) 331 - 0399

APPROVAL DRAWINGS
There shall be a complete set of drawings that are designed from the specifications and/or any change orders signed by the purchaser before construction begins. These drawings shall indicate the chassis make and model, location of lights, siren, horns, compartments and all major components of the unit. The signed drawings will become part of the contract documents. NO EXCEPTIONS.

LIMITED WARRANTY
The body manufacturer shall warrant the new apparatus for a period of twelve (12) months or 12,000 miles (whichever occurs first) from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free from defects in material and workmanship that may appear under normal use and service within the warranty period.

PAINT WARRANTY
The body manufacturer shall warrant the new apparatus paint finish for a period of seven (7) years or 84,000 miles (whichever occurs first) from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free from peeling, cracking, loss of gloss caused by cracking, and any paint failure caused by defective finishes as determined by the manufacturer under normal use and service within the warranty period.

ELECTRICAL WARRANTY
The body manufacturer shall warrant the new apparatus electrical system for a period of five (5) years or 60,000 miles (whichever occurs first) from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free from defects in the electrical harness and connections under normal use and service within the warranty period.

BODY STRUCTURAL WARRANTY
The body manufacturer shall warrant the new apparatus for structural integrity for a period of ten (10) years from the date of delivery to the original retail purchaser. The warranty will ensure that the vehicle will be free all structural defects of both material and workmanship that may appear under normal use and service within the warranty period.

CHASSIS
GMC CREW CAB - 4WD
TECHNICAL SPECIFICATIONS
Per Specs provided by Matheny Motor Truck Cop.

WINCH
A Warn Quick Mount winch model XD9000i shall be provided with the completed unit. The winch shall have a rated line pull of 9,000 lbs. It shall be equipped with a locking pin and 105 of 5/16" galvanized aircraft cable with replaceable clevis hook. The winch shall be equipped with a 24" long quick disconnect battery power lead. At each hitch location a matching electrical connector shall be installed along with a dust/weather cover to protect the truck connection.

A Remote control power switch shall be provided on a 12' long cord.

Hitch pin provided.

WINCH
A Warn brand winch Model M12000 12V, 12,000# Electric shall be installed in the front bumper extension. The winch shall be supplied complete with 125 feet of 3/8" galvanized aircraft wire cable and replaceable clevis hook. The winch shall be so equipped to enable power reverse and free-spooling. A 30-foot remote control switch shall also be supplied.

WINCH MOUNTING
On both body sides of the apparatus, there shall be a 2 inch square receiver hitch installed in the wheel well of the unit. They shall be adequately supported to facilitate the use of an electric winch. Each side hitch location shall be recessed into the body wheel well and concealed behind a tread plate access door. The door and recessed area shall be large enough to facilitate the pinning of the hitch as well as a 12-volt connection with both hands.

At each hitch location, a matching electrical connector for the winch shall be installed along with a dust/weather cover to protect the truck connection.

Side mounting locations will be rated at a significantly reduced capacity to meet safety requirements.

On the rear of the apparatus (chassis), there shall be a 2-inch square receiver hitch installed below the rear step of the unit. It shall be adequately supported to facilitate the use of an electric winch. The receiver location shall be centered under the rear step.

At the hitch location, a matching electrical connector for the winch shall be installed along with a dust/weather cover to protect the truck connection.

EXHAUST SYSTEM
The exhaust pipe shall be extended to exit on the right side of the unit ahead of the rear wheels.

TIRE PRESSURE MONITORING SYSTEM
A tire pressure monitoring system shall be provided on the chassis. It shall monitor the tire pressure and provide a visual notification of low air pressure.

REAR TOW EYES
Under the rear tail board there shall be structural steel reinforcement attached to frame rails of chassis to support tow eye assemblies. Mounted at rear center of apparatus it must be capable to with stand the requirements of towing (not lifting) the apparatus without damage.

NFPA 1901 COMPLIANT SEATING (FRONT)
The chassis specified to date, does not offer nor provide provisions for NFPA compliant seating. Since NFPA is not a governing body, the chassis manufacturer does not recognize 1901 requirements. The chassis manufacturer has tested and supports current seating and verified it complies with all local and Federal motor vehicle standards in regards to safety and seating requirements

NFPA 1901 COMPLIANT SEATING (REAR)
The chassis specified to date, does not offer nor provide provisions for an NFPA compliant seating. Since NFPA is not a governing body, the chassis manufacturer does not recognize 1901 requirements. The chassis manufacturer has tested and supports current seating and verified it complies with all local and Federal motor vehicle standards in regards to safety and seating requirements

VEHICLE DATA RECORDER
The chassis specified does not provide a vehicle data recorder (VDR) system nor provisions for an NFPA approved VDR.

SEAT BELT WARNING
The chassis specified to date, does not offer nor provide provisions for an NFPA compliant a seat belt warning system. Since NFPA is not a governing body, the chassis manufacturer does not recognize 1901 requirements.

STAINLESS STEEL WHEEL COVERS
A set of four (4) Phoenix stainless steel wheel covers shall be installed on the wheels of the unit, front and rear. Braided stainless air filler shall be installed on rear wheels.

