SPECIFICATIONS FOR AIR/LIGHT UNIT FOR SURREY FIRE DEPT

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LIABILITY INSURANCE

Bidder shall furnish with the bid a certificate of insurance for;

Workman's Compensation and Employer's Liability Insurance covering for all employees.

General Liability (each occurrence) of $1,000,000.00. General Aggregate coverage of $2,000,000.00. Products Completed / Operations Aggregate coverage of $2,000,000.00. Medical Expense coverage of $5,000 (any one person). Personal Injury of $1,000,000.00.

Automobile liability of $1,000,000.00 combined single limit (each accident), including any auto, all owned autos, scheduled autos, hired autos, non-owned autos, and garage liability.

Excess Umbrella Liability coverage of $4,000,000.00 each occurrence, Aggregate of $4,000,000.00.
Garage Keepers Liability coverage of $4,500,000.00 combined limit.

All insurance policies must be;

- Maintained for the life of the contract,
- Must provide ten (10) days notice before cancellation,
- Must cover all operations of the contractor, or anyone employed by them.

INTERNET IN-PROCESS SITE

The Bidder shall post and maintain a website where the Surrey Fire 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.

VEHICLE STABILITY SUPPLIED WITH CAB/CHASSIS

The cab/chassis shall be equipped with a stability control system. The system shall have, at a minimum, a steering wheel position sensor, a vehicle yaw sensor, a lateral accelerometer and individual wheel brake controls.

ROADABILITY

The apparatus, when loaded to its estimated in-service weight, shall be capable of the following performance while on dry, paved roads that are in good condition:

1) From a standing start, the apparatus shall be able to attain a speed of 35 mph (55 km/hr) within 25 seconds on a level road.
2) The apparatus shall be able to attain a minimum top speed of 50 mph (80 km/hr) on a level road.
3) The apparatus shall be able to maintain a speed of at least 20 mph (32 km/hr) on any grade up to and including 6 percent.

The maximum top speed of fire apparatus with a GVWR over 26,000 lb (11,800 kg) shall not exceed either 68 mph (105 km/hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

If the combined water tank and foam agent tank capacities on the fire apparatus exceed 1250 gal (4732 L), or the GVWR of the vehicle is over 50,000 lb (22,680 kg), the maximum top speed of the apparatus shall not exceed either 60 mph (85 km/ hr) or the manufacturer's maximum fire service speed rating for the tires installed on the apparatus, whichever is lower.

SERVICEABILITY

The fire apparatus shall be designed to allow the manufacturer's recommended routine maintenance checks of lubricant and fluid levels to be performed by the operator without lifting the cab of a tilt-cab apparatus or without the need for hand tools.

Where special tools are required for routine service on any component of the apparatus, such tools shall be provided with the apparatus.

Apparatus components that interfere with repair or removal of other major components shall be attached with fasteners, such as cap screws and nuts, so that the components can be removed and installed with ordinary hand tools. These components shall not be welded or otherwise permanently secured into place.

CONSTRUCTION DOCUMENTATION

The contractor shall supply, at the time of delivery, at least one (1) copy of the following documents:

The manufacturers record of apparatus construction details, including the following information:

4) Owner's name and address
5) Apparatus manufacturer, model, and serial number
6) Chassis make, model, and serial number
   a) GAWR of front and rear axles and GVWR
   b) Front tire size and total rated capacity in pounds (kilograms)
   c) Rear tire size and total rated capacity in pounds (kilograms)
   d) Chassis weight distribution in pounds (kilograms) with water and manufacturer-mounted equipment (front and rear)
   e) Engine make, model, serial number, rated horsepower and related speed, and governed speed; and if so equipped, engine transmission PTO(s) make, model, and gear ratio
   f) Type of fuel and fuel tank capacity
   g) Electrical system voltage and alternator output in amps
   h) Battery make, model, and capacity in cold cranking amps (CCA)
   i) Chassis transmission make, model, and serial number; and if so equipped, chassis transmission PTO(s) make, model, and gear ratio
7) Pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
8) Pump transmission make, model, serial number, and gear ratio
9) Auxiliary pump make, model, rated capacity in gallons per minute (liters per minute where applicable), and serial number
10) Water and Foam tank certified capacity in gallons or liters
11) Paint manufacturer and paint number(s)
12) Company name and signature of responsible company representative
13) If the apparatus is a mobile foam fire apparatus, the certification of foam tank capacity
14) Certification of compliance of the optical warning system
15) Siren manufacturer's certification of the siren
16) Written load analysis and results of the electrical system performance tests
17) Certification of slip resistance of all stepping, standing, and walking surfaces
18) If the apparatus has a fire pump, the pump manufacturer's certification of suction capability
19) If the apparatus is equipped with a fire pump and special conditions are specified by the purchaser, the pump manufacturer's certification of suction capacity under the special conditions
20) If the apparatus has a fire pump, a copy of the apparatus manufacturer's approval for stationary pumping applications
21) If the apparatus has a fire pump, the engine manufacturer's certified brake horsepower curve for the engine furnished, showing the maximum governed speed
22) If the apparatus has a fire pump, the pump manufacturer's certification of the hydrostatic test
23) If the apparatus has a fire pump, the certification of inspection and test for the fire pump
24) If the apparatus is equipped with an auxiliary pump, the apparatus manufacturer's certification of the hydrostatic test
25) When the apparatus is equipped with a water tank, the certification of water tank capacity
26) If the apparatus has a foam proportioning system, the foam proportioning system manufacturer's certification of accuracy and the final installer's certification the foam proportioning system meets this standard
27) If the system has a CAFS, the documentation of the manufacturer's pre delivery tests
28) If the apparatus has a line voltage power source, the certification of the test for the power source
29) If the apparatus is equipped with an air system, air tank certificates, the SCBA fill station certification, and the results of the testing of the air system installation
30) Any other required manufacturer test data or reports.

