SVI Trucks

PROPOSAL FOR:

City of Boston Police Department

Boston, MA 02120

FOR

ONE (1) SWAT TRUCK

"ROCK SOLID QUALITY"

DATE: 5/6, 2010

SVI TRUCKS - A Division of Super Vacuum Mfg. Co., Inc.
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INTERNET IN-PROCESS SITE

The Bidder shall post and maintain a website where the City of Boston Police Department will be able to view digital images of their apparatus as its being manufactured. The digital images shall be posted once a week starting when the body begins production or when the cab/chassis arrives and shall continue until the final completion of the apparatus.

OPERATIONS AND SERVICE DOCUMENTATION

The Contractor shall deliver with the fire apparatus at least two (2) sets of complete operation and service documentation covering the completed apparatus as delivered and accepted.

The documentation shall address at least the inspection, service, and operations of the fire apparatus and all major components thereof.

The Contractor shall also deliver with the fire apparatus the following documentation for the entire apparatus and each major operating system or major component of the apparatus:

1) Manufacturer's name and address
2) Country of manufacture
3) Source for service and technical information
4) Parts replacement information
5) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
6) Wiring diagrams for low voltage and line voltage systems to include the following information:
   a) Pictorial representations of circuit logic for all electrical components and wiring
   b) Circuit identification
   c) Connector pin identification
   d) Zone location of electrical components
   e) Safety interlocks
   f) Alternator–battery power distribution circuits
   g) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
7) Lubrication charts
8) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
9) Precautions related to multiple configurations of aerial devices, if applicable
10) Instructions regarding the frequency and procedure for recommended maintenance
11) Overall apparatus operating instructions
12) Safety considerations
13) Limitations of use
14) Inspection procedures
15) Recommended service procedures
16) Troubleshooting guide
17) Apparatus body, chassis and other component manufacturer's warranties
18) Special data required by this standard
19) A material safety data sheet (MSDS) for any fluid that is specified for use on the apparatus

The Contractor shall deliver with the apparatus all manufacturer's operations and service documents supplied with components and equipment that are installed or supplied by the Contractor.

NFPA REQUIRED DOCUMENTATION FORMAT - USB FLASH DRIVE

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

There shall be two (2) printed copies of the manual provided with the apparatus.

TESTING

ROAD TEST

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

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

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

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

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

TEST SEQUENCE

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

1. RESERVE CAPACITY TEST

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

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

2. ALTERNATOR PERFORMANCE TEST

TEST AT IDLE

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

failure.

TEST AT FULL LOAD

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

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

3. LOW VOLTAGE ALARM TEST

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

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

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

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

LOW VOLTAGE - ELECTRICAL SYSTEM PERFORMANCE TEST

DOCUMENTATION

The manufacturer shall deliver the following with the fire apparatus:

1) Documentation of the electrical system performance tests
2) A written electrical load analysis, including the following:
   h) The nameplate rating of the alternator
   i) The alternator rating
   j) Each of the component loads specified that make up the minimum continuous electrical load
   k) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
   l) Each individual intermittent electrical load

UL 120/240 VAC CERTIFICATION

The 120/240 volt electrical system shall be third-party, independent, audit-certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901 to perform as listed below;

The prime mover shall be started from a cold start condition, and the unloaded voltage and frequency shall be recorded.

The line voltage electrical system shall be loaded to at least 100% of the continuous rated wattage stated on the power source specification label. Testing with a resistive load bank shall be permitted.

The power source shall be operated in the manner specified by the apparatus manufacturer as documented on instruction plates or in operation manuals. The power source shall be operated at a minimum of 100% of the continuous rated wattage as stated on the power source specification label for a minimum of two (2) hours.

The load shall be adjusted to maintain the output wattage at or above the continuous rated wattage during the entire 2-hour test.

The following conditions shall be recorded at least every 1/2 hour during the test:

1) The power source output voltage, frequency and amperes
2) The prime mover's oil pressure, water temperature and transmission temperature, if applicable
3) The power source hydraulic fluid temperature, if applicable
4) The ambient temperature and power source air inlet temperature

The following conditions shall be recorded once during the test for power sources driven by dedicated auxiliary internal combustion engines:

1) Altitude
2) Barometric pressure
3) Relative humidity

If the generator is driven by the chassis engine and the generator allows for operation at variable speeds, the chassis engine speed shall be reduced to the lowest rpm allowed for generator operation and the voltage and frequency shall be recorded.

The load shall be removed and the unloaded voltage and frequency shall be recorded.

Voltage shall be maintained within ±10% of the voltage stated on the power source specification label during the entire test. Frequency shall be maintained within ±3 Hz of the frequency stated on the power source specification label during the entire test.

The total continuous electrical loads, excluding those loads associated with the equipment defined in NFPA 22.15.7.3.11.2, shall be applied during the testing unless an auxiliary engine drives the power source.

If the apparatus is equipped with a fire pump, the 2-hour certification test of the power source shall be completed with the fire pump pumping at 100% capacity at 150 psi (1000 kPa) net pump pressure. The test shall be permitted to be run concurrently with the pump certification test.

DOCUMENTATION

The Body Manufacturer shall deliver the following with the fire apparatus:

The results of each test shall be recorded on an appropriate form and provided with the delivery of the fire apparatus.

DIELECTRIC VOLTAGE WITHSTAND TEST

The line voltage wiring and permanently connected devices and equipment shall be subjected to a dielectric voltage withstand test of 900 volts for one (1) minute. The testing shall be performed after all body work has been completed.

The test shall be conducted as follows:

1) Isolate the power source from the panel board and disconnect any solid state low voltage components
2) Connect one lead of the dielectric tester to all the hot and neutral buses tied together
3) Connect the other lead to the fire apparatus frame or body
4) Close any switches and circuit breakers in the circuit(s)
5) Apply the dielectric voltage for one (1) minute in accordance with the testing equipment manufacturer's instructions

The electrical polarity of all permanently wired equipment, cord reels and receptacles shall be tested to verify that wiring connections have been properly made.

Electrical continuity shall be verified from the chassis or body to all line voltage electrical enclosures, light housings, motor housings, light poles, switch boxes and receptacle ground connections that are accessible to fire fighters in normal operations.

If the apparatus is equipped with a transfer switch, it shall be tested to verify operation and that all non grounded conductors are switched.

Electrical light towers, floodlights, motors, fixed appliances and portable generators shall be operated at their full rating or capacity for 30 minutes to ensure proper operation.

PERFORMANCE BOND

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

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

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

WARRANTY

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

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

labor.

The Body Manufacturer shall warrant all materials and accessories used on the vehicle(s), whether fabricated by manufacturer or purchased from an outside source and will deal directly with the City of Boston Police Department on all warranty work.

GENERAL LIMITED WARRANTY - One (1) YEARS

The vehicle shall be free of defects in material and workmanship for a period of one (1) years or 36,000 miles (or 57,936 kilometers), whichever occurs first starting thirty (30) days after the original invoice date.

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

LOW VOLTAGE ELECTRICAL WARRANTY - FIVE (5) YEARS

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

GRAPHICS LIMITED WARRANTY

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

CONSTRUCTION PERIOD

The completed vehicle shall be delivered within three hundred (300) days after receipt of a purchase order or contract.

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

OVERALL HEIGHT REQUIREMENT

The overall height (OAH) of the vehicle shall be approximately 132“ (11') from the ground. This measurement shall be taken on flat ground with the tires properly inflated, in the unloaded condition, at that highest point of the vehicle.

OVERALL LENGTH

The overall length (OAL) of the vehicle shall be approximately 309“ (25' - 9").

ENGINEERING SUPPORT AT PRE-CONSTRUCTION MEETING

The Contractor shall provide an engineer to be present at the pre-construction meeting held at the factory location. The engineer will address all engineering related questions for the truck as purchased and for all proposed changes.

The engineer will have the 2D and/or 3D AutoCAD electronic drawings projected on screen and be able to provide dimensional data for proposed changes and proposed layouts. This will help ensure that the final design matches the City of Boston Police Department intentions to the maximum extent possible.

PRE-CONSTRUCTION CONFERENCE

A pre-construction conference shall be required at the Contractor's factory for three (3) personnel from the City of Boston Police Department to finalize all construction details prior to manufacturing.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the pre-construction conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

PRE-PAINT CONFERENCE

A pre-paint conference shall be required at the Contractor's factory for three (3) personnel from the City of Boston Police Department to inspect the vehicle and construction details prior to the painting process.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the pre-paint conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

FINAL INSPECTION CONFERENCE

A final inspection conference shall be required at the Contractor's factory for three (3) personnel from the City of Boston Police Department to inspect the vehicle and construction details prior to shipment of the completed vehicle. This inspection shall take place after any specified striping and lettering is installed.

The Contractor shall at his/her expense, provide transportation, lodging, rental car and meal expenses during the final inspection conference. Any travel distance greater than 250 miles shall be by non-stop commercial air travel.

DELIVERY AND DEMONSTRATION

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

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by City of Boston Police Department.