FLUID IDENTIFICATION PLATE
A permanently engraved plate shall be installed in the cab specifying the quantity and type of fluids used in the apparatus.

FUEL TYPE PLATE
A permanently engraved plate shall be installed on or near the fuel fill to designate the chassis fuel type.

SEATING LABEL
There shall be a label located in the cab or in view of the driver, stating maximum seating capacity.

VEHICLE HEIGHT LABEL
There shall be a label located in the cab or in view of the driver, stating the overall height of the vehicle.

SEAT BELT WARNING LABEL
There shall be a label located at all seating areas, warning personnel that death or serious injury could result from not wearing seat belts while the vehicle is in motion.

RIDING ON STEP WARNING LABEL
There shall be a label located at all exterior stepping surfaces, stating "Warning: Death or serious injury may result from riding on any stepping surface when the vehicle is in motion.

REAR MUD FLAPS
There shall be a set of rear anti-spray black mud flaps shall be installed in the rear wheel well.

BODY CONSTRUCTION
Construction material shall be aluminum, fully welded, with no rivets. The roof and wall beams shall be MIG welded to body exterior panels. All dissimilar metals shall have a barrier material between them to prevent electrolysis.

The entire body is to be modular in design, it shall be fully capable of being removed and remounted on another chassis.

The overall body width shall be approximately 96” and overall body-only height of 73 1/8”.

All exterior panels shall be 5052-H34 corrosion resistant aluminum. Roof and side wall panels shall be one piece.

All welds whether seen or not shall be of good craftsmanship, pleasing appearance. Welds, which are visible, shall be either ground smooth, cleaned or power wire brushed. We are stating that we want Fire Truck quality workmanship not standard delivery practices.

All aluminum body parts are to be welded for unitized construction to give maximum strength throughout the body. The use of adhesive as a structural fastening system is not acceptable.

On all items that are bolted or fastened onto a painted surface there will be isolation strips installed between mating surfaces. This is to prevent problems associated with dissimilar metals and cutting the painted surface by sharp edge of installed items.

The overall body construction and shelf support shall be welded, NO RIVETS SHALL BE USED NO EXCEPTIONS. The body shall have squared corners with no tapering.

The header walls, and partitions forming and dividing the compartments, plus the compartment floors shall be of.160" aluminum of 5052-H34 alloy construction.

Compartment floors shall be properly supported, and capable sustaining up to a five hundred (500) pound load.

The roof rails shall be of .125" aluminum of 5052-H34 alloy and shall be a continuous formed sheet to "square up" the top of the body to enhance looks and provide a flat mounting surface for lights. Radius type roof rails will not be acceptable.

The roof rails shall extend up from the drip channel approximately 10” at the front, rear and sides. They shall be formed over to create a flange around the top to give rigidity to the side walls.

The roof sheet shall be of .160” aluminum tread-brite welded around perimeter; 3004-H14 alloy.

A recessed roof well shall be provided in the roof above the L1 and R1 transverse area. Well shall be designed to hold a light tower below the roof surface for a clean appearance. There shall be large drain previsions to prevent the well from retaining water. The drains shall be run through the body and exit under the truck.

The body shall be designed and constructed to provide a full 60” rear compartment height. Compartment shall be properly supported by utilizing a substructure that ties to chassis frame.

Rub rails shall be provided for additional protection. They shall be installed along the sides and run the length of the apparatus body below the compartments, only to be interrupted by the wheel wells. Rub rails shall be constructed from aluminum bar stock and mounted to the body using stainless steel fasteners. Rub rails shall be completely removable for replacement.

All compartments shall be of sweep-out type with no lip at bottom edge. The compartment floors shall be raised 1” above the lower sill to prevent water from entering the bottom of the opening. Each compartment shall be fitted with a drain and located in such a manner as to minimize or eliminate water from entering.

Compartment interiors walls shall remain unpainted aluminum finish. The aluminum finish walls shall be easier to maintain, reflect light better to allow you better visibility, and prevent the masking of questionable workmanship with interior coatings.

The heights of all shelves and trays shall be easily adjustable by using a system that is inherent to the compartment partitions. A system of individual mounting locations have been integrated into the compartment side walls providing level and equal shelf and tray support. System allows shelf and tray adjustment on 2” centers from 4” off the floor to the top of door opening

The wheel wells shall have a removable, full poly liner installed. Liner shall provide protection to the over wheel well compartment and prevents, moisture, dirt and road debris from being distributed through out the understructure.

A polished stainless steel fenderette shall be installed in the fender well. An extruded rubber gasket is to be installed between the fenderette and the body to restrict moisture and or reduce the possibility of electrolysis.

The rear bumper trimmed out on top and sides with 1/8” aluminum tread-brite. The bumper shall extend approximately 8” from the body, and be approximately 18 - 20" from the ground to the top of the tailboard, not exceeding the NFPA 1901 requirements outlined in latest edition of 1901 section 13-7.1.

All exterior surface areas designated for stepping or standing shall be punch raised to provide slip resistance when stepping or walking on as outlined in the latest NFPA 1901, section 13-7.2.