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:

31) Manufacturer's name and address
32) Country of manufacture
33) Source for service and technical information
34) Parts replacement information
35) Descriptions, specifications, and ratings of the chassis, pump (if applicable), and aerial device (if applicable)
36) Wiring diagrams for low voltage and line voltage systems to include the following information:
    j) Pictorial representations of circuit logic for all electrical components and wiring
    k) Circuit identification
    l) Connector pin identification
    m) Zone location of electrical components
    n) Safety interlocks
    o) Alternator–battery power distribution circuits
    p) Input/output assignment sheets or equivalent circuit logic implemented in multiplexing systems
37) Lubrication charts
38) Operating instructions for the chassis, any major components such as a pump or aerial device, and any auxiliary systems
39) Precautions related to multiple configurations of aerial devices, if applicable
40) Instructions regarding the frequency and procedure for recommended maintenance
41) Overall apparatus operating instructions
42) Safety considerations
43) Limitations of use
44) Inspection procedures
45) Recommended service procedures
46) Troubleshooting guide
47) Apparatus body, chassis and other component manufacturer's warranties
48) Special data required by this standard
49) 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.

STATEMENTOF EXCEPTIONS

The Contractor shall deliver with the fire apparatus either a certification that the apparatus fully complies with all requirements of this standard or alternatively, a Statement of Exceptions specifically describing each aspect of the completed apparatus that is not fully compliant with the requirements of this standard at the time of delivery.

The Statement of Exceptions shall contain, for each noncompliant aspect of the apparatus or missing required item, the following information:

50) A separate specification of the section of the applicable standard for which compliance is lacking
51) A description of the particular aspect of the apparatus that is not in compliance therewith or required equipment that is missing
52) A description of the further changes or modifications to the delivered apparatus that must be completed to achieve full compliance
53) Identification of the entity that will be responsible for making the necessary post delivery changes or modifications or for supplying and installing any missing required equipment to the apparatus to achieve full compliance with this standard

Prior to or at the time of delivery of the apparatus, the Statement of Exceptions shall be signed by an authorized agent of the entity responsible for final assembly of the apparatus and by an authorized agent of the purchasing entity, indicating mutual understanding and agreement between the parties regarding the substance thereof.

An apparatus that is delivered subject to a Statement of Exceptions other than a certification of full compliance shall not be placed in emergency service until the apparatus has been modified as necessary to accomplish full compliance with this standard.

CARRYING CAPACITY

The GAWR and the GCWR or GVWR of the chassis shall be adequate to carry the weight of the completed vehicle when loaded to its estimated in-service weight. The Body Manufacturer shall establish the estimated in service weight during the design of the vehicle

The estimated in-service weight shall include the following:

54) The chassis, body and tank(s)
55) Full fuel, lubricant, and other chassis or component fluid tanks or reservoirs
56) Full water and other agent tanks
57) *250 lb (114 kg) in each seating position
58) Fixed equipment such as pumps, aerial devices, generators, reels and air systems as installed
59) Ground ladders, suction hose, designed hose load in their hose beds and on their reels
60) An allowance for miscellaneous equipment that is the greatest of the values for type of vehicle per NFPA 1901, a Purchaser provided list of equipment to be carried with weights or a Purchaser specified miscellaneous equipment allowance.

The Body Manufacturer shall engineer and design the vehicle such that the completed unit, when loaded to its estimated in-service weight, with all movable weights distributed as close as is practical to their intended in-service configuration, does not exceed the GVWR.

A final Body Manufacturer's certification of the GVWR or GCWR, along with a certification of each GAWR, shall be supplied on a label affixed to the vehicle.

			Equipment Allowance	
Apparatus Type	**Equip. Storage Area**	**Apparatus Size**	**lb.**	**kg.**
Special Service Fire Apparatus	Minimum of 120 cu ft (3.4 cu mt) of enclosed compartmentation.	10,000 lb to 15,000 lb (4,500 kg to 7,000 kg) GVWR	2,000	910
		15,001 lb to 20,000 lb (7,001 kg to 9,000 kg) GVWR	2,500	1,135

		20,001 lb to 30,000 lb (9,001 kg to 14,000 kg) GVWR	3,000	1,350
		30,001 lb to 40,000 lb (14,001 kg to 18,000 kg) GVWR	4,000	1,800
		40,001 lb to 50,000 lb (18,001 kg to 23,000 kg) GVWR	6,000	2,700
		50,001 lb to 60,000 lb (23,001 kg to 27,000 kg) GVWR	8,000	3.600
		60,001 lb and up (27,001 kg) GVWR	10,000	4,500

TESTING

The completed rescue vehicle shall be third-party, independent, audit-certified through Underwriters Laboratory Canada (ULC) to the current edition of CAN/ULC S515 standards.