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

CHASSIS/WALKIN VAN SPECIFICATION

Chassis: 2015 Freightliner MT55
GVWR: 23,000 pounds
Wheelbase: 178"

General Service
EXPECTED FRONT AXLE(S) LOAD : 8000.0 lbs

EXPECTED REAR DRIVE AXLE(S) LOAD : 15000.0 lbs
EXPECTED GROSS VEHICLE WEIGHT CAPACITY : 23000.0 lbs
DOMICILED, USA 50 STATES (INCLUDING CALIFORNIA AND CARB OPT-IN STATES)
TERRAIN/DUTY: 100% (ALL) OF THE TIME, IN TRANSIT, IS SPENT ON PAVED ROADS
SMOOTH CONCRETE OR ASPHALT PAVEMENT - MOST SEVERE IN-TRANSIT (BETWEEN SITES) ROAD SURFACE

Engine

CUM ISB 6.7-260 260 HP @ 2300 RPM, 2600 GOV, 660 LB/FT @ 1600 RPM
2013 OBD/2010 EPA/CARB/GHG14
NO IDLE LIMITER, ELECTRONIC ENGINE
2008 CARB EMISSION CERTIFICATION - CLEAN IDLE (INCLUDES 6X4 INCH LABEL ON LEFT SIDE OF HOOD)
85 MPH ROAD SPEED LIMIT
NO CRUISE CONTROL SPEED LIMIT
NO IDLE SHUTDOWN CONFIGURATION
PTO MODE ENGINE RPM LIMIT - 2300 RPM
PTO MODE BRAKE OVERRIDE - SERVICE BRAKE ONLY ENABLED
REGEN INHIBIT SPEED THRESHOLD - 5 MPH
ALTERNATE SWITCH SPEED 950 RPM
TRANSMISSION VEHICLE INTERFACE CONNECTOR WIRED TO TRANSMISSION ECU
ALLISON TRANS - SEM/LRTP REQ
SHIFT LEVER, CABLE LINKAGE, AUTO TRANS, MTD ON RH SIDE OF CONTROL SUPPORT

Engine Equipment

690 SQ-IN DOWNFLOW RADIATOR MOUNTED IN FRONT
ENGINE OIL CHECK MOUNTED ON RADIATOR AND OIL FILL IN VALVE COVER
STANDARD ENGINE OIL
FARR ECO BC AIR CLEANER WITH WATER SEPARATOR
FRONTAL AIR INTAKE
AIR INTAKE PIPING - CLNR TO ENGINE
AIR CLEANER MOUNTED ON RAIL
LN 12V 270 AMP 4942PA PAD MOUNT ALTERNATOR
(2) ALLIANCE MODEL 1131, GROUP 31, 12 VOLT MAINTENANCE FREE 1900 CCA THREADED STUD BATTERIES
BATTERY BOX MOUNTED RIGHT HAND WITH BATTERIES PERPENDICULAR TO FRAME RAIL
FRAME GROUND RETURN, BATTERY CABLES WITH EYELET CONNECTORS
NO BATTERY SHUTOFF SWITCH
NO AIR COMPRESSOR
ELECTRONIC ENGINE INTEGRAL SHUTDOWN PROTECTION WITH OVERRIDE SWITCH
CUMMINS EXHAUST BRAKE INTEGRAL WITH VARIABLE GEOMETRY TURBO WITH ON/OFF DASH SWITCH
RETARDER CONTROL WIRING AND CONTROL SWITCH
ENGINE AFTERTREATMENT DEVICE, AUTOMATIC OVER THE ROAD ACTIVE REGENERATION AND DASH MOUNTED SINGLE REGENERATION REQUEST/INHIBITIT SWITCH
HORIZONTAL DIESEL PARTICULATE FILTER AFTERTREATMENT DEVICE
RH FRAME MOUNTED HORIZONTAL AFTERTREATMENT DEVICE
HORIZONTAL SCR CATALYST
RH OB FRAME MTD HZ SCR CATALYST
EXHAUST MITIGATION DEVICE FTL 4" ID SLIP-FIT
LH HORIZONTAL TAILPIPE

10 GALLON DEF TANK RH FRAME MTD
ADC ELEC-MG ON/OFF ENGINE FAN CLUTCH
CUMMINS SPIN ON FUEL FILTER
FULL FLOW OIL FILTER
RADIATOR MOUNTED SURGE TANK
AIR RECIRCULATION SHIELD
ANTIFREEZE TO -34F, ETHYLENE GLYCOL PRE-MIXED 50/50 COOLANT
RUBBER COOLANT HOSES
CONSTANT TENSION HOSE CLAMPS FOR COOLANT HOSES
STANDARD CHARGE AIR COOLER PLUMBING
PHILLIPS-THERMO 1000 WATT/ 115VOLT BLOCK HEATER
CHROME ENGINE HEATER RECEPTACLE WITH 12 VOLT INDICATOR TEMPORAILY MOUNTED
ALUMINUM FLYWHEEL HOUSING
NIPPON-DENSO 12V STARTER WITH COPPER CONTACTS

Transmission
ALLISON 2200 HS AUTOMATIC TRANSMISSION WITH PARK PAWL, NO PTO PROVISION

Transmission Equipment
PTO MOUNTING, LH AND RH SIDES OF MAIN TRANSMISSION
WATER TO OIL TRANSMISSION COOLER
TRANSMISSION OIL CHECK AND FILL
SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

Front Axle and Equipment
AF-8.0-2 8,000# FC1 68.0 KPI/3.74 DROP SINGLE FRONT AXLE
NON-ASBESTOS FRONT BRAKE LINING
BOSCH HYDRAULIC PIN-SLIDE DISC FRONT BRAKES
FRONT BRAKE DUST SHIELDS
FRONT BRAKE DISC ROTORS
COMMET IRON FRONT HUBS
FRONT OIL SEALS
MOBIL SYNTHETIC SHC007 FRONT AXLE LUBE
TRW TAS 55 POWER STEERING
TRW POWER STEERING PUMP
2 QUART POWER STEERING RESERVOIR

Front Suspension
8,000# TAPERLEAF FRONT SUSPENSION
MAINTENANCE FREE RUBBER BUSHING FRONT SUSPENSION
SACHS FRONT SHOCK ABSORBERS

Rear Axle and Equipment
DA-RS-15.0-2 15,000# F-SERIES SINGLE REAR AXLE
5.13 REAR AXLE RATIO
IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING
SPL70 DANA SPICER MAIN DRIVELINE WITH HALF ROUND YOKES
SYNTHETIC 75W-90 REAR AXLE LUBE
BOSCH HYDRAULIC PIN-SLIDE DISC REAR BRAKES
NON-ASBESTOS REAR BRAKE LINING
REAR DISC BRAKE ROTORS
REAR BRAKE DUST SHIELDS

REAR OIL SEALS
TRANSMISSION MOUNTED DRUM PARK BRAKE

Rear Suspension
15,000# TAPERLEAF SPRING REAR SUSPENSION LOW PROFILE WITH RADIUS LEAF
REAR SWAYBAR
MONROE REAR SHOCK ABSORBERS

Brake System
BOSCH HYDRAULIC BRAKE PACKAGE
WABCO HYDRAULIC 4S/4M WITHOUT TRACTION CONTROL
HYDRAULIC CHASSIS TUBING

Wheelbase & Frame
4525MM (178 INCH) WHEELBASE
5/16X2.81X9-1/8 INCH STEEL FRAME
2350MM (93 INCH) REAR FRAME OVERHANG

Chassis Equipment
THREE-PIECE 14 INCH CHROMED STEEL BUMPER WITH COLLAPSIBLE ENDS
DRILLING PREP FOR CUST INSTALLED BODY SUPPORTS FOR 93" WALK-IN VAN BODY WIDTH

Fuel Tanks
60 GALLON RECTANGULAR ALUM FUEL TANK - AT REAR
PETROLEUM DIESEL FUEL
FUEL TANK(S) MOUNTED BELOW RAILS AFT OF REAR AXLE
LH SIDEFILL FUEL TANK CAP
ALLIANCE FUEL FILTER/WATER SEPARATOR WITH PRIMER PUMP AND INDICATOR LIGHT

Tires
GOODYEAR G647 RSS 245/70R19.5 14 PLY RADIAL FRONT TIRES
GOODYEAR G622 RSD 245/70R19.5 14 PLY RADIAL REAR TIRES

Wheels
MAXION WHEELS 91831 19.5X6.75 8-HUBPILOT 4-HAND STEEL DISC FRONT WHEELS
MAXION WHEELS 91831 19.5X6.75 8-HUBPILOT 4-HAND STEEL DISC REAR WHEELS

Cab Exterior
OUTBOARD MOUNTED WITH ANGLE MOUNTED PARK BRAKE
FREIGHTLINER NAMEPLATES
HOOD MOUNTED CHROMED PLASTIC GRILLE
DUAL ELECTRIC HORN
IGNITION KEY ONLY
INCANDESCENT BODY MTD MARKER LAMPS

Cab Interior
HVAC WIRING PROV LOC INSIDE CAB
5/8" HEATER PLUMBING HOSE - TO FRONT OF CHASSIS
SANDEN COMPACT AIR CONDITIONER COMPRESSOR
RADIATOR MOUNTED AIR CONDITIONER CONDENSER
AUTO SELF-RESET CIRCUIT BREAKERS AND FUSES
FASTEN SEAT BELT INDICATOR, ACTIVE LOW, FOR CUSTOMER FURNISHED SEAT BELT

TRW TILT/3.00" TELESCOPIC STEERING COLUMN WITH FOOT ACTIVATION PEDAL
4-SPOKE 18 INCH (450MM) STEERING WHEEL

Instruments & Controls
GREEN GAUGE BACKLIGHTING
ENGLISH UNITS MAJOR SCALE
DRIVER MESSAGE CENTER W/LCD DISPLAY,24 WARNING LAMPS, DATA LINKED, AMI
ELECTRONIC MPH SPEEDOMETER WITH SECONDARY KPH SCALE, WITHOUT ODOMETER
ELECTRIC ENGINE OIL PRESSURE GAUGE W/WARNING LAMP AND ALARM
ELECTRIC ENGINE COOLANT TEMP GAUGE W/WARNING LAMP AND ALARM
DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY
ELEC FUEL GAUGE & LOW FUEL IND LAMP
ENGINE HOUR METER, INTEGRAL TO MESSAGE CENTER LCD
INTAKE MOUNTED AIR RESTRICTION INDICATOR WITHOUT GRADUATIONS
PROGRAMMABLE RPM CONTROL WITH LOW VOLTAGE AUTO HIGH IDLE
WAGNER 7212 TURN SIGNAL FLASHER