This body channel support shall be isolated with a .125” UHMW polyethylene type 819. The isolator shall lay the full length of both sides of frame rails.

The body mounting system shall feature cross members at the front panel and at each end of the wheel box for bolting directly to the steel frame, which straddles the frame rails. Mounting should be isolated from the steel frame by other synthetic material.

There shall be minimal clearance between cab body and box. Consideration shall be given for the presence of push-up floodlights and any other equipment placed between the cab and body.

The entire rescue module will be undercoated. Body is to be completely undercoated before mounting. Undercoating body separate from the chassis ensures better coverage in to the corners and crevices with obstruction from the chassis.

COMPARTMENT CONFIGURATION

The compartment doors shall be of the type that roll up on themselves. The door shall have an adjustable tubular type counter balance which assures easy lifting and lowering of the compartment doors while eliminating the risk of accidental closing.

Doors shall be front roll up style to maximize upper compartment storage.

Door tracks shall be one-piece aluminum extrusions, which have no obstructions to bind the doors. Tracks shall have a replaceable side seal that shall inhibit water and dust from intruding into the compartments.

An aluminum drip rail shall be provided above each door with standard non-abrasive top seals to provide a water and dust barrier to keep compartment equipment clean and dry while maintaining shutter appearance.

Door slats shall be constructed from double wall box frame aluminum extrusion. Slat exteriors shall have a flat surface while the interior surface shall be concave to aid in preventing loose equipment from interfering with roll up operation.

Between each slat shall be a co-extruded inner seal to prevent metal-to-metal contact and to repel moisture from the joints.

Each door slat shall have interlocking joints with folding locking flange and end shoes secured by a swage process. The interlocking end shoes provide tight fitting operation, removing any play between slats and keeping graphics (if applicable) aligned. Shoes are swaged / dimpled (never riveted) into place for easy replacement.

Nested end shoes prevent metal-to-metal contact and protect the shutters from damage as the doors move up and down in the tracks.

Doors shall have a full width lift bar (operable by one hand), shall be used as a positive latch device for securing each individual compartment door in the closed position. All doors shall be equipped with indicator switches to alert the driver that one or more doors are not fully closed. These switches may all be connected to a single flashing warning light on the dash of the cab.

Doors shall be available in an anodized satin finish.

Door Style: R.O.M. Robinson rollup doors

12' Equipment Body

Body Length 144”

Body Height 73 1/8”

Body Width 96”

Cab/Axle 84”

Approximate Compartment Dimensions:

Compartment Location	Width	Height	Depth
Driver Side #1	50”	60”	23” lower, transverse upper
Driver Side #2	50”	38”	Transverse
Driver Side #3	30”	60”	23”
Passenger Side #1	50”	60”	23” lower, transverse upper
Passenger Side #2	50”	38”	Transverse
Passenger Side #3	30”	60”	23”
Rear #1	44”	60”	30”

ADJUSTABLE SLIDEOUT TRAY
Shelves shall be adjustable using the Select-O-Track Adjustment System incorporated into the body partitions. System allows the shelving to be adjusted up and down the compartment properly maintaining a level surface.

The trays shall be capable of supporting a minimum weight of three hundred (300) pounds, even when fully extended.

All trays are to be of 3/16" smooth aluminum with press formed flanges of 2" on all four sides.

All slide trays shall be on roller mechanisms, which will allow them to extend beyond compartment by ninety percent (90%) of their overall length. An automatic latching system shall be provided to hold the slide trays in their fully retracted and extended positions. The latching system shall be deactivated or unlatched, by simply pulling or pushing the slide tray with approximately 20 lbs. of force. No other latches shall be required to operate the slides, NO EXCEPTIONS.

Tray dimensions shall vary to accommodate the specified compartment for which it is to be mounted.

There shall be fourteen (14) adjustable slideout trays mounted as per fire department instructions.

HEAVY DUTY SLIDE TRAY (SLIDE MASTER)
There shall be one (1) heavy-duty slide trays installed in the rear compartment, as directed by the fire department.

All trays shall be of 3/16" smooth aluminum with press formed flanges of 2" on all four sides.

Tray dimensions shall vary to accommodate the specified compartment for which it is to be mounted.

Tray slides shall use heavy steel rail construction, and stainless steel ball bearings.

The tray shall extend outward of the compartment 70 percent of the tray length and shall be able to support up to a 1000 lbs. of distributed weight.

Hurst Simo Power Unit shall be mounted in the slide-out tray in the rear compartment.

HYDRAULIC RESCUE TOOL MOUNTING
The fire department shall ship their hydraulic powered rescue tools (maximum five pieces) to the body manufacturer. The tools shall have custom brackets fabricated and mounted on the desired shelf or slide tray.

STOKES / BACKBOARD STORAGE
There shall be provisions made in the over the wheel well transverse compartment for horizontal storage of stokes basket stretcher and backboards as directed by the fire department. The stokes and backboards shall be accessible from either side of the unit.

CASCADE BOTTLE STORAGE RACK (2)
There shall be a cascade storage unit constructed of all aluminum, and mounted in a compartment specified by the fire department.

The unit shall be capable of storing up to two (2) department supplied cascade bottles securely during transport.