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 third-party, independent, audit-certified through Underwriters Laboratory (UL) to the current edition of NFPA 1901standard. 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:

61) Documentation of the electrical system performance tests
62) A written electrical load analysis, including the following:
    q) The nameplate rating of the alternator
    r) The alternator rating
    s) Each of the component loads specified that make up the minimum continuous electrical load
    t) Additional electrical loads that, when added to the minimum continuous electrical load, determine the total continuous electrical load
    u) 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:

63) The power source output voltage, frequency and amperes
64) The prime mover's oil pressure, water temperature and transmission temperature, if applicable
65) The power source hydraulic fluid temperature, if applicable
66) 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:

4) Isolate the power source from the panel board and disconnect any solid state low voltage components
5) Connect one lead of the dielectric tester to all the hot and neutral buses tied together
6) Connect the other lead to the fire apparatus frame or body
7) Close any switches and circuit breakers in the circuit(s)
8) 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.

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 Surrey Fire Department on all warranty work.

GENERAL LIMITED WARRANTY - TWO (2) YEARS

The vehicle shall be free of defects in material and workmanship for a period of two (2) 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.

STRUCTURAL WARRANTY - TEN (10) YEARS

The body shall be free of structural or design failure or workmanship for a period of ten (10) years, or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT LIMITED WARRANTY - TEN (10) YEARS

The body shall be free of bubbling or peeling as a result of a defect in the method of manufacture for a period of ten (10) years or 100,000 miles (or 160,934 kilometers), whichever occurs first, starting thirty (30) days after the original invoice date. **Pro-rated warranties will not be acceptable.**

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 sixty (360) 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 Surrey Fire 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 150“ (12' - 6") 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 360“ (30' - 0").

OVERALL WIDTH

The overall width (OAW) of the body at drip rails shall be 102“ (8' - 6"), and body shall be 100" (8' - 4").

ANGLE OF APPROACH

The angle of approach for this vehicle shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

ANGLE OF DEPARTURE

The angle of departure for this vehicle shall not be less than eight (8) degrees as specified by the current edition of NFPA 1901.

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 Surrey Fire Department intentions to the maximum extent possible.

Dealer Commission

PRE-CONSTRUCTION CONFERENCE

A pre-construction conference shall be required at the Contractor's factory for one (1) personnel from the Surrey Fire 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 one (1) personnel from the Surrey Fire 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 one (1) personnel from the Surrey Fire 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 Surrey Fire 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 Surrey Fire Department regarding the operation, care and maintenance of the apparatus and equipment supplied at Surrey Fire Department location.

The Delivery Engineer shall set delivery and instruction schedule with the person appointed by Surrey Fire Department.

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

CAB CHASSIS SPECIFICATION

Vehicle Configuration
M2 106 CONVENTIONAL CHASSIS
2015 MODEL YEAR SPECIFIED
SET BACK AXLE - TRUCK
General Service
DOMICILED, BC CANADA
CANADA CMVSS CERTIFICATION
RESCUE AND EMERGENCY SERVICE
MEDIUM TRUCK 2 YEAR WARRANTY
EXPECTED FRONT AXLE LOAD: 14000 lbs
EXPECTED REAR DRIVE AXLE LOAD: 23000 lbs
EXPECTED GROSS VEHICLE CAPACITY: 37000 lbs
Engine
CUM ISL 350 HP @ 2000 RPM, 2200 GOV RPM, 1000 LB/FT @ 1400 RPM
Engine Equipment
2013 ONBOARD DIAGNOSTICS/2010 EPA/CARB/GHG14
NFPA COMPLIANT EMBER SCREEN AND FIRE RETARDANT DONALDSON AIR CLEANER
DR 12V 275 AMP 40-SI BRUSHLESS PAD ALTERNATOR WITH REMOTE BATTERY VOLTAGE SENSE
(2) ALLIANCE MODEL 1231, GROUP 31, 12 VOLT MAINTENANCE FREE 2250 CCA THREADED STUD BATTERIES WITH POSITIVE JUMP START POST
BATTERY BOX FRAME MOUNTED

WIRE GROUND RETURN FOR BATTERY CABLES WITH ADDITIONAL FRAME GROUND RETURN

POSITIVE LOAD DISCONNECT WITH CAB MOUNTED CONTROL SWITCH MOUNTED OUTBOARD DRIVER SEAT

CUMMINS TURBOCHARGED 18.7 CFM AIR COMPRESSOR WITH INTERNAL SAFETY VALVE

C-BRAKE BY JACOBS WITH LOW/OFF/HIGH BRAKING DASH SWITCH

RH MTD HORIZONTAL EXHAUST & TAILPIPE

HORTON DRIVEMASTER ON/OFF FAN DRIVE

AUTOMATIC FAN CONTROL WITHOUT DASH SWITCH

CUMMINS SPIN ON FUEL FILTER

COMBINATION FULL FLOW/BYPASS OIL FILTER

FLEETGUARD PLAIN COOLANT FILTER

1100 SQUARE INCH ALUMINUM RADIATOR

ANTIFREEZE TO -34F, ETHYLENE GLYCOL PRE-CHARGED SCA HEAVY DUTY COOLANT

GATES BLUE STRIPE COOLANT HOSES OR EQUIVALENT

CONSTANT TENSION HOSE CLAMPS FOR COOLANT HOSES

ELECTRIC GRID AIR INTAKE WARMER

DELCO 12V 38MT HD STARTER WITH INTEGRATED MAGNETIC SWITCH

Transmission

ALLISON 3000 EVS 4 SPD W/ 5TH ON MODE AUTOMATIC TRANSMISSION WITH PTO PROVISION

Transmission Equipment

MAGNETIC PLUGS, ENGINE DRAIN, TRANSMISSION DRAIN, AXLE(S) FILL AND DRAIN

PUSH BUTTON ELECTRONIC SHIFT CONTROL, DASH MOUNTED

TRANSMISSION PROGNOSTICS - ENABLED 2013

WATER TO OIL TRANSMISSION COOLER

TRANSMISSION OIL CHECK AND FILL WITH ELECTRONIC OIL LEVEL CHECK

CUSTOM REVERSE BACK UP ALARM

SYNTHETIC TRANSMISSION FLUID (TES-295 COMPLIANT)