Color
VENDOR BLACK FRONT WHEELS/RIMS
VENDOR BLACK REAR WHEELS/RIMS

BASIC CHASSIS WARRANTY
FREIGHTLINER CUSTOM CHASSIS CORPORATION BASIC CHASSIS WARRANTY

MORGAN OLSON

CAB DOORS:
SEDAN DOORS, LH/RH WITH 2-POINT ROTARY LATCHES AND SLIDING WINDOWS
KEY BOTH DOORS ALIKE
DOOR SKIN RIVETED TO DOOR FRAME

SEATS:
DRIVER MAGNUM 200 SEAT
MECHANICAL SUSPENSION
PREMIUM BLACK CLOTH
SEAT ARMREST, BLACK CLOTH.
SEAT BELT, BLACK

NO PASS SEAT

ROOF/INTERIOR LIGHTS/VENTS
OUTER ROOF SKIN ALUMINUM
ROOF LINER EMBOSSED ALUMINUM AND 1 INCH FIBERGLASS INSULATION
CAB ROOF LINER PLASTIC AND 1 INCH FIBERGLASS INSULATION
ROCKER SWITCH MOUNTED IN INSTRUMENT PANEL FOR LOAD DOME

FLOOR
HANGER PLATE INSTALL FOR REAR BUMPER
FORWARD FLOOR, RIBBED EXTRUDED ALUMINUM
MID FLOOR HEAVY DUTY RIBBED EXTRUDED ALUMINUM
REAR FLOOR, RIBBED ALUMINUM
ACCESS DOOR INSTALL WITH DZUS LATCH

1 INCH WIDE SIDEWALL SUPPORT GUSSET ATTACHED TO LOWER SIDEWALL.

BUMPERS/HOODS
FIBERGLASS HOOD, FREIGHTLINER
HOOD PROP FOR FIBERGLASS HOOD
HOOD STOP INSTALL.
STEEL REAR BUMPER, 12INCH GRIP STRUT 93 WIDE.
REAR BUMPER SUPPORT BRACES, 3/4 INCH DIAMETER STEEL BRACES ATTACHED TO THE CHASSIS FRAME AND THE BUMPER CORNERS.

EXTERIOR BODY
THE SIDEWALLS ARE CONSTRUCTED USING .102 ALUMINUM.
FUEL FILL DOOR WITH SOUTHCO HINGE.
FLUSH FIT DOOR FOR UREA TANK
MUD FLAPS, NO LOGO
CAB FOR 93 WIDE WITH ROADSIDE VENT AT FOOT AREA.
SIDE MIRROR, DUAL HEAD, POWER CONTROLLED, REVOLUTION, HEATED WITH TURN SIGNAL

EXTERIOR LIGHTING
REAR TAIL LIGHT KIT (2 RED LED LIGHTS AND 2 WHITE LED LIGHTS)INCLUDES LED LICENSE PLATE LIGHTS
LICENSE PLATE BOX IN REAR SILL
LED FRONT PARK/TURN LAMP INSTALL, OPTRONIC
LAMP MARKER AMBER LED
LAMP MARKER REAR SIDE RED LED
LAMP MARKER (NOT SIDE) RED LED
MARKER LAMPS IN TRANSOM CENTER AMBER LED

INTERIOR CAB
SUN VISOR BLACK TINTED PLASTIC
ENGINE BOX FOR FREIGHTLINER MT45/MT55 ALUMINUM
AM/FM/WB/CD RADIO WITH TUNER, BUILT IN CLOCK, AUXILLIARY INPUT AND TWO SPEAKERS.
DRIVERS CONVENIENCE CENTER MOUNTED TO THE ENGINE BOX CONSISTING OF (2) CUP HOLDERS, A CLIPBOARD HOLDER AND MISCELLANEOUS.
WIPER MOTOR COVER PLATE. ALUMINUM COVER PLATE WITH ACCESS DOOR TO WIPER MOTOR ABOVE THE DRIVER AND A COMPARTMENT WITH DOOR ABOVE THE PASSENGER.
12V POWER POINT IN DASH.
CAB STEPS, ALUMINUM, CURBSIDE HAS BATTERY ACCESS

CARGO AREA
STIFFENERS ON SIDEWALLS, DOUBLE "H" STIFFNERS 3.00" ON 24 INCH CENTERS
SIDEWALL MATERIAL TO BE .125 INCH ALUMINUM,

PAINT
DUPONT PRIMER, DUPONT TOP COAT, DUPONT IMRON 5000
BLACK N0001H
PAINT REAR BUMPER SAME COLOR AS BODY
PAINT FOR 4 OR 5 WHEELS
BLACK N0001H

HEATING/AIR COND.
CONTROL PANEL FOR ELECTRIC HEATER WITH AIR CONDITIONING
AIR CONDITIONING FARM OUT FREIGHTLINER WITH OUT PREP CUMMINS 2010
CAB DASH HEATER WITH AIR CONDITIONING AND ELECTRIC CONTROLS.

SAFETY EQUIPMENT
REFLECTOR KIT, 3 TRIANGLES IN BOX

CHASSIS MODIFICATIONS

LUBRICATION AND TIRE DATA PLATE

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

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

VEHICLE DATA PLATE

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

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

OVERALL HEIGHT, LENGTH DATA PLATE (US)

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

The label shall show the height of the completed fire apparatus in feet and inches, the length of the completed fire apparatus in feet and inches, and the GVWR in pounds.

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

ACCIDENT PREVENTION

There shall be a placard in the cab seating area which reads, **"ALL OCCUPANTS MUST BE SEATED AND BELTED WHEN THE APPARATUS IS IN MOTION".**

PERSONNEL CAPACITY

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

ACCIDENT PREVENTION

If the rear bumper is 8" deep or more, there shall be a placard on the rear face of the body, in clear sight from the ground, which reads, **"WARNING - DO NOT RIDE ON STEPS OR DECK AREAS WHILE THE APPARATUS IS IN MOTION. DEATH OR SERIOUS INJURY MAY RESULT"**.

WEARING HELMET WARNING

A label stating **"DO NOT WEAR HELMET WHILE SEATED"** shall be visible from each seating location.

FINAL STAGE MANUFACTURER VEHICLE CERTIFICATION

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

FAN BELT PLATE

A permanently engraved plate {will/shall} be furnished in the cab that provides the size and type of all fan belts.

EXHAUST

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

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

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

Exhaust shall exit out the drivers side of the body.

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

SECURITY ALARM SYSTEM

There shall be a security alarm system installed on each cab door. Alarm shall be supplied with a arm/disarm keypad installed. Alarm system shall be a Keyscan 250 or equal. The alarm system shall also be attached to a motion detector located inside the van.

Alarm will sound if either cab door is opened or motion is detected inside the van.

RADIO ANTENNA INSTALLATION

There shall be one (1) radio antenna mounts provided and installed on the roof of the cab/chassis. The end of each radio antenna shall be routed to a location determined by the City of Boston Police Department.

Due to multiple configurations of antenna whips, the Body Manufacturer shall provide the antenna base, and City of Boston Police Department shall provide the whip.

12 VDC FUSE BLOCK

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

There shall be (1) additional 12v power point located on the passenger side of the cab dash panel.

PASSENGER AREA WORK AREA

A work area shall be provided in the cab at passenger area. The work area shall be securely fastened to the cab interior. It shall be fabricated of 3/16" smooth aluminum and painted with a black or gray textured powder coat paint finish for durability and finished appearance.

The design and location of work area shall be determined by the City of Boston Police Department at the pre-construction meeting.

RIFLE STORAGE FOR DRIVER

There shall be (1) Pac-Trac (or equal) bracket that will hold a rifle mounted by the driver’s seat in the van. Prefer a holder that will hold the rifle in a vertical position.

CAB INTERIOR DOOR PANELS

Interior cab door panels shall be provided with powder coat finish, final color to be determined at pre-construction meeting.

AUTOMATIC TIRE CHAINS

The apparatus chassis shall be provided with "ONSPOT" air operated automatic tire chains at the rear driving axle. Tire chains shall offer the traction of a single set of conventional snow chains at the touch of a button on the dash, without having to stop the vehicle.

ROAD EMERGENCY SAFETY KIT

One (1) set of three (3) dual faced triangular warning flares with fold away base complete with storage case per DOT requirements shall be provided with the completed apparatus.

One (1) 2.5 lb. ABC type vehicle fire extinguisher with bracket per DOT requirements shall be provided with the completed apparatus.

12 VOLT DISRIBUTION PANEL

The 12 volt electrical distribution panel shall be located in the front cab area above windshield.

VEHICAL RUST PROOFING

The exterior chassis and body components and all exposed electrical components shall be sprayed with Krown KL-73 automotive corrosion inhibitor. Krown shall cover all underside components of the body and chassis area to help prevent corrosion under the vehicle.

THREE (3) POSITION ANTENNA RAIL

One (1) radio antenna rail(s) shall be provided and installed on roof of vehicle. Each rail shall be constructed of aluminum, forming a two piece box design. The top section shall be removable for easy access to the individual antenna wiring. Three (3) antenna bases shall be provided and installed in each rail. Each antenna base shall include enough cable to reach radio location plus a service loop of at least 10' of LMR195 flexible communications cable. The antenna wiring shall enter the vehicle roof at a single point under the end of the rail. The end of each radio antenna shall be routed to radio mounting locations, or as determined by the City of Boston Police Department.

Due to the various configurations of antenna whips, the contractor shall provide the antenna base only, and City of Boston Police Department shall provide the antenna whip(s).

PAINT ANTENNA RAIL

Antenna rail shall be provided with a powder coat paint finish, black color.

ELECTRIC DOOR LOCK INTERFACE

Electric door locks shall be provided and interfaced as follows;

The 2 door cab manual door locks shall be retrofitted with a POP Locks electric actuated door locking system. All cab doors shall be locked and un-locked from a numeric key pad located adjacent to the drivers door. All doors shall have a manual key operated override capability in the event of a failure of the electric lock system. All cab doors shall be keyed alike. Four (4) hand held remote control units shall be provided for remote switching.