The storage unit shall have a D.A. sanded finish and a clamping / retaining device for two (2) cylinders. The securing of the cylinders shall meet current DOT requirements for the transporting of cascade air cylinders.

AIR SYSTEM
The bidder shall provide a fire department an air source using DOT bottles system consisting of two (2) DOT storage bottles, control panel and fill station. The system shall have a six thousand (6,000) pound working pressure with a four to one (4:1) safety factor.

There shall be two (2) customer supplied 6000-PSI storage cylinders mounted horizontally and transversely in the over the wheel compartment on the provided storage rack. The cylinders shall be easily accessible for removal, testing and maintenance. A horizontal rack shall be provided to secure the cylinders to the apparatus. It shall be self-supporting. The clamping device bolts shall be readily accessible for cylinder removal. Easy access to each bottle shut off valve shall be provided.

The air control panel shall distribute and control the airflow and pressure within the air system. The panel shall incorporate the following functions:

*Filling of storage system directly from an external source such as an in house compressor.
*Control air to high-pressure hose reel
*A pressure regulator to control the pressure of air coming from Dot storage cylinders.

The following equipment shall be provided on the air control panel:

*Two (2) air cylinder control valves.
*Two (2) air liquid pressure gauges that will show the amount of air left in each bottle.
*One (1) adjustable pressure regulator.
*One (1) unregulated air refill inlet, on the panel, shall be stainless steel male thread with stainless dust cap.
*One (1) control valve for unregulated air refill inlet.

Gauges, instruments, valves, etc. shall be located in a stainless steel panel. All gauges shall be liquid filled and recessed mounted in the control panel. This panel shall be adequately lighted with a full-length light shield. The panel shall also have hand holes cut into enable the operation of turning off or on each cylinder.

SCBA BOTTLE STORAGE RACK
There shall be a SCBA storage unit constructed of all aluminum, and mounted in a specified compartment. The unit shall be capable of storing up to eight (8), 30-minute SCBA bottles securely during transport. The storage unit shall have an external D.A. sanded finish while each storage space shall be coated entirely with a rubber-enhanced liner. The liner will protect bottles from superficial injury and minimize any rattling during transport. The use of neoprene liners adhered to the storage unit will not be accepted.

There shall be 2" nylon web straps used to secure spare bottles in the rack while in transport. Nets shall be securely fastened using footman loops and hook and loop fastening devices.

GRAB RAIL
A grab rail of 1" diameter aluminum extrusion antislip grip shall be mounted on the rear of the apparatus one on each side of the rear compartment. Handrail shall meet or exceed the National Fire Protection Associations Pamphlet 1901.

A FRAME HIGH ANGLE RESCUE MOUNT
Front bumper extension shall be reinforced and be provided to support two (2) additional receiver tubes for securing a high angle rescue system. In addition the roof of the body shall be supplied with two eyelets for securing of ropes. Body shall be constructed with additional support to handle the loads necessary for rescue.

12 VOLT WIRING

GENERAL REQUIREMENTS:
All electrical work shall be performed by persons familiar with emergency vehicle systems.

All of the emergency electrical equipment shall be served by circuits separate and distinct from the vehicle chassis circuits.

The 12-Volt DC electrical system shall be controlled by an industry proven electrical system.

Clearance and marker lights shall be installed to comply with the NFPA and all Federal standards for highway vehicles. Lights are grommet mounted LED series marker lamps.

Reflectors shall be installed on the apparatus in compliance with the Federal Motor Vehicle Safety Standards and NFPA 1901.

WIRING REQUIREMENTS:
The complete 12-volt wiring system and electrical appliances shall meet NFPA 1901 minimum standards as well as standard automotive practices throughout the installation in the apparatus. The system shall comply with all the appropriate SAE recommended practices such as J1939 and/or J1708.

All required DC power conducting wiring shall be of GXL stranded copper wire of adequate gauge for the function served so as to ensure voltage drop of less than one volt at the appliance under full amperage load.

Body wiring shall be color and function coded, grease, oil and moisture resistant, routed in protective loom through protected locations, neatly and securely fastened, and all apertures properly grommeted for passing wiring. Solder less insulated connectors shall be provided where required. Primary wiring harnesses shall be bench assembled. Where crimp connections are necessary, the connections shall be made using approved connectors with heat shrink insulators. Any wiring routed within proximity of any exhaust components or other high temperature components shall be given special consideration and shielded for best protection.

Any required signal conductors shall be shielded twisted pairs rated by the system manufacturer to carry the multiplex command signals from the switch panel to the control modules.

ELECTRICAL MANAGEMENT SYSTEM:
The system installed shall be easily re-programmable and reconfigurable. Most factory authorized service centers or technicians will have on hand all required diagnostic hardware and software required for maintenance of the installed system.

PC DIAGNOSTICS
The system shall incorporate a feature that enables a service representative to troubleshoot, repair and replace nodes in the system, should they for any reason fail. It will be run via a PC interface and will monitor all system information. All messages going across the communications bus must be seen on the screen, including analog information. Each node must be capable of being queried for its own voltage drop and capable of obtaining the status of all inputs and outputs from the diagnostics interface.