Front Axle and Equipment

DETROIT DA-F-14.7-3 14,700# FF1 71.5 KPI/3.74 DROP SINGLE FRONT AXLE

BENDIX ADB22X-V AIR DISC FRONT BRAKES

FIRE AND EMERGENCY SEVERE SERVICE, NON-ASBESTOS FRONT LINING

FRONT DISC BRAKE ROTORS

FRONT BRAKE DUST SHIELDS

SKF SCOTSEAL PLUS XL FRONT OIL SEALS

VENTED FRONT HUB CAPS WITH WINDOW, CENTER AND SIDE PLUGS - OIL

FRONT AIR DISC BRAKE INTERNAL ADJUSTERS

TRW TAS-85 POWER STEERING

Front Suspension

14,600# TAPERLEAF FRONT SUSPENSION

MAINTENANCE FREE RUBBER BUSHINGS - FRONT SUSPENSION

FRONT SHOCK ABSORBERS

Rear Axle and Equipment

DETROIT DA-RS-23.0-4 23,000# R-SERIES SINGLE REAR AXLE

IRON REAR AXLE CARRIER WITH STANDARD AXLE HOUSING

MXL 17T MERITOR EXTENDED LUBE MAIN DRIVELINE WITH HALF ROUND YOKES

BENDIX ADB22X-V AIR DISC REAR BRAKES

FIRE AND EMERGENCY SEVERE SERVICE NON-ASBESTOS REAR BRAKE LINING

BRAKE CAMS AND CHAMBERS ON REAR SIDE OF DRIVE AXLE(S)