A switch shall be provided in the cab under the drivers dash to activate the body electric door locks.

BODY DESIGN

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

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

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

VAN BODY EXTERIOR COMPARTMENTATION

The van body shall be modified to accommodate additional exterior compartments as per the detailed specifications.

The compartment floors and exterior panels shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Interior compartment dividing walls shall be constructed with not less than 1/8" (.125) aluminum 3003H-14 smooth plate. Lighter gauge sheet metal will not be acceptable in these areas. Compartments shall be preformed, then positioned in van body cutout opening and bolted into final position.

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

Seams shall be welded and caulked to prevent moisture from entering the compartments. Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment. Exterior compartments shall be machine louvered in lower back wall of compartment for ventilation.

HINGED DOOR CONSTRUCTION

The exterior compartment doors shall be custom manufactured and built for each compartment. The compartment doors must be able to withstand years of rugged service and wear. For this reason, the compartment door design, metal thickness, and attachments must be strictly adhered to.

The compartment doors shall be all aluminum 3003H-14 alloy construction. The exterior panel shall be of 1/8" thickness smooth plate aluminum and the interior panel shall be of 1/8" thickness smooth plate aluminum. Lighter gauge material will NOT BE ACCEPTABLE in these areas. The double panel doors shall be 1-3/4" thick to completely enclose the door latching assembly. Doors shall have drain hole openings for drainage and ventilation.

Compartment door openings shall be sealed with closed cell automotive type rubber molding to provide a weather resistant seal around door. In addition, rubber molding shall be provided along hinge to prevent moisture entry. Open cell foam type rubber moldings are NOT ACCEPTABLE.

Hinged compartment doors shall have 14 gauge stainless steel hinge, with 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws. A polyester barrier film gasket shall be placed between stainless steel hinge and any dissimilar metals as necessary.

Drip rails shall be installed above all compartment door openings. Drip rails shall be completely removable for easy replacement if necessary.

The latching mechanism of hinged compartment doors shall include stainless steel 6" offset bent D-ring keyed handles. A gasket shall be placed between stainless steel handle and door. Door latches shall be a double catching two-point rotary slam latch, recessed inside the double panel door with striker plate.

All vertically hinged compartment doors shall have a pneumatic cylinder to hold door in the open and closed positions. Each door shall be capable of being closed without unlatching. Door checks shall be bolted to the upper compartment door header and the box pan of the door. Door checks that require unlatching by hand will NOT BE ACCEPTABLE. All horizontally hinged compartment door shall have a door check as specified with each door.

STREETSIDE COMPARTMENT - FRONT (S1)

The interior useable compartment width shall be approximately 46.50" wide.

The compartment door opening shall be approximately 41.0" wide.

This compartment shall have a pair of vertically hinged box pan style doors fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

COMPARTMENT LAYOUT

Diesel generator located in this compartment.

- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.

STREETSIDE COMPARTMENT - REAR (S2)

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

The compartment door opening shall be approximately 44.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior

color.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.

- There shall be two (2) adjustable shelf/shelves approximately 24" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edge.

- There shall be one (1) slide-out smooth aluminum vertical tool board(s) approximately 24" deep. Tool board vertical exterior edge shall have a double 90 degree formed edge to provide an easy grip handle. The top and bottom of tool board(s) shall be provided with Accuride 9300 series slide tracks. The board shall be rated for a maximum 200 lbs. evenly distributed load. Tool board shall utilize a pneumatic cylinder to hold the tool board in both the opened and closed positions.
-
- Toolboard shall be located 10" from the rear wall in this compartment.

  - The vertical tool board material shall be 3/16" (.188) 3003H-14 aluminum alloy sheet.

  - Tool board will be bolted to compartment floor.

- There shall be one (1) bolt-in vertical compartment partition provided dividing the compartment into left and right sides. The vertical partition shall be 3/16" (.188) 3003H-14 alloy smooth aluminum sheet.

Partition shall be centered in compartment to divide the compartment into two equal halves.

  - There will be one (1) pull-out tool drawer located on the compartment floor.
    The drawer will be approximately 9.0 inches high x 23.0 inches long x as wide as space permits. The drawer will have a mechanical device to hold it in the stored position. **Note:** Drawer will be designed so not to inhibit the opening of the exterior roll-up compartment doors if drawer is left unlocked.
  - Locate drawer to the forward side of the vertical partition.

- One (1) OnScene 64" Access LED compartment light, vertically mounted.

- There shall be one (1) 120 VAC outlet(s) located in compartment on the forward wall.

- There shall be one (1) approximate 4' long 120 VAC outlet strip(s) with straight blade household type outlet provided.
- Electrical strip shall be located on the forward wall of the cabinet in a vertical position.

- The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).

- Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.

CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment width shall be approximately 58.0" wide.

The compartment door opening width shall be approximately 52.0" wide.

- This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.
- The door shall be hinged across the bottom and be a drop down door.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- The hinged door(s) shall have a stainless steel 6" offset bent D-ring locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be one (1) 400 lbs. slide-out tray(s) approximately 24" deep and as wide as the compartment layout or door opening permits. The tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.

- One (1) OnScene 36" Access LED compartment light, horizontally mounted at the top of the compartment toward the door opening.

CURBSIDE COMPARTMENT - FORWARD OF REAR WHEEL (C2)

The interior useable compartment space width shall be approximately 37.0" wide.

The compartment door opening width shall be approximately 30.0" wide.

- This compartment shall have a horizontally hinged box pan style door fabricated of 1/8" thick smooth aluminum. The inner liner of the door shall be 1/8" thick smooth aluminum with an unpainted finish. The door exterior shall be painted job color.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- The hinged door(s) shall have a stainless steel 6" offset bent D-ring non-locking handle. A gasket shall be placed between handle and door. Door latches shall be a two-point rotary slam, double-catch latch, recessed inside the double panel door with striker plate.

- The hinged door(s) shall have a pair of tailgate style mechanisms to stop the door at 90 degrees. Each door shall be capable of being closed without unlatching.

- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.

- One (1) OnScene 36" Access LED compartment light, vertically mounted.

CURBSIDE COMPARTMENT - REAR (C3)

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

The compartment door opening shall be approximately 44.0" wide.

This compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum shelf-trac for specified component installation.

- There shall be one (1) 400 lbs. adjustable, slide-out tray approximately **30" deep** and as wide as the compartment layout or door opening permits. Tray top shall be fabricated from 3/16" 3003 aluminum sheet with a 3" vertical lip and welded corners to form a box type tray surface. The sliding tracks shall extend 100% of the slide length. The tray assembly shall utilize a pneumatic cylinder mounted on underside to hold the tray in both the extended and closed positions.

- **Tray shall be used to store the police departments robot.**

- There shall be one (1) 250 lbs. slide-out and tilt down tray(s) with a SlideMaster painted structural steel base approximately 30" deep and as wide as the compartment layout or door opening permits. It shall be located above the level of the chassis frame rails and will be vertically adjustable in height. Each slide base shall have a gravity latch which will lock the tray in the closed and full extension positions. Each tray shall be fabricated from 3/16" 3003 aluminum sheet and shall have welded corners to form a box type tray surface with an internal depth of approximately 3 ½".

  - There will be one (1) pull-out tool drawer located on the compartment floor. The drawer will be approximately 9.0 inches high x 28.0 inches long x as wide as space permits. The drawer will have a mechanical device to hold it in the stored position. **Note:** Drawer will be designed so not to inhibit the opening of the exterior roll-up compartment doors if drawer is left unlocked.
  -
  - There shall be a quantity of Pac-Trac brackets supplied for holding forcible entry tools, such as crow bars, pry bars, etc. Exact quantity and location to be determined by the police department during construction.

- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).

- One (1) OnScene 64" Access LED compartment light, vertically mounted.

- There shall be one (1) 120 VAC outlet(s) located in compartment on the forward wall.

- There shall be one (1) approximate 4' long 120 VAC outlet strip(s) with straight blade household type outlet provided.
- Electrical strip shall be located on the forward wall of the cabinet in a vertical position.

  - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).

  – Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.

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

Rear Center Compartment
SHOP NOTES
32" deep.

REAR COMPARTMENT RC1

Rear compartment shall be approximately 36.00" wide.

The rear compartment(s) shall be closed to both side rear compartments.

The rear center compartment shall start at the top of the frame and be as high as the body permits.

The interior useable compartment width shall be approximately 36.0" wide.

The compartment door opening shall be approximately 36.0" wide maximum.

The rear compartment shall have a ROM roll-up door.

- The roll-up door slats and the door trim components shall be painted to match the single tone exterior color.
- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.
- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.
- One (1) nylon strap shall be provided to assist in closing the door.
- A compartment threshold protection plate shall be installed on the bottom edge of the compartment door opening. The threshold protection shall be fabricated from an aluminum extrusion with an anodized exterior finish.

COMPARTMENT LAYOUT

- There shall be vertically mounted aluminum Shelf-Trac for specified component installation. Shelf-Trac extrusion shall have side extruded channels for use in mounting or securing special ancillary items, without need for drilling into body.
- There shall be one (1) 1,000 lbs. slide-out tray(s) in each specified in each rear compartment with a SlideMaster painted structural steel base approximately 48" deep and as wide as the compartment layout or door opening permits located above the level of the chassis frame rails. Each slide base shall have a gravity latch which will lock the tray in the closed and full extension positions. Each tray shall be fabricated from 3/16" 3003 aluminum sheet and shall have welded corners to form a box type tray surface with an internal depth of approximately 3 ½".

SHOP NOTES

Tray shall be used to store department's body shields. One shipped to us for a template.

- There shall be one (1) vertical partition(s) installed on tray dividing the tray into left and right sides. Each vertical partition shall be horizontally adjustable; mounted on aluminum shelf trac on tray floor.