The system shall feature the following:

Total load management
Load shedding capabilities (will begin load shedding when voltage drops below selected level after a 2 minute period per output.)
Load sequencing capabilities
PC Diagnostics
Error reporting
Continuous system monitoring and reporting

PC PROGRAMMING
The system must be programmable at the factory in a language that can be downloaded to a remote service representative's PC or down loader tool with all OEM data, as programmed for this specific unit and allow field reprogramming changes as provided by the unit manufacturer.

EMI/RFI PROTECTION
The electrical system proposed shall include means to control undesired electromagnetic and radio frequency emissions. State of the art electrical system design and components will be used to insure radiated and conducted EMI (electromagnetic interference) and RFI (radio frequency interference) emissions are suppressed at their source.

The unit proposed will have the ability to operate in the electromagnetic environment typically found in fire ground operations. The contractor will be able to demonstrate the EMI and RFI testing has been done and meets SAE J551 requirements. Harness and cable routing be given careful attention to minimize the potential for conducting and radiated EMI/RFI susceptibility.

CONTROLS & FUNCTIONS
A switch panel controlling electrical devices and equipment installed on the chassis and body shall be located in the cab within easy access to the driver or centrally located convenient to the driver and/or officer positions. The panel shall include switches arranged in the most convenient and practical manner that is possible.

The panel shall control individually all emergency warning light circuits, which shall also be controlled by warning master switch.

SERVICE AND MAINTENANCE DIAGNOSTIC
Advanced unit service and maintenance will be assisted with an integral software program. The software will provide troubleshooting tools to service technicians to understand diagnostic procedures; failure detection; warning regarding components; System simulation and pinging of nodes for status verification.

All electrical and emergency lighting equipment and circuits not controlled by the electronic management system shall be supplied with automatic reset circuit breakers of appropriate amperage. These circuits shall be operated through a Bosch or equal continuous duty relay to remove load from all switches.

12V DC VOLTAGE OUTPUT TESTING & DOCUMENTATION
The low voltage system of the completed apparatus shall be tested and certified by the manufacturer prior to delivery. A copy of the testing and successful completion will be provided to the purchaser with the in the Owners Manual. Any failures to these tests will require corrective actions to be taken and re-tested before delivery.

RESERVE CAPACITY TEST:
The engine shall be started and run until all engine and engine compartment temperatures are stabilized and the battery system is fully charged. The engine shall be shut off and the minimum continuous electrical load shall be activated for ten (10) minutes. All electrical loads shall be shut down. The battery system shall then be capable of restarting the engine.

ALTERNATOR PERFORMANCE TEST AT IDLE:
Minimum continuous electrical load shall be activated while the unit is at idle speed. The engine and engine compartment temperatures are stabilized. The battery system shall be tested to detect the presence of battery discharge current. The detection of battery discharge current shall be considered a test failure.

ALTERNATOR PERFORMANCE TEST AT FULL LOAD:
The total continuous electrical load shall be activated with the engine running up to the manufacturer's governed speed. The test duration shall be a minimum of two (2) hours. Activation of the load management system shall be permitted during the test. If however, an alarm sounded by excessive battery discharge, as detected by the system, or a voltage of less than 11.7 volts DC for a 12-volt nominal system for more than 120 seconds, it shall be considered a test failure.

LOW VOLTAGE ALARM TEST:
The engine shall be shut off and the total continuous electrical load shall be activated and continue to be applied until the excessive battery discharge alarm is activated. The battery voltage measured at the battery terminals with the load still applied must be above 11.7 volts or the test shall be considered a failure and corrective actions employed.

DOCUMENTATION:
At the time of delivery an Amp Draw Report Section 13-15 will be completed and provided to the purchaser with the Owners Manual. Documentation shall include:

1. Copy of electrical system performance test complying with NFPA 1901,

2. Written load analysis with the following information:
a. Nameplate rating of the alternator
b. The alternator rating under the conditions specified NFPA 1901, section 13.3.2.
c. The minimum continuous load of each component specified per NFPA 1901 section 13.3.2
d. Additional electrical loads that, when added to the minimum continuous electrical load, determine the total electrical load.
e. Each individual intermittent electrical load

BATTERY DISCONNECT SWITCH
A solenoid operated battery disconnect switch shall be installed on the chassis to disconnect the body electric from the chassis batteries. Switch shall be engaged by the use of ignition switch. When the ignition switch is switched to off position, the solenoid shall separate the body and equipment from the batteries.

BATTERY LIGHT
A green "battery on" pilot light that is visible from the driver's position shall be provided.

BRAKE / TURN / BACKUP LIGHTS
New stop, tail, and back-up lights shall be installed. The type used shall be Whelen brand
4"x 6"rectangular lights, model 600 series consisting of the following.

Two (2) Whelen model 60R00XRR Red LED Stop/ Tail lights.
Two (2) Whelen model 60A00TAR Amber LED Arrow Turn lights
Two (2) Whelen model 60C00WCR Clear Back-Up lights

Each light shall be installed separately on the rear of the apparatus with a chrome flange.