REAR DISC BRAKE ROTORS

REAR BRAKE DUST SHIELDS

SKF SCOTSEAL PLUS XL REAR OIL SEALS

AIR DISC LONGSTROKE 1-DRIVE AXLE SPRING PARKING CHAMBERS

REAR AIR DISC BRAKE INTERNAL ADJUSTERS

Rear Suspension

23,000# FLAT LEAF SPRING REAR SUSPENSION WITH HELPER AND RADIUS ROD

FORE/AFT CONTROL RODS

Brake System

AIR BRAKE PACKAGE

WABCO 4S/4M ABS WITH TRACTION CONTROL

NFPA COMPLIANT ENHANCED STABILITY CONTROLS

STANDARD AIR SYSTEM PRESSURE PROTECTION

RELAY VALVE WITH 5-8 PSI CRACK PRESSURE, NO REAR PROPORTIONING VALVE

WABCO SS-1200 PLUS AIR DRYER WITH INTEGRAL AIR GOVERNOR AND HEATER

CUSTOM STEEL AIR BRAKE RESERVOIRS

BW DV-2 AUTO DRAIN VALVE WITH HEATER - WET TANK

(1) 1730 CUBIC INCH AIR HORN TANK, 85 PSI PRESSURE PROTECTED INLET WITH CHECK VALVE AND QUICK DISCONNECT FITTING

Electrical Connections

UPGRADED CHASSIS MULTIPLEXING UNIT

UPGRADED BULKHEAD MULTIPLEXING UNIT

Wheelbase & Frame

5500MM (217 INCH) WHEELBASE / (151 INCH) CA

11/32X3-1/2X10-15/16 INCH STEEL FRAME (8.73MMX277.8MM/0.344X10.94 INCH) 120KSI

2225MM (88 INCH) REAR FRAME OVERHANG

Chassis Equipment

THREE-PIECE 14 INCH CHROME STEEL BUMPER WITH COLLAPSIBLE ENDS AND LH WING CUTOUT FOR SPEAKER

FRONT TOW HOOKS - FRAME MOUNTED

FENDER AND FRONT OF HOOD MOUNTED FRONT MUDFLAPS

GRADE 8 THREADED HEX HEADED FRAME FASTENERS

Fuel Tanks

50 GALLON/189 LITER ALUMINUM FUEL TANKS – LH/RH

6 GALLON DIESEL EXHAUST FLUID TANK

ALLIANCE FUEL FILTER/WATER SEPARATOR WITH HEATED BOWL

EQUIFLO INBOARD FUEL SYSTEM

Tires

GOODYEAR G287 MSA 12R22.5 16 PLY RADIAL FRONT TIRES

GOODYEAR G182 RSD 11R22.5 14 PLY RADIAL REAR TIRES

Hubs

CONMET PRE-SET BEARING IRON FRONT HUBS

CONMET PRE-SET BEARING IRON REAR HUBS

Wheels

22.5X8.25 10-HUB PILOT 2-HAND STEEL DISC FRONT WHEELS – PAINTED WHITE

22.5X8.25 10-HUB PILOT 2-HAND STEEL DISC REAR WHEELS – PAINTED WHITE

Cab Exterior

106 INCH BBC FLAT ROOF ALUMINUM CONVENTIONAL CAB

AIR CAB MOUNTS

NFPA COMPLIANT EXTERIOR GRAB HANDLES

HOOD MOUNTED CHROMED PLASTIC GRILLE

CHROME HOOD MOUNTED AIR INTAKE GRILLE

TUNNEL/FIREWALL LINER

DUAL 25 INCH ROUND STUTTER TONE HOOD MOUNTED AIR HORNS

(1) RH FOOT SWITCH WITH DASH SWITCH FOR HORN BUTTON TO CONTROL AIR HORN, DEFAULT TO ELECTRIC <85 PSI

DUAL ELECTRIC HORNS

DOOR LOCKS AND IGNITION SWITCH KEYED THE SAME

INTEGRAL HEADLIGHT/MARKER ASSEMBLY WITH CHROME BEZEL

LED AERODYNAMIC MARKER LIGHTS

DAYTIME RUNNING LIGHTS

DUAL 102” WEST COAST BRIGHT FINISH HEATED MIRRORS WITH LH AND RH REMOTE

LH AND RH 8 INCH BRIGHT FINISH CONVEX MIRRORS MOUNTED UNDER PRIMARY MIRRORS

REAR WINDOW 63”X14”

TINTED DOOR GLASS LH AND RH WITH TINTED NON-OPERATING WING WINDOWS

MANUAL DOOR WINDOW REGULATORS

TINTED WINDSHIELD

2 GALLON WINDSHIELD WASHER RESERVOIR WITHOUT FLUID LEVEL INDICATOR, FRAME MOUNTED

Cab Interior

OPAL GRAY VINYL INTERIOR

MOLDED PLASTIC DOOR PANELS WITH ALUMINUM KICKPLATES LOWER DOORS

BLACK MATS WITH PREMIUM INSULATION

FORWARD ROOF MOUNTED CONSOLE WITH UPPER STORAGE COMPARTMENTS WITHOUT NETTING

IN DASH STORAGE BIN

(2) CUP HOLDERS LH AND RH DASH

HEATER, DEFROSTER AND AIR CONDITIONER

MAIN HVAC CONTROLS WITH RECIRCULATION SWITCH

SOLID-STATE CIRCUIT PROTECTION AND FUSES

12V NEGATIVE GROUND ELECTRICAL SYSTEM

DOME LIGHT WITH 3-WAY SWITCH ACTIVATED BY LH AND RH DOORS

CAB DOOR LATCHES WITH MANUAL DOOR LOCKS

(1) 12 VOLT POWER SUPPLY IN DASH

SEATS INC 911 UNIVERSAL SERIES HIGH BACK AIR SUSPENSION DRIVER SEAT NFPA COMPLIANT

SEATS INC 911 UNIVERSAL SERIES HIGH BACK AIR SUSPENSION PASSENGER SEAT NFPA COMPLIANT

LH AND RH INTEGRAL DOOR PANEL ARMRESTS

GRAY VINYL SEAT COVERS WITH GRAY CORDURA CLOTH BOLSTERS AND HEADRESTS

3 POINT HIGH VISIBILITY ORANGE RETRACTOR DRIVER AND RH FRONT PASSENGER SEAT BELTS WITH NFPA COMPLIANT VDR & SEAT BELT SENSOR

ADJUSTABLE TILT AND TELESCOPING STEERING COLUMN

4-SPOKE 18 INCH (450MM) STEERING WHEEL

DRIVER AND PASSENGER INTERIOR SUN VISORS

Instruments & Controls

WOODGRAIN INSTRUMENT PANELS

BLACK GAUGE BEZELS

LOW AIR PRESSURE LIGHT AND BUZZER

2 INCH PRIMARY AND SECONDARY AIR PRESSURE GAUGES

ENGINE COMPARTMENT MOUNTED AIR RESTRICTION INDICATOR WITH GRADUATIONS, WITH WARNING LIGHT IN DASH

ELECTRONIC CRUISE CONTROL WITH SWITCHES IN LH SWITCH PANEL

KEY OPERATED IGNITION SWITCH AND INTEGRAL START POSITION; 4 POSITION OFF/RUN/START/ACCESSORY

ODOMETER/TRIP/HOUR/DIAGNOSTIC/VOLTAGE DISPLAY: 1X7 CHARACTER, 26 WARNING LAMPS, DATA LINKED, ICU3

FIRE AND EMERGENCY SERVICE VEHICLES ENGINE WARNING

2 INCH ELECTRIC FUEL GAUGE

ELECTRICAL ENGINE COOLANT TEMPERATURE GAUGE

2 INCH TRANSMISSION OIL TEMPERATURE GAUGE

ENGINE AND TRIP HOUR METERS INTEGRAL WITHIN DRIVER DISPLAY

STEMCO MECHANICAL HUBOMETER WITH TENTHS LEFT SIDE SINGLE AXLE

ELECTRIC ENGINE OIL PRESSURE GAUGE

ELECTRONIC KPH SPEEDOMETER WITH SECONDARY MPH SCALE

ELECTRONIC 3000 RPM TACHOMETER

DIGITAL VOLTAGE DISPLAY INTEGRAL WITH DRIVER DISPLAY

SINGLE ELECTRIC WINDSHIELD WIPER MOTOR SITH DELAY

MARKER LIGHT SWITCH INTEGRAL WITH HEADLIGHT SWITCH

ONE VALVE PARK BRAKE SYSTEM WITH DASH VALVE

SELF CANCELING TURN SIGNAL SWITCH WITH DIMMER, WASHER/WIPER AND HAZARD IN HANDLE

INTEGRAL ELECTRONIC TURN SIGNAL FLASHER WITH HAZARD LAMPS OVERRIDING STOP LAMPS

Paint Design

TWO COLOR CUSTOM PAINT WHITE/RED BC

BLACK, HIGH SOLIDS POLYURETHANE CHASSIS PAINT

TOTAL VEHICLE SUMMARY

Weight Summary

	Weight Front	Weight Rear	Total Weight
Factory Weight+	7,560 lbs	4,128 lbs	11,688 lbs