– Two (2) OnScene 64" Access LED compartment lights, vertically mounted.

- There shall be one (1) 120 VAC outlet(s) located in compartment on the forward wall.
- There shall be two (2) approximate 4' long 120 VAC outlet strip(s) with straight blade household type outlets provided.
- Power strips shall be installed, one each side of the slideout tray for plugging the body shields into. They will be attached to a coil cord so they will slide out on the tray.

- The outlet receptacle shall be 20 amp, straight-blade (NEMA 5-20R).

The outlet shall be located in the rear compartment on the forward wall.

– Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.

ROLL-OUT AWNING CURBSIDE

A Carefree Mirage, 110 Volt AC powered, Lateral Arm Acrylic Patio Awning with Direct Response Electronics shall be installed on the apparatus body. The Direct Response Electronics includes easy-to-use controls and a Motion Detection System. The awning shall have a system to detect canopy motion, the most important element to prevent wind/weather damage. The awning shall automatically retract when the canopy reaches a certain level of movement - you determine the movement level on the control panel.

The awning shall activate the door ajar warning system in the cab when not in the stowed position.

The 110V motor shall be completely sealed and UL approved. The awning pitch shall be adjusted to up to 30"

The awning shall be 15' wide with a 10' projection. (Size refers to box length; actual fabric length will be 8" shorter.)

The Mirage shall be covered by a "Two and Four" Limited Warranty - Two years 100% parts, labor, & freight on canopy, four years 100% parts, labor, and freight on motor, electronics, roller & hardware. Warranty covers manufacturer's defects only. Wind and rain damage are not covered.

- The awning fabric color shall be ivory.

The specified awning above shall be surface mounted to upper body side. The awning shall add approximately 5.75" to body width.

AWNING HOUSING COLOR

The awnings standard Polar White vinyl housing color shall be re-painted to match body color.

ADD-A-ROOM AWNING ATTACHMENT

An enclosed area under the awning shall be provided for increased protection from the elements. The length of the Add-A-Room shall match the length of the awning.

Features of the Add-A-Room are:

- Webbing reinforced eyelets
- Nickel plated twist fasteners
- Completely reversible
- Heavy-duty zippers
- 15oz. 1000 denier reinforced Vinyl fabric
- Zippered privacy panels
- Three foot zippered door
- Storage bag

The color of the Add-A-Room shall be white.

ROOF ACCESS LADDER

The ladder shall be weld constructed of vertical aluminum extrusion tubing and aluminum grip surface ladder rungs with slip resistant tread grip pattern. It shall be set off from body 8 inches and mounted to body with chrome

plated end stanchions bolted to the body with stainless steel bolts. **The ladder shall NOT extend above the body roof.**

The location shall be on the rear curbside of the apparatus body.

STEP LIGHTS

There shall be two (2) OnScene Solutions 9" LED lights provided to illuminate the step area. The lights shall be activated when the parking brake is set.

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

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

WALK-IN INTERIOR FINISH DETAILS

DESK, CABINET, CONSOLE FINISH

All specified interior desks, cabinets, overhead cabinets, or consoles shall be fabricated from formed 1/8" 3003 H14 alloy smooth aluminum. After fabrication is completed they shall be painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

The use of wood materials or laminated surfaces in the construction of desks, cabinets, overhead cabinets, or consoles will not be allowed. There will be **No Exceptions** allowed on specified ruggedized finish.

INTERIOR SPECIFICATIONS

INTERIOR INSULATION

Following the sheet metal fabrication the roof area, upper exterior walls and the entry door of the apparatus body shall be insulated with 1-1/2" rigid polyurethane foam insulation. This insulation shall be the type that will not absorb moisture, move once in place or deteriorate. Mat type fiberglass or spray in foam insulation is not acceptable.

INTERIOR FINISH

The interior of the apparatus body shall have a fully maintenance free and durable finish. The interior finish shall be installed on the ceiling, front wall, and interior side walls from top of exterior compartments to ceiling height.

The interior panels shall be installed with sheet metal screws with gray plastic plugs covering the screws. The seams between FRP panels, interior corners, and exterior corners shall be trimmed with gray plastic molding.

The interior finish shall be pearl gray pebble grain FRP.

WALK-IN FLOOR FINISH

The walk in floor of the apparatus body shall have a fully maintenance free and durable finish. The interior finish shall be comprised of Scorpion Liner installed throughout the floor up to the kick-plate height.

The interior finish shall be colored to match the cab interior as closely as possible.

AIR CONDITIONER - HEATER

One (1) Dometic Penguin, model 641835 low profile, 120 VAC, 60 cycle, single phase air conditioner(s) shall be provided and installed on the body roof. The unit shall be a roof top contemporary contoured integral evaporator/condenser type with built-in heating elements.

Each unit shall be rated at minimum of 13,500 BTU cooling capacity with a heating element rated at 5,600 BTU.

A three-speed fan shall supply a maximum/minimum of 335/250 cfm air flow capacity.

The roof mounted air conditioner shall be approximately 9.5" high x 29" wide x 40" long and weigh approximately 96 pounds.

BODY HEATER (ELECTRIC)

A Broam model 174 or equal, 120v wall mount electric heater shall be provided, with a 1500w BTU rating.
A remote thermostat control shall also be included with this heater. Shall be located near the driver's seat.

INTERIOR SMOKE/CO ALARMS

One (1) combination smoke/CO alarm(s) shall be provided, one (1) per interior room.

There shall be a manual type switch located in the cab that shall allow you to switch from the 120v body heater over to the 120v body A/C system when the shoreline is plugged in.

STREETSIDE INTERIOR AREA (IS1)

- There shall be two (2) full height cabinet(s) provided on interior. Cabinet(s) shall be constructed of 1/8" smooth finish aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray. Each cabinet shall be approximately 40" high x 24" deep.

- There shall be two (2) 1,000 lbs. slide-out tray(s) with a SlideMaster painted structural steel base approximately 24" deep and as wide as the compartment layout or door opening permits located below the level of the chassis frame rails. Each slide base shall have a gravity latch which will lock the tray in the closed and full extension positions. Each tray shall be fabricated from 3/16" 3003 aluminum sheet and shall have welded corners to form a box type tray surface with an internal depth of approximately 3 ½".

- One (1) OnScene 63" Night Axe LED compartment light, vertically mounted.

    - The above cabinet(s) shall have a ROM roll-up door, with un-painted finish.

- The roll-up door shall have an unpainted satin aluminum finish on the door slats and the door trim components.

- The door shall be equipped with a CPI harsh environment mechanical type door ajar switch located inside compartment interior lower door track.

- A keyed cylinder lock shall be provided in the bottom portion of the roll-up door.

Interior cabinet(s) shall be provided with storage for department mobile arsenal with proper restraints and security. Arsenal storage for rifle size weapons with individual adjustment and lock for each weapon.

Rack shall be capable of holding the following weapons:

-(19) M-4 rifles
-(5) M-16 rifles
-(2) gas launchers

INTERIOR WORK CABINET

There shall be an interior work cabinet located on the streetside interior. Cabinet shall be fabricated from 1/8" aluminum.
Cabinet shall be approximately 41.5" wide x 28" high x 21" deep. It shall be designed to hold the customers installed toolbox. (which will be mounted on top of the cabinet). Size of toolbox is 41" wide x 22" high x 20" deep.

Work cabinet shall have (2) two vertically hinged doors with a retaining latch.
There shall be (2) two adjustable shelves installed inside the cabinet with a 1" high lip on outside to prevent anything from falling off.

Work cabinet shall have a hammertone gray powerd coated finish to match rest of interior cabinets.

There shall be two (2) 120v 15a electric power strips installed inside the streetside interior work cabinet. Power strip shall be a minimum of (4) outlets.
Power strips shall be mounted in a vertical position against the back wall of the cabinet, one in each corner.
Shall be wired thru both the generator and the shoreline.

There shall be (1) 120v 20A duplex electrical outlet installed up high on the inside of the storage cabinet in the streetside interior of the van. This outlet will be used for plugging in the (2) 2' power strips.

Outlet shall be wired thru the shoreline and the generator.

CURBSIDE INTERIOR AREA (IC1)

INTERIOR FLIP-UP SEAT

The interior body walkway on the curbside shall be provided with a squad bench seat along the side wall. The seat shall be approximately 60" wide to hold two (2) personnel and have a flip-up bottom cushion. The seat shall be fabricated of 3/4" exterior grade plywood with 3" thick foam and Duraware heavy duty fabric covering. The seat backrest shall be approximately 12" high x 2" thick and constructed the same as the seat. Two (2) automotive style lap type seat belts shall be installed.

CURBSIDE INTERIOR AREA (IC2)

- The interior deck area over the top of the exterior side compartments shall be un-painted smooth aluminum.
- There shall be one (1) 120 volt outlet(s) located in the walk-in area of the body.
    - The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).

- Outlet(s) shall be powered by both the on-board generator and shore power system through a relay system.

There shall be a two (2) of 120v 20a fourplex outlet boxes installed on the curbside van interior. They shall be located directly above the workdesk, one each side.

Outlets shall be wired thru generator and shoreline.

The (6) 120v electrical outlets shall be located as follows:

(1) behind each divider that stores a Pelican case on the curbside interior of the van. It shall be up high so each Pelican case can be plugged in. There are (4) Pelican cases and (1) spare outlet included.

(1) shall be located just forward of the flip up seat on the interior wall of the van on the curbside between the E-Tracks.

All wired thru shoreline and generator.

There shall be two (2) hi-voltage USB ports installed by the workbench on the curbside interior of the van.

There shall be two (2) low-voltage USB ports installed by the workbench on the curbside interior of the van.

12 VDC ACCESSORY PLUG

There shall be three (3) 12 volt accessory plug(s) furnished and installed in the van area. Location of accessory plugs will be above the countertop worksurface on the curbside, evenly spaced.