BACKUP ALARM
An Ecco brand backup alarm shall be installed and shall be activated when the unit is placed in reverse gear.

REAR MOUNTED MONITOR CAMERA
A Voyager or equivalent back up camera safety system for RV & emergency vehicles shall be installed on the apparatus. The camera shall be color and feature advanced moisture protection and industrial-strength construction for longevity.

A 5-6" cab mounted color monitor, shall display high-resolution images and a wide field of view to eliminate the blind spot behind the vehicle, facilitate backing, and reduce accidents. The monitor shall be located in clear view of the driver, per fire department approved location.

COMPARTMENT LIGHTS
The body compartments shall be equipped with low voltage, light emitting diode (LED) strip style lighting. Each light strip shall be consist of a single LED placed every 1.5" in cased in a durable and impact resistant translucent shield to protect the diodes from inadvertent contact or collision which may result in damage. The lights shall be mounted vertically in each compartment where they will not interfere with adjustment or accessibility of any shelving or equipment.

Each light shall be sized accordingly to illuminate the compartment adequately.

COMPARTMENT OPEN LIGHT
A large red light shall be mounted in the cab visible from the driver's and officer's seat.

Each compartment door shall be equipped with a door open indicator switch. When contact is broken at these switches, it shall activate the compartment open light in the cab.

ENGINE COMPARTMENT LIGHT
There shall be one (1) light installed in the engine compartment to illuminate the engine area. There shall be a switch located adjacent to or on the light.

GROUND AREA LIGHTING
There shall be low voltage, light emitting diode (LED) strip style lighting provided around the truck to provide proper ground area illumination in areas designed for the personnel to climb onto or descend from as well as for work area illumination under the body sides. Each light strip shall be consist of a single LED placed every 1.5" encased in a durable and impact resistant translucent shield to protect the diodes from inadvertent contact or collision which may result in damage. In addition, each strip casement shall be filled and sealed with a gel resin to protect the diodes from water as well as excess vibration.

Lights shall be provided under each cab door; behind the rear wheels; under the rear tailboard and along the body ahead of the rear wheels.

BATTERY CONDITIONER (External Mount)
There shall be a Kussmaul Auto Charge Super kit installed on the chassis. It shall consist of an Auto Charge1000 120 volt AC battery conditioner with a Super Auto Eject, and remote bar graph.

The battery conditioner (charger) system shall be wired to the chassis batteries and will recharge them to required levels. Conditioner shall provide a full 15 amps of output as well as supplying up to 3 amps for loads connected directly to the battery such as radio memory, etc. System shall be connected through a 110 volt shoreline inlet or receptacle located on the cab. A 10 element LED charge indicator shall be mounted on the driver's side of the cab near the shoreline inlet.

The shoreline inlet shall be a Kussmaul Super Auto-Eject input connector with a weather proof, sealed box and cover. Auto Eject is designed to connect a 120-volt AC source to the vehicle. Unit shall automatically disconnect 120 volt AC power source by ejecting plug from the receptacle when vehicle-starting system has been energized. Super eject shall be installed in location to be determined by the fire department.

LIGHT BAR
A Whelen model FN55LED 55" L.E.D. light bar shall be installed on the cab roof of the unit. There shall be four (4) red corner linear12 L.E.D light heads, and four (4) front linear8 L.E.D light heads. Two (2) red, and two (2) white L.E.D's.

There shall be two modes of operation, calling for the right-of-way and blocking the right-of-way. When the master optical; warning system switch is closed, and the parking brake is released or the automatic transmission is not in park, the warning devices signaling the call for right-of-way shall be energized. When the master optical warning system switch is closed, and the parking brake is on or the automatic transmission is in park, the warning devices signaling the blockage of the right-of-way shall be energized.

LOWER ZONE WARNING LIGHTS
A Whelen NFPA 1901 L.E.D. lower zone warning light package shall be installed on the unit.

There shall be a total of ten (10) 60R02FRR 600 series Super L.E.D. surface mount lights mounted on the unit. Each light shall be equipped with a chrome 6E series flange. Lights shall be mounted as follows:

There shall be three (3) red 60R02FRR lights mounted on each side in the lower half of the unit (zones B & D lower); two (2) red 60R02FRR lights shall be mounted on the rear lower half of the unit (zone C lower); and two (2) red 60R02FRR lights with cast housings shall be mounted on the grille (zone A lower).

UPPER ZONE WARNING LIGHTS
A Whelen NFPA 1901 L.E.D. upper zone warning light package shall be installed on the unit.

There shall be a total of four (4) 90R00FRR 900 series L.E.D. and two (2) 70R00FRR surface mount lights mounted on the unit. Each light shall be equipped with a chrome flange. Lights shall be mounted as follows:

There shall be one (1) red 90R00FRR lights mounted on each side toward the upper rear (zones B & D upper); two (2) red 90R00FRR lights and two (2) red 70R00FRR lights shall be mounted on the rear upper half of the unit (zone C upper)

ELECTRONIC SIREN
There shall be one (1) Whelen model 295SLSA1 200-watt self-contained siren with electronic noise canceling microphone shall be installed in the cab area.