(+) Weights shown are estimates

Weights:
F: 7,560
R: 4,128

CAB TO AXLE DIMESION

Cab to axle will be 151”.

CAB/CHASSIS PREPAYMENT

The specified cab/chassis shall be prepaid by Surrey Fire Department within 30 days of invoice. Surrey Fire Department understands that if payment is made after 30 days, additional interest charges may apply.

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 (METRIC)

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 meters (to nearest 1/10th), the length of the completed fire apparatus in meters (to nearest 1/10th), and the GVWR in kilograms.

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.

FRONT BUMPER EXTENSION

The front bumper of the chassis shall be extended approximately 6" ahead of the cab using Junior I-beams.

The bumper mounting plate shall be welded to the Junior I-beam for mounting of the chassis bumper. After fabrication of the bumper extension, the panels shall be removed and the unit shall be primed and painted black.

BUMPER GRAVEL SHIELD

The front bumper extension shall have a 3/16" aluminum tread plate gravel shield. The gravel shield shall cover the full width of the front bumper to the front of the cab and the full height of the bumper on each end.

AIR HORN(S)

The air horn(s) shall be supplied and installed by the cab/chassis manufacturer.

AIR HORN ACTIVATION

The air horn(s) shall be operated by the steering wheel horn button located at the driver position and a push button switch on the cab dash at the officer position.

AIR HORN / ELECTRIC HORN SWITCH

There shall be a switch which allows the driver to select the steering column horn ring operation. This switch shall allow the driver to select either the air horn or electric horn activation.

MOTOR DRIVEN SIREN

There shall be a Federal model Q2B motor driven rotary siren with chrome plated grill and housing, recess in the extended front bumper. The siren shall be wired through the master warning light switch, and properly wired with heavy copper cable for minimum voltage drop.

The siren shall be located on the curbside of the front bumper.

There shall be a siren brake installed in the rocker switch control panel to activate the siren brake.

SIREN ACTIVATION

There shall be two (2) switches provided to activate the siren; one (1) drivers side foot switch, and one (1) officers side push button on the dash. The drivers side switch shall be mounted on the floor in a location to prevent accidental activation.

Switch shall be interlocked with the Master Switch and the Park Brake circuit.

FRONT TOW PROVISIONS

The front tow provisions shall be supplied and installed by the cab/chassis manufacturer.

AIR INTAKE SYSTEM

An air filter shall be provided in the engine's air intake system.

Air inlet restrictions shall not exceed the engine manufacturer's recommendations.

The air inlet shall be equipped with a means of separating water and burning embers from the air intake system.

This requirement shall be permitted to be achieved by either of the following methods:

9. Provision of a device such that burning particulate matter larger than 0.039 in. (1.0 mm) in diameter cannot reach the air filter element.
10. Provision of a multi screen ember separator capable of meeting the test requirements defined in the Parker Hannafin, Racor Division, publication LF 1093-90, *Ember Separation Test Procedure*, or an equivalent test.

EXHAUST DIVERTER

An exhaust diverter valve shall be located in-line of exhaust tubing and controlled from driver's position to re-route exhaust discharge. Exhaust diverter valve shall be constructed from 14 gauge stainless steel material with air actuated control.

As a default, the exhaust shall always discharge to curbside just ahead of rear wheels, and when selected the exhaust shall discharge to a vertical exhaust pipe, extending above the body height 12".

Exhaust diverter shall activate when the PTO is engaged.

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

Exhaust pipe discharge shall be directed away from any operator's position.

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

RAIN CAP ON EXHAUST

There shall be a rain cap furnished and installed on the chassis exhaust system.

NEDERMAN EXHAUST ANCHOR PLATE

A Nederman exhaust anchor plate shall be provided and mounted in fender area near chassis engine exhaust tail pipe for use with Nederman exhaust extraction system. Center of anchor plate to center of exhaust pipe should be 24".

EXHAUST

The existing exhaust tailpipe shall be modified from the stock location by cutting the pipe and adding a connector and band clamp.

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

Exhaust pipe discharge shall be directed away from any operator’s position.

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

RADIO/ANTENNA INSTALLATION

There shall be one (1) Surrey Fire Department supplied radio(s) with antenna installed in the cab within easy reach of driver. The location of radio shall be determined by the Surrey Fire Department at the pre-construction meeting. All required radio programming shall be responsibility of Surrey Fire Department. Radio(s) may not be fully tested if no radio program is provided with radio and will be responsibility of Surrey Fire Department after delivery.

Radio shall be installed per Manufacturer's requirements and wired for proper 12 volt power and ground.