CURBSIDE COUNTERTOP WORK SURFACE

There shall be a countertop worksurface with a slideout drawer installed on the curbside interior of the body just to the rear of the fold up seat area.

Worksurface shall be approximately 43" above the van floor. Below the worksurface there shall be a slideout storage drawer. Drawer shall be approximately 6" high x as wide and as deep as possible.
Size of the countertop shall be approximately 42" wide x 24" deep.

Countertop shall have a gray hammertone powder coated finish.
NOTE: the area below the countertop shall be used to store customers Pelican cases.

There shall be (4) four vertical stationary dividers installed under the countertop located on the curbside of the van interior.
Dividers shall be for seperating (4) customer installed Pelican cases. Case size is: 22" high x 15" deep x 8" wide.
Dividers shall be fabricated from 1/8" aluminum and be painted to match the rest of the interior cab compartments.

There shall be an On-Scene nylon retaining strap to be installed across the opening to retain all (4) Pelican Cases in the divided areas.

There shall be a total of (3) D-ring tie downs installed onto the side wall evenly spaced by the cargo E-tracks.

INTERIOR CENTER REAR AREA

There shall be a 1" hinged retaining lip installed across the upper open storage area on the inside of the van in the area above the rear RC1 compt. Lip shall be made to "drop down" for easy access of future storage cargo.

There shall be 1" nylon cargo netting installed over the opening of the upper storage area. Netting shall be attached across the top, and be a drop down style.

There shall be a stainless steel handrail, approximately 12' long running front to rear, mounted to the interior van ceiling. Handrail shall be mounted offset of the center towards the curbside.

There shall be a set of E-Tracks mounted to the side wall on the interior of the van, forward of the flip up seat. Tracks shall be mounted horizontally on the wall.

LOW VOLTAGE ELECTRICAL SYSTEM- 12 VDC

General

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

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

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

Wiring

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

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

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

Wiring and Wire Harness Construction

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

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

installations exposed to higher temperatures. The overall covering of jacketed cables shall be moisture resistant and have a minimum continuous temperature rating of 194°F (90°C), except where good engineering practice dictates special consideration for cable installations exposed to higher temperatures.

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

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

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

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

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

- SAE J156, *Fusible Links*

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

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

Power Supply

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

Minimum Continuous Electrical Load

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

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

hydraulic pumps
6) Other warning devices and electrical loads defined by the purchaser as critical to the mission of the apparatus

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

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

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

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

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

Electromagnetic Interference

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

Wiring Diagram

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

Low Voltage Electrical System Performance Test

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

12 VOLT DIAGNOSTIC RELAY CONTROL CENTER

The 12 volt power distribution shall be conveniently located with easy access for service. All relays and circuit breakers shall be plug-in type allowing for removal for repairs without necessitating soldering or tools. The sockets mounts for both the relays and circuit breakers shall be of a design that permits the use of standard automotive type components.

The 12 volt distribution panel shall utilize printed circuit boards mounted in high strength enclosure. Each printed circuit board shall be provided with twelve (12) heavy duty independent switching relays. Each relay shall have the ability to be configured either normally open or normally closed and be protected by a 20 amp automatic reset breaker. Each circuit will be provided with a LED for visual diagnostic.

Power distribution panel shall be located in apparatus body within a protected enclosure with removable or hinged cover.

ROCKER SWITCH PANEL

The control of the 12 volt equipment installed on chassis and body shall be centrally located in the cab. The individual rocker style switches shall be located on a separate electrical panel, complete with backlit name tags describing function of each individual switch. The back lighting shall have two (2) levels of intensity, low level lights activated when the vehicle lights or ignition switch is turned "On", and high level lights activated when individual switch is turned "On". An internally lighted rocker switch shall be furnished to the left of specified emergency lighting switches, and identified as "MASTER EMERGENCY SWITCH".

Switch circuitry shall be on a printed circuit board. The lights shall be solid state type and have a 100,000 hour life span.

Rocker switches shall be supplied on the dash to control the following:
(1) for Frt Scene Lights
(1) for Rear Scene
(1) for the L/S scene
(1) for the R/S scene
(2) Spare switches

The rocker switch panel shall be located in the cab center console for all master switches and emergency light switches.

CAB CONSOLE

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

The rear portion of the console shall be provided with open top storage for notebooks or maps. Two (2) adjustable dividers shall be provided in the storage area. The forward portion of console shall be slanted for mounting of siren head, radio or 12 volt control panel, and etc, with easy access to both Driver and Officer.

The final design of console shall be determined by the City of Boston Police Department at the pre-construction meeting.

BATTERY SYSTEM

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

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

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

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

A master load disconnect switch shall be provided between the starter solenoid(s) and the remainder of the electrical loads on the apparatus. The starter solenoids shall be connected directly to the batteries.

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

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

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

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

BATTERY SWITCH

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

BATTERY SOLENOID

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

BATTERY CONDITIONER

One (1) Kussmaul LPC 80, model #091-206-12 battery charger, with 120 VAC input and 80 amp, 12 volt output shall be provided. This system shall monitor the condition of batteries and provide an electrical current at variable rates to overcome battery failure. A display shall be provided with charge indicator, remote mounted.

SHORE POWER INLET

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

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

CAB HAZARD WARNING LIGHT

A red flashing or rotating light, located in the driving compartment, shall be illuminated automatically whenever the vehicles parking brake is not fully engaged and any of the following conditions exist:

8) Any passenger or equipment compartment door is not closed.
- Any ladder or equipment rack is not in the stowed position.
- Stabilizer system is not in its stowed position.

- Powered light tower is not stowed.
- Any other device permanently attached to the apparatus is open, extended, or deployed in a manner that is likely to cause damage to the apparatus if the apparatus is moved.

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

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

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

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

BACK-UP ALARM

The body manufacturer shall furnish and install one (1) 107 dB(A) electronic back-up alarm. Back-up alarm to actuate automatically when the transmission gear selector is placed in reverse.

REAR VIEW CAMERA

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

The camera image shall be displayed on a model AOM713, 7" color flat panel display (up to 3 camera inputs) located within the driver's range of view.

INTERIOR LED LIGHTS

Four (4) OnScene Solution model #70152, 10” x 6” x 7/8”, 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided in van interior. Each light shall be individually switched with a high/low intensity setting. In addition light(s) will be capable of a five (5) second delay after switching off.

Locate lights as follows: (1) to be located above the workstation on the curbside, (1) located above the gun rack, (2) shall be evenly spaced in the van ceiling.

ELECTRONIC SIREN

One (1) Federal /Unitrol Omega 5000 siren controller shall be provided in the cab within easy reach of the Driver. An Omega model 90 remote mounted universal 100/200 watt siren/PA amplifier shall also be provided. Siren power shall be wired throught the master warning light switch.

A Unitrol noise canceling type microphone shall be provided for the PA system.

There shall be an auxillary siren installed. One Federal model "Rumbler" to be installed in the front bumper. Locate the control head on the cab dash.

SIREN SPEAKER

Two (2) Federal Signal model ES100, 100 watt siren speakers shall be provided with model ESFMT polished trim ring recess mounted, one (1) on the streetside and one (1) on the curbside of the front bumper.

SIDE SCENE LIGHTS

There shall be four (4) Whelen 810 series (10" x 8") surface mounted Opti-Scene halogen lights (810CA0ZR) provided on the upper body. Light quantity shall be divided equally per side. Each light will have an 8-32 degree lens and chrome flange.

Two (2) switches shall be provided, one (1) for the streetside scene lights, and one (1) for the curbside scene lights.

The lights shall be switched at the 12 volt control panel in the cab.

REAR SCENE LIGHTS

Two (2) Whelen 810 series (10" x 8") surface mounted Opti-Scene halogen lights (810CA0ZR) shall be provided on the upper rear body to light the work area immediately behind the vehicle to a level of at least 3 fc (30 lx) within a 10 ft × 10 ft (3 m × 3 m) square. Each light will have a 8-32 degree lens and chrome flange.

The lights shall be switched at the 12 volt control panel in the cab.

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

WARNING LIGHT PACKAGE

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

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

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

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

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

The optical warning system on the fire apparatus shall be capable of two (2) separate signaling modes during emergency operations. One (1) mode shall signal to drivers and pedestrians that the apparatus is responding to an emergency and is calling for the right-of-way. One (1) mode shall signal that the apparatus is stopped and is

blocking the right-of-way. The use of some or all of the same warning lights shall be permitted for both modes provided the other requirements of this chapter are met.

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

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

UPPER LEVEL OPTICAL WARNING DEVICES

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

ZONE A - FRONT WARNING LIGHTS

There shall be one (1) Whelen Edge FN60VLED LED 60" lightbar permanently mounted to the cab roof.

The lightbar configuration (streetside to curbside) shall be:

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

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

The lightbar shall be separately switched at the siren control head in the cab console.

ZONES B AND D - SIDE WARNING LIGHTS

UPPER REAR CORNER WARNING LIGHTS

There shall be two (2) Whelen 600 series (6" x 4") blue Linear Super-LED lights (60B02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Whelen 600 series (6" x 4") blue Linear Super-LED lights (60B02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

LOWER LEVEL OPTICAL WARNING DEVICES

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

The optical center of the lower-level optical warning devices at the rear of the vehicle shall be mounted on or behind the rear axle centerline and as close to the rear corners of the apparatus as is practical. The optical center of any lower-level device shall be between 18 in. and 62 in. (460 mm and 1600 mm) above level ground for large apparatus, and 18 in. and 48 in. (460 mm and 1220 mm) above level ground for small apparatus.

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

ZONE A - FRONT WARNING LIGHTS

There shall be two (2) Whelen TIR3 series red Linear Super-LED lights provided, one (1) each side. Each light shall have a clear lens and chrome flange.