MECHANICAL SIREN
There shall be one (1) Federal model Q2B siren installed. The Q2B shall be mounted per fire department request and activated by Linemaster brand Model 491-S floor switches.

The floor switches shall be located one on each side of the driving compartment. There shall be a "Siren Brake" switch included on the cab switch panel.

SPEAKER
There shall be one (1) Federal siren speaker model MS100 Dynamax installed on the front bumper of chassis.

SCENE LIGHTS
The unit shall be equipped with four (4) Whelen 810 series 8-32 degree halogen lights. Scene lights shall be surface mounted lights and located two (2) on the right side and two (2) on the left side of the apparatus.

120 VOLT & 240 VOLT

Since the apparatus is equipped with a 120/240-volt electrical system, the wiring and associated equipment shall be tested.

The wiring and associated receptacles shall be subjected to a 1-min, 900-V dielectric voltage withstand test with any switches in the circuit(s) closed between live parts, including neutral and the vehicle frame. This test shall be conducted after all body work has been completed.

Electrical polarity checks shall be made of permanently wired equipment and receptacles to determine that connections have been properly made.

An operational test shall 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 test shall be recorded and provided to the purchaser at the time of delivery.

GENERATOR

The generator system shall be a Smart Power 12 KW or approved equal. The system shall be designed and assembled by a company with no less than 10 years experience in the manufacture of hydraulic driven systems.

The motor/generator shall be placed in a tray frame assembly which affords protection to the components and provides a unitized mounting module containing motor/generator, reservoir, oil cooler, filtration system, and a manifold containing a cross port check valve plus system relief valve. The generator shall be a commercial type with a heavy-duty bearing and of brushless design to ensure low maintenance. No brushes of slip rings will be allowed. The reservoir shall include an oil level gauge, oil temperature gauge, fill cap, fill strainer, and a boost unit to provide a positive pressure to the pump suction port. The generator and hydraulic motor shall be close coupled and permanently aligned using a Morse taper with a through bolt to secure the motor to the generator. No two bearing generators or shaft coupling devices are allowed.

The system must be capable of producing the rated full-load power when driven from the vehicle PTO from high idle to maximum engine speed.

The hydraulic motor and pump shall be of axial piston design to provide low internal leakage and a high degree of frequency stability. No gear pumps or gear motors are allowed. The pump will match to the system with the proper orifice, pressure compensator and load sensing to provide a stable output over the rated speed range of the pump and with electrical loads from no-load to full-load.

The system shall be capable of normal operations using a commonly available ATF fluid, such as GM DEXTRON II, or equivalent. All fluid service points shall be in close proximity for ease of scheduled maintenance.

When properly installed, the system shall be warranted by the manufacturer for a period of not less than two years or two thousand hours, which ever should come first.

OUTLETS
Four (4) duplex outlets shall be installed per the fire department request. The outlets shall be recessed in the body and be protected by a weatherproof cover. Two shall be located adjacent to the rear tripod lights and two shall be located in the rear wheel wells. All outlets are to be of the plug configuration used by the Fire Department.

There shall be one (1) 220-volt receptacle installed in the rear compartment for powering the Hurst simo power unit.

BREAKER BOX
The main breaker box shall be a Square D with ten (10) circuit breaker rated to wire size and load demand. The circuit breaker panel shall be equipped with standard circuit breakers. Circuit breaker panel shall be installed on the front (left) wall of compartment over the rear wheels. An engraved label shall be furnished next to breaker box to indicate switches and circuits.

120VOLT / 1000 WATT (2) FIRE RESEARCH FOCUS (TRI-POD)
There shall be a total of two (2) Fire Research FC600-M10-1000 Watt, 120 volt Focus low profile extendible lights installed per Fire Department instructions. Each light shall utilize the 600 series, telescoping twist lock tri-pods. Each tri-pod shall use the patented concentric locking mechanism. The twist lock cannot jam or be over tightened, and has no metal-to-metal contact.

There shall be two (2) Focus FC600-M10 tri-pod lights installed on the apparatus at the rear of the body. The light shall be easily removable from truck and shall be wired with type of plug used by the Fire Department.

The lights shall be located so as not to interfere with any other lights, doors or handles.

LIGHT TOWER
There will be one (1) Will-Burt roof mounted elevated lighting system shall be installed on the roof of the body. The light model shall be the Night Scan Chief model NS6-3600M.

The light tower shall be equipped with four (4) 900 watt 230 volt Magnafire 3000 Halogen lights.

The remote control shall be a pistol grip type with 30 feet of cable. The remote shall be stored against the wall of the center compartment. A bracket shall be supplied for both the controller and the cable.

HURST TOOL HOSE REELS
There shall be one (1) Hurst JL-ER 12V electric re-wind reel with 100 ft of hydraulic hose supplied and mounted in the rear compartment.

There shall be one (1) electric JL-ER 12V rewind reel with 100 ft of hydraulic hose supplied and mounted in the rear compartment.

Hose assembly is available in 3 colors: orange, green, blue.

ELECTRIC REEL
One (1) Hannay Model ECR-1616-17-18, 240-volt electric cord reel capable of holding 200 feet of 10/3 wire shall be supplied and mounted in a location determined by the fire department.