One (1) Surrey Fire Department supplied GPS antenna shall be installed on curbside of cab roof. The radio antenna shall be located on streetside of cab roof.

Radio shall be a model MACOM #D28LTX.

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. One (1) fuse block shall be wired battery direct, and one (1) fuse block shall be wired to the Master switch. Fuse block(s) shall be located per required circuits and be protected from damage.

SEAT BELT COLOR

Section 14.1.3.4 of the NFPA 1901 Standards, 2009 edition, requires all seat belt webbing in cab to be bright red or bright orange in color, and the buckle portion of the seat belt shall be mounted on a rigid or semi rigid stalk such that the buckle remains positioned in an accessible location.

SEAT BELT WEB LENGTH - COMMERCIAL CAB

Sections 14.1.3.2 and 14.1.3.3 of the NFPA 1901 standards, 2009 edition, require the effective seat belt web length for a Type 1 lap belt for pelvic restraint to be a minimum of 60", and a Type 2 pelvic and upper torso restraint-style seat belt assembly to be a minimum of 110".

The chassis seat belt web length as supplied by the commercial chassis manufacturer shall be compliant to NFPA Standards 14.1.3.2 and 14.1.3.3.

SEAT BELT MONITORING AND VEHICLE DATA RECORDER (VDR) SYSTEMS

SEAT BELT MONITORING

A Weldon 6204 series system with Vista IV display shall be provided and installed to allow the driver to know if all persons seated in the vehicle are secured with seat belts before moving the vehicle. Built-in smart seating logic shall detect if the correct sit and buckle sequence is not followed for all seats. System shall also provide an output for an external alarm. Weldon diagnostic port will be located under dash on driver side. System shall include the following features;

VEHICLE DATA RECORDER (VDR)

The vehicle data recorder shall have the following features;

- Recorded Data Includes: Vehicle Speed, Acceleration, Deceleration, Engine Speed, Engine Throttle Position, ABS Event, Seat Occupied Status, Seat Belt Status, Master Optical Warning Switch, Park Brake, Service Brake, Time, Date and Engine Hours.
- Password Protected by the customer
- Six (6) seat position inputs for occupied and belts buckled. Additional six (6) seat expansion module available.
- Easily interfaces with V-MUX™ or other multiplexing systems
- Data is extracted by a standard, mini USB cable

OCCUPANT RESTRAINT INDICATOR

The occupant restraint indicator shall have the following features;

- Will be displayed on Vista IV panel.
- Supports commercial and custom cab seating layouts; up to 12 seats
- Built-in audible alarm
- Use in conjunction with Vehicle Data Recorder (VDR)

IGNITION KEY

If the vehicle is specified to have an ignition key it will be permenantly attached to steering column with vinyl covered steel cable or a similiar device.

SIX (6) – LED TIRE PRESSURE VISUAL INDICATORS

Each tire shall be equipped with a VECSAFE heavy duty valve cap (or equal) LED indicator that indicates proper tire pressure. The VECSAFE valve cap is self-calibrating. When the cap is mounted on the valve stem the first time, it will memorize that tire pressure, and can be set to recognize a drop in pressure as little as 4 psi. It can be checked for functionality and battery condition by simply unscrewing the cap. If it is in working condition, it will immediately start blinking.

HELMET STORAGE

No helmet storage is required in the cab driving or crew area.

CAB CRASH TEST CERTIFICATION

A cab crash test certification from the fire apparatus manufacturer shall be provided with the equipment. A copy of this certification shall be included with the bid.

NOTE: There shall be no exception to any portion of the cab integrity certification requirements. Nonconformance shall lead to immediate rejection of bid.

The certification shall state that the cab does meet or exceed the requirements below:

11) European Occupant Protection Standard ECE Regulation No. 29.
12) SAE J2422 Cab Roof Strength Evaluation - Quasi-Static Loading Heavy Trucks.

CAB MIRRORS, DRIVER ADJUSTABLE

Section 14.3.5 of the NFPA 1901 Standards, 2009 edition, requires all primary rear view mirrors used by the driver to be adjustable from the driver's position.

Do not install any wheel covers or lugnut covers.

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 front portion of the console shall be slanted upward for better viewing of any siren or radio equipment. The area shall be within easy access to both Driver and Officer.

The console shall have a total of (6) switches, (3) shall be spares.

The final design of console shall be determined by the Surrey Fire Department at the pre-construction meeting.

CAB STEP COVER AND BATTERY COMPARTMENT

The stock chassis step and fuel tank brackets shall be overlaid with 1/8" aluminum tread plate covers. The stepping surface of the covers will be overlaid with a non-slip NFPA approved stepping surface. There will be a removable panel to access and replace the chassis batteries and a hinged fuel fill access door.

The following options will be cut into the step cover:

BATTERY JUMPER STUDS

Two (2) battery jumper studs, one (1) positive with a red weather cover, and one (1) negative with a black weather cover shall be provided in the lower front portion of the driver step area. Jumper studs shall be identified with color coded label.

These studs shall allow this vehicle to be jump started due to a battery failure, or to allow easy access to assist another vehicle.

MUDFLAPS

There shall be 1/4" rubber mudflaps provided and installed behind each set of tires to prevent throwing road debris and lower road spray.

AIR BRAKE SYSTEM QUICK BUILD-UP

There shall be one (1) Milton male quick connector type air shoreline inlet to provide air to the chassis air tanks from an external source compressed air shoreline hookup in order to maintain full operating air pressure while the vehicle is not running. Air inlet shall be located near driver's door. The female end of the connector shall be supplied by the Surrey Fire Department.