There shall be two (2) Whelen TIR3 series blue Linear Super-LED lights provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

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

There shall be two (2) Whelen 600 series (6" x 4") blue Linear Super-LED lights (60B02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

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

There shall be two (2) Whelen 600 series (6" x 4") blue Linear Super-LED lights (60B02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Whelen 600 series (6" x 4") blue Linear Super-LED lights (60B02FCR) provided, one (1) each side. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the siren control head in the cab console.

COMPARTMENT INTERIOR FINISH

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

REFLECTIVE STRIPE REQUIREMENTS

This unit is non NFPA compliant. No Striping required.

GRAPHICS PROOF
No SVI supplied graphics required.

LETTERING

N/A

GRAPHICS PROOF

No Graphics required.

UPPER BODY SIDE LETTERING

No Lettering: Required

LINE VOLTAGE ELECTRICAL SYSTEM

DIESEL GENERATOR

An Onan model 8HDKAU, diesel driven generator shall be installed on the vehicle. The generator shall be installed so that fumes, vapors, heat, and vibrations do not enter the driving or crew compartment. The generator shall be rated at 8,000 watts at 120 VAC, 66 amps, single phase. Current frequency shall be stable at 60 hertz.

Generator features shall include:

- 3-cylinder diesel engine
- Permanent magnet alternator
- Digital voltage regulation with no adjustments required
- Integral enclosed muffler
- USDA approved spark arrestor
- Internal radiator
- Sound insulated cover
- Intake silencer
- Heavy-duty air cleaner
- Maintenance-free electronic governor
- Fused DC circuits
- Automotive type starter
- Overvoltage, low oil pressure, overtemp, overspeed, and overload safeties
- 10 A battery charging
- Hourmeter
- Waterproof connector for remote operation
- Electric fuel pump
- Fuel filter
- Full flow oil filter
- Automatic timed glow plugs for quick easy start

Overall size of generator shall be 36" L x 24" W x 22" H and weigh 420 lbs.

Generator shall be equipped with a high temperature automatic shutdown system and a low oil (pressure or level) automatic shutdown system.

The generator shall be installed in accordance with the generator manufacturer's requirements for ventilation and service accessibility.

If the generator is installed in a compartment and the compartment doors must be open during its operation, the generator shall be equipped with an interlock system to prevent its operation if the doors are not open, or the compartment shall be equipped with a high temperature alarm.

If the generator is installed in a compartment on a slide tray and the slide tray must be in the extended or out position during operation, an interlock shall be provided to prevent operation unless the tray is in the correct position, or the compartment shall be equipped with a high temperature alarm.

Permanently installed generators shall have readily accessible engine oil drain provisions or piping to a remote location for oil changing.

If the generator is located in a position on the vehicle where the operator cannot see the instrumentation and operate the controls while standing at ground level or positioned at a specifically designated operator station, an operating panel with the required instrumentation, start and stop controls, and other controls necessary for safe operation shall be provided at a remote operator's panel.

GENERATOR BONDING

A minimum of four (4) 16" x 2 gauge copper ground straps shall be bolted to body sub-frame and chassis sub-frame for proper bonding of high voltage system. The conductor shall have a minimum amperage rating, as defined in 310.15, "Ampacities for Conductors Rated 0–2000 Volts," of *NFPA 70*, of 115 percent of the rated amperage on the power source specification label.

WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Onan's written instructions, Onan warrants that the CMQD Quiet Diesel Series Generators shall be free from defects in material and workmanship for a period of two (2) years or two thousand (2,000) hours, whichever comes first, from the date of delivery to the first purchaser.

GENERATOR MOUNTING

The generator shall be mounted in a lower exterior compartment on rubber vibration isolators. The compartment shall be reinforced where necessary to hold weight of generator. A valve shall be provided on the generator oil drain outlet and piped to underside of generator compartment with flexible hose and plug. The drain shall be located where easily accessible for generator service.

FUEL SYSTEM

The generator fuel system shall be plumbed to the chassis main fuel tank. A separate fuel line shall be installed directly from the tank, not connected to the truck engine fuel line system. The generator fuel line shall be properly protected and secured inside of chassis frame. A shut-off valve shall be provided between the generator and fuel line as it enters the compartment.

Fuel lines shall be protected from chafing at all wear points. If the fuel source is shared with the apparatus engine, a separate fuel pickup system shall be provided that is arranged to ensure that the generator cannot utilize more than 75 percent of the fuel tank capacity.

STARTING SYSTEM

The generator starting system shall be powered by chassis battery system with heavy duty stranded copper cables. The starter line shall by-pass the chassis master switch to permit generator operation when the apparatus engine is not running. This starter line shall be of sufficient size for the generator, adequately protected and supported inside the chassis frame area.

EXHAUST SYSTEM

The generator exhaust system shall be equipped with a residential type muffler for maximum quieting, and black iron rigid pipe to link the generator to the muffler.

The exhaust piping and discharge shall be located or shielded to prevent thermal damage to the apparatus or equipment. The exhaust shall be piped to the exterior of the vehicle and discharged at a location away from any operator’s position.

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

Silencing devices shall be provided and shall not create exhaust back pressure that exceeds the limits specified by the engine manufacturer.

MANUALS AND SCHEMATICS

Two (2) complete manuals on parts list, maintenance, wiring schematics, hydraulic schematics, circuit boards, voltage regulator board and other components shall be provided on delivery.

GENERATOR CONTROLS

Generator controls shall be provided at the generator.

GENERATOR CONTROLS

In addition to generator controls provided at the generator, there shall be controls provided in the cab near the 12 volt control panel. The following controls shall be provided:

- One (1) pre-heat switch (if generator is diesel).
- One (1) start/stop switch.
- One (1) generator running indicator light.

LOADCENTER

The loadcenter shall be a Cutler Hammer, BR Series, specifically designed for protection and distribution of 120/240 volt AC, such as lighting and small motor branch circuits. The loadcenter enclosure shall be made of 16 gauge galvanized sheet steel. The galvanized coating provides corrosion protection and as such does not require paint. All trims used on the BR Loadcenter shall be chromate sealed and finished with electro disposition epoxy paint (ASA61) which exceeds requirements for outdoor and indoor applications. A combination surface/flush cover with integral door shall be supplied.

The loadcenter shall be UL/CSA listed, **NO EXCEPTIONS** will be allowed.

No main breaker will be provided, the main breaker will be supplied on the specified generator.

GENERATOR MONITORING PANEL

To properly monitor the generator performance and load demand during operation, the generator installation shall be equipped with a full instrument monitor panel.

- Generator frequency in hertz
- Line 1 current in amperes
- Line 2 current in amperes
- Generator voltage in volts

The program shall support the accumulation of elapsed generator hours. Generator hours shall be displayed.

SHORE POWER INLET - BATTERY CHARGER

The above mentioned shore power inlet, and battery conditioner shall be specified in the 12 volt section.

There shall be an additional auxillary 30a manual shoreline installed on the chassis, adjacent to the main shoreline.
The second shoreline shall be dedicated to operate the thermastically controlled van heater only.

OUTLETS AND CIRCUITS

The generator and or shore power shall supply the 120/240 volt electrical equipment and outlets outlined below. Proper circuit protection shall be installed as noted:

Exterior Outlet: 120 VAC

- The outlet receptacle(s) shall be 20 amp, straight-blade (NEMA 5-20R).

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- Outlet locations to be as follows:
- (1) each side by van fenders
- (2) on the rear of the van exterior, one high on curbside, one low on the streetside
- All wired thru generator only.

LINE VOLTAGE ELECTRICAL SYSTEM

GENERAL REQUIREMENTS

Stability

Any fixed line voltage power source producing alternating current (ac) shall produce electric power at 60 Hz, ±3 Hz when producing power at all levels between no load and full rated power. Any fixed line voltage power source shall produce electric power at the rated voltage ±10 percent when producing power at all levels between no load and full rated power.

The maximum voltage supplied to portable equipment shall not exceed 275 volts to ground. Higher voltage shall be permitted only when used to operate fixed wired, permanently mounted equipment on the apparatus.

Conformance with National Electrical Code

All components, equipment, and installation procedures shall conform to *NFPA 70*, *National Electrical Code*, except where superseded by the requirements of this chapter. Where the requirements of this chapter differ from those in *NFPA 70*, the requirements in this chapter shall apply.

Where available, line voltage electrical system equipment and materials included on the apparatus shall be listed and used only in the manner for which they have been listed. All equipment and materials shall be installed in accordance with the manufacturer's instructions.

Location Ratings

Any equipment used in a dry location shall be listed for dry locations. Any equipment used in a wet location shall be listed for wet locations.

Any equipment, except a PTO-driven generator, used in an underbody or under chassis location that is subject to road spray shall be either listed as Type 4 or mounted in an enclosure that is listed as Type 4.

If a PTO-driven generator is located in an underbody or under chassis location, the installation shall include a shield to prevent road spray from splashing directly on the generator.

Grounding

Grounding shall be in accordance with 250.34(A) and 250.34(B) of *NFPA 70*. Ungrounded systems shall not be used.

Only stranded or braided copper conductors shall be used for grounding and bonding.

The grounded current-carrying conductor (neutral) shall be insulated from the equipment-grounding conductors and from the equipment enclosures and other grounded parts.

The neutral conductor shall be colored white or gray in accordance with 200.6, “Means of Identifying Grounded Conductors,” of *NFPA 70*.

Any bonding screws, straps, or buses in the distribution panel board or in other system components between the neutral and equipment-grounding conductor shall be removed and discarded.

Bonding

The neutral conductor of the power source shall be bonded to the vehicle frame. The neutral bonding connection shall occur only at the power source. In addition to the bonding required for the low voltage return current, each body and each driving or crew compartment enclosure shall be bonded to the vehicle frame by a copper conductor.

The conductor shall have a minimum amperage rating, as defined in 310.15, “Ampacities for Conductors Rated 0–2000 Volts,” of *NFPA 70*, of 115 percent of the rated amperage on the power source specification label.