The reel shall be equipped with a 12-volt electric motor with a sealed push button momentary switch located near that reel in the same compartment.

The reel shall also be supplied with 200 feet of 10/3 wire, color to be black.

JUNCTION BOX
There shall be one (1) GFE electrical outlet junction box with powder coat finish, located on the specified electric cord reel(s). The box shall be hard wired on the specified cable, and shall terminate with four (4) 125 volt, 20 Amp outlets. Plug type shall be as specified by the fire department.

AIR REEL
There shall be one (1) Hannay EFH1514-17-18 high-pressure air reel installed as per the fire department instructions.

The reel shall be capable of holding 150 feet of 1/4" hose. The reel shall also be equipped with a 12-volt electric motor with a sealed push button momentary switch located near that reel in that same compartment.

The reel will be supplied with 100 feet of 1/4" 6000 PSI hose, color to be red.

CAPTIVE ROLLER
There shall be a fairlead at all reel locations, a retractable captive 4-way roller fairlead shall be provided. These devices shall be so designed as to extend out of the body when the roll-up door is opened. This shall eliminate the cable or hose from rubbing against the exterior painted body surface. This device shall be activated by simply pulling it out from the body with a web strap. The design shall also not allow the cable or hose to be deployed without the device being swung out.

PAINT & LETTERING
The body exterior shall have no mounted components prior to painting to assure full coverage of metal treatments. Compartment doors will be painted separately to assure proper paint coverage on body, door jambs and door edges.

All painted surfaces shall follow the following procedure to insure a lasting finish.

Metal surfaces shall be sanded to remove all burrs and imperfections in aluminum, before etching and treatment.

A wax & grease solvent shall be used to clean and prep the aluminum surface. The surface shall then be rinsed with freshwater. This step removes wax, grease and other surface contaminants, thus leaving a bright, clean and conditioned surface.

A self-etching, aluminum primer shall be applied next. The self-etching primer shall fill all of the minor imperfections, scratches, etc. in the metal. This step produces a corrosion resisting conversion coating that fends off oxidation and other surface contaminates leaving a surface that gives excellent paint adhesion.

A sandable primer shall be sprayed on the metal that seals the surface for the polyurethane paint. A minimum coating thickness of 2 mil shall be applied. Primer is then sanded smooth leaving the best surface for topcoat.

The apparatus body shall then be painted with a minimum of three (3) coats of high luster final finish polyurethane paint.

These steps are followed as recommended by the paint manufacturer to provide a lasting and high quality gloss finish. All paint products shall be provided by the same manufacture as the topcoat finish.

The body shall be painted to match the (PAINT COLOR & CODE) provided by the fire department.

REPAINT CHASSIS
Because of the limited GM chassis availability and color choices of the chassis cab the chassis may require being sanded and prepared for repaint.

The chassis shall be painted a color and code number specified by the fire department. This will include door jambs

LETTERING
There shall be a maximum of sixty (60) 4" tall 3M reflective gold letters applied to the apparatus. The lettering shall also have left drop shading applied. The department shall supply the exact location of the lettering.

STRIPE
There shall be a 4" wide, white Scotchlite stripe located no higher than 48" from the ground installed on the apparatus cab and body. The stripe shall cover a minimum of fifty percent (50%) of perimeter of each side of the apparatus and twenty-five (25%) of the perimeter of the front of the apparatus.

The department shall specify the exact location of the stripe.

CONSPICUITY STRIPING
3M Conspicuity highly reflective prismatic striping shall be installed along the apparatus rub rails. Vehicle markings are made for application to sides and rear of emergency vehicles to meet and exceed all US DOT and NHTSA and NFPA requirements.

CAB DOOR REFLECTIVE STRIPING
The completed apparatus shall be equipped with reflective material on the interior of each cab door in accordance with the current standards of NFPA.

ALTERNATING "CHEVRON" STYLE STRIPE (FULL COVERAGE)
The rear of the apparatus, including the rear roll up door shall be overlaid with alternating red and (amber / green) reflective 6” stripes. Stripes to be configured to resemble in a “Chevron” style lay out where the stripes come in from the sides at an upward 45 degree angle converging in the center to provide an upward point.

LOOSE EQUIPMENT

WHEEL CHOCK
There shall be two (2) Zico model SAC-44 wheel chocks with a horizontal hanging bracket shall be mounted in front of the left rear wheels.

WIRING SCHEMATICS
A complete set of detailed electrical wiring schematics shall be provided with the completed unit. The schematic shall clearly labeled and describe all electrical circuits for an accurate reference.

SERVICE MANUAL AND PARTS LIST
A service manual shall be provided with the completed unit. Manual shall include equipment and component information as well as warranty and service information.

TRAFFIC ADVISOR BAR
There shall be a Whelen model TAM85 46" traffic advisor shall be installed on the upper rear of the apparatus. The advisor shall contain eight (8) TIR6 L.E.D amber panels with arrow lenses on either end of the bar. The advisor has the capability to direct traffic to the right or to the left or the right and left simultaneously. The traffic advisor shall be operated by a TACTRL1A control head mounted in the cab convenient to the driver.