The quick buildup system shall provide sufficient air pressure so that the apparatus has no brake drag and is able to stop under the intended operating conditions following the 60-second buildup time.

CHASSIS AIR TANK DRAINS

The drains on cab/chassis air system tanks shall be extended to the streetside body below compartment S1, using DOT compliant brass lines, and 1/4 turn MIDLAND HALDEX #12110 VALVES. Each tank shall be properly labeled to identify each tank on lower body (or rub rail if specified).

AUTOMATIC TIRE CHAINS

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

TIRE CHAINS ACTIVATION

The tire chain system shall be activated by a switch on the center cab console so that the operator may engage the chains from the driver's seat. The switch shall be lighted to indicate when the chains are engaged. The switch shall be complete with a switch guard to avoid accidental engagement of the automatic chains. The switch guard must be properly labeled with a sticker with operating instructions provided.

The tire chains shall be interlocked with the transmission and shall engage only if the vehicle is traveling 30 MPH or less. After traveling over 30 MPH, the vehicle must be reduced to a speed below 5 MPH for the tire chains to be engaged or re-engaged.

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.

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.

The fabrication of the body shall be formed sheet metal. Formed components shall allow the Surrey Fire Department to have the body repaired locally in the case where any object has struck the body and caused damage. The use of proprietary extrusions will prevent the Surrey Fire Department from such repair and shall NOT be used.

Following construction of the subframe, which supports the apparatus body, the sheet metal portion of the body shall be built directly on the subframe. The joining of the subframe and body shall be of a welded integral construction.

The sheet metal fabrication of the body shall be performed using inert gas continuous feed welders only. The entire body shall be welded construction. The use of pop rivets in any portion of structural construction may allow premature failure of the body structure. Therefore, pop rivets shall NOT be used in the construction of the structural portions of the body. This includes side body sheets, inner panels of compartment doors, and any other structural portions of the body.

EXTERIOR ALUMINUM BODY

The fabrication of the body shall be constructed from aluminum 3003H-14 alloy smooth plate. This shall include compartment front panel, vertical side sheets, side upper rollover panels, rear panels and compartment door frames.

The body compartment floors and exterior panels shall be constructed with not less than 3/16" (.187) 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, No Exceptions.

The front and rear corners of body shall be formed as part of the front or rear body panels. This provides a stronger body corner and finished appearance. The use of extruded corners, or caps will not be acceptable, No Exceptions.

The door side frame openings shall be formed "C" channel design. An electrical wiring conduit raceway running the full length of exterior compartments shall be provided. This raceway shall contain all 12 volt wiring running to the rear of the apparatus, permitting easy accessibility to wiring.

Individual compartment modules, with dead air space voids between compartments, will not be an acceptable method of compartment construction.

The compartments shall be an integral part of the body construction. Compartment floors from front of body to ahead of rear axle, also from rear axle to rear of body shall be single one-piece sections. Compartment floors shall be preformed, then positioned in body and welded 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.

All exterior seams in sheet metal below frame, and around the rear wheel well area shall be welded and caulked to prevent moisture from entering the compartments. All other interior seams and corners shall be sealed with silicone based caulk prior to painting.

Only stainless steel bolts, nuts, and sheet metal screws shall be used in mounting exterior trim, hardware and equipment.

Exterior compartments shall have louvers in lower back wall of compartment for ventilation.

DRIP RAILS

The body shall have drip rails over the side full height compartments. The drip rails shall be formed into the upper body panels providing a ridged lower panel and a flat upper body panel surface. The use of mechanically fastened, taped or glued on drip rails will not be acceptable, No Exceptions.

ROOF CONSTRUCTION

The roof shall be integral with the body and shall be all welded construction. The roof of the body shall not be less than 3/16" aluminum 3003H-14 alloy tread plate, fully and continuously welded. The roof shall be reinforced with 2" x 2" x 1/4" aluminum tubing running the full width of the body.

All seams in the roof area shall be welded to the radius and supports prior to paint to prevent entry of moisture. All roof seams shall be continuously welded.

A 2" formed radius shall be provided along the body sides. The use of extruded radius will not be acceptable, No Exceptions.

BODY SUBFRAME

The chassis frame rails shall be fitted with 1/4" custom extruded UHMW polyethylene rail cap to isolate the body frame members from direct contact with chassis frame rails.

The body subframe shall be constructed from 6061T6 aluminum alloy tubing. Subframe shall consist of two (2) 2" x 6" x 1/4" aluminum tubes, the same width as the chassis frame rails, NO EXCEPTION. Welded to this tubing shall be cross members of 2" x 6" x 1/4" aluminum. These cross members shall extend the full width of the body to support the compartments. Cross members shall be located at front and rear of the body, below compartment divider walls, and in front and rear of wheel well opening. Additional aluminum cross members shall be located on 16" centers, or as necessary to support walkway or heavy equipment.

To form the frame, the tubing shall be beveled and welded at each joint using 5356 aluminum alloy welding wire.

BODY MOUNTING

The body subframe shall be fastened to the chassis frame with a minimum of six (6) spring loaded body mounts. Each mount shall be configured using a two-piece encapsulated slide bracket. The two (2) brackets shall be fabricated of heavy duty 1/4" thick steel and shall have a powder coat finish