A single conductor that is sized to meet the low voltage and line voltage requirements shall be permitted to be used.

Ground Fault Circuit Interrupters

In special service vehicles incorporating a lavatory, sink, toilet, shower, or tub, 120 V, 15 or 20 A receptacles within 6 ft (1.8 m) of these fixtures shall have ground fault circuit interrupter (GFCI) protection. GFCIs integrated into outlets or circuit breakers or as stand-alone devices shall be permitted to be used in situations.

Power Source General Requirements

All power source system mechanical and electrical components shall be sized to support the continuous duty nameplate rating of the power source.

The power source shall be shielded from contamination that would prevent the power source from operating within its design specifications.

Power Source Rating

For power sources of 8 kW or larger, the power source manufacturer shall declare the continuous duty rating that the power source can provide when installed on fire apparatus according to the manufacturer’s instructions and run at 120°F (49°C) air intake temperature at 2000 ft (600 m) above sea level.

The rating on the power source specification label shall not exceed the declared rating from the power source manufacturer.

Access shall be provided to permit both routine maintenance and removal of the power source for major servicing. The power source shall be located such that neither it nor its mounting brackets interfere with the routine maintenance of the fire apparatus.

Instrumentation

If the power source is rated at less than 3 kW, a “Power On” indicator shall be provided. If the power source is rated at 3 kW or more but less than 8 kW, a voltmeter shall be provided.

If the power source is rated at 8 kW or more, the following instrumentation shall be provided at an operator’s panel:

- Voltmeter
- Current meters for each ungrounded leg

1) Frequency (Hz) meter
2) Power source hour meter

The instrumentation shall be permanently mounted at an operator’s panel. The instruments shall be located in a plane facing the operator. Gauges, switches, or other instruments on this panel shall each have a label to indicate their function.

The instruments and other line voltage equipment and controls shall be protected from mechanical damage and not obstructed by tool mounting or equipment storage.

An instruction plate(s) that provides the operator with the essential power source operating instructions, including the power-up and power-down sequence, shall be permanently attached to the apparatus at any point where such operations can take place.

Operation

Provisions shall be made for placing the generator drive system in operation using controls and switches that are identified and within convenient reach of the operator.

Where the generator is driven by the chassis engine and engine compression brakes or engine exhaust brakes are furnished, they shall be automatically disengaged for generator operations.

Any control device used in the generator system power train between the engine and the generator shall be equipped with a means to prevent unintentional movement of the control device from its set position in the power generation mode.

If there is permanent wiring on the apparatus that is designed to be connected to the power source, a power source specification label that is permanently attached to the apparatus at the operator’s control station shall provide the operator with the information required.

The power source, at any load, shall not produce a noise level that exceeds 90 dBA in any driving compartment, crew compartment, or onboard command area with windows and doors closed or at any operator’s station on the apparatus.

Power Supply Assembly

The conductors used in the power supply assembly between the output terminals of the power source and the main over current protection device shall not exceed 12 ft (4 m) in length.

All power supply assembly conductors, including neutral and grounding conductors, shall have an equivalent amperage rating and shall be sized to carry not less than 115 percent of the amperage of the nameplate current rating of the power source.

If the power supply assembly connects to the vibrating part of a generator (not a connection on the base), the conductors shall be flexible cord or other fine-stranded conductors enclosed in metallic or nonmetallic liquid tight flexible conduit rated for wet locations and temperatures not less than 194°F (90°C).

Overcurrent Protection

Manually resettable over current devices shall be installed to protect the line voltage electrical system components.

Power Source Protection

A main over current protection device shall be provided that is either incorporated in the power source or connected to the power source by a power supply assembly.

The size of the main over current protection device shall not exceed 100 percent of the rated amperage stated on the power source specification label or the rating of the next larger available size over current protection device, where so recommended by the power source manufacturer.

If the main over current protection device is subject to road spray, the unit shall be housed in a Type 4–rated enclosure.

Branch Circuit Overcurrent Protection

Over current protection devices shall be provided for each individual circuit and shall be sized at not less than 15 amps in accordance with 240.4, “Protection of Conductors,” of *NFPA 70*.

Any panel board shall have a main breaker where the panel has six or more individual branch circuits or the power source is rated 8 kW or larger.

Each over current protection device shall be marked with a label to identify the function of the circuit it protects.

Dedicated circuits shall be provided for any large appliance or device (air conditioning units, large motors, etc.) that requires 60 percent or more of the rated capacity of the circuit to which it is connected, and that circuit shall serve no other purpose.

Panelboards

All fixed power sources shall be hardwired to a permanently mounted panel board unless one of the following conditions exists:

3) All line voltage power connections are made through receptacles on the power source and the receptacles are protected by integrated over current devices.
4) Only one circuit is hardwired to the power source, which is protected by an integrated over current device.

The panel shall be visible and located so that there is unimpeded access to the panel board controls. All panel boards shall be designed for use in their intended location. The panel(s) shall be protected from mechanical damage, tool mounting, and equipment storage.

Where the power source is 120/240 V and 120 V loads are connected, the apparatus manufacturer or line voltage system installer shall consider load balancing to the extent that it is possible.

Wiring Methods

Fixed wiring systems shall be limited to the following:

1) Metallic or nonmetallic liquid tight flexible conduit rated at temperatures not less than 194°F (90°C) with stranded copper wire rated for wet locations and temperatures not less than 194°F (90°C)
2) Type SOW, SOOW, SEOW, or SEOOW flexible cord rated at 600 V and at temperatures not less than 194°F (90°C)

Electrical cord or conduit shall 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 and shall be arranged as follows:

1) Separated by a minimum distance of 12 in. (300 mm) from exhaust piping or shielded from such piping
2) Separated from fuel lines by a minimum distance of 6 in. (150 mm)

A means shall be provided to allow “flexing” between the driving and crew compartment, the body, and other areas or equipment whose movement would stress the wiring.

Electrical cord or conduit shall be supported within 6 in. (150 mm) of any junction box and at a minimum of every 24 in. (600 mm) of run.

Supports shall be made of nonmetallic materials or of corrosion-resistant or corrosion-protected metal. All supports shall be of a design that does not cut or abrade the conduit or cord and shall be mechanically fastened to the apparatus.

Only fittings and components listed for the type of cord or conduit being installed shall be used.

Splices shall be made only in a listed junction box.

Additional Requirements for Flexible Cord Installations

Where flexible cord is used in any location where it could be damaged, it shall be protected by installation in conduit, enclosures, or guards.

Where flexible cord penetrates a metal surface, rubber or plastic grommets or bushings shall be installed.

Wiring Identification

Each line voltage circuit originating from the main panel board shall be identified.

The wire or circuit identification either shall reference a wiring diagram or wire list or shall indicate the final termination point of the circuit.

Where prewiring for future power sources or devices exists, the un-terminated ends shall be marked with a label showing their wire size and intended function.

Wiring System Components

Only stranded copper conductors with an insulation rated for temperatures of at least 194°F (90°C) and wet locations shall be used. Conductors in flexible cord shall be sized in accordance with Table 400.5(A) of *NFPA 70*. Conductors used in conduit shall be sized in accordance with 310.15, “Ampacities for Conductors Rated 0–2000 Volts,” of *NFPA 70*. Aluminum or copper-clad aluminum conductors shall not be used.

All boxes shall conform to and be mounted in accordance with Article 314, “Outlet, Device, Pull, and Junction Boxes; Conduit Bodies; Fittings; and Manholes,” of *NFPA 70*. All boxes shall be accessible using ordinary hand tools. Boxes shall not be permitted behind welded or pop-riveted panels.

The maximum number of conductors permitted in any box shall be in accordance with 314.16, “Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies,” of *NFPA 70*.

All wiring connections and terminations shall provide a positive mechanical and electrical connection. Connectors shall be installed in accordance with the manufacturer’s instructions. Wire nuts or insulation displacement and insulation piercing connectors shall not be used.

Each switch shall indicate the position of its contact points (i.e., open or closed) and shall be rated for the continuous operation of the load being controlled. All switches shall be marked with a label indicating the function of the switch. Circuit breakers used as switches shall be “switch rated” (SWD) or better. Switches shall simultaneously open all associated line voltage conductors. Switching of the neutral conductor alone shall not be permitted.

Line voltage circuits controlled by low voltage circuits shall be wired through properly rated relays in listed enclosures that control all non-grounded current-carrying conductors.

Receptacles and Inlet Devices

Wet and Dry Locations

All wet location receptacle outlets and inlet devices, including those on hardwired, remote power distribution boxes, shall be of the grounding type, provided with a wet location cover, and installed in accordance with Section 406.8, “Receptacles in Damp or Wet Locations,” of *NFPA 70*.

All receptacles located in a wet location shall be not less than 24 in. (600 mm) from the ground. Receptacles on off road fire apparatus shall be a minimum of 30 in. (750 mm) from the ground. All receptacles located in a dry location shall be of the grounding type and shall be at least 12 in. (300 mm) above the interior floor height. No receptacle shall be installed in a face-up position.

The face of any wet location receptacle shall be installed in a plane from vertical to not more than 45 degrees off vertical.

Receptacle Label

Each receptacle shall be marked with a label indicating the nominal line voltage (120 volts or 240 volts) and the current rating in amps of the circuit. If the receptacle is DC or other than single phase, that information shall also be marked on the label.

All receptacles and electrical inlet devices shall be listed to UL 498, *Standard for Safety Attachment Plugs and Receptacles*, or other recognized performance standards.

Receptacles used for DC voltages shall be rated for DC service.

Wiring Schematics

An "As-Built" Wiring diagrams for line voltage systems shall be provided to include the following information;

1) Pictorial representations of circuit logic for all electrical components and wiring
2) Circuit identification
(a) Connector pin identification
(b) Zone location of electrical components
(c) Safety interlocks
(d) Alternator–battery power distribution circuits
(e) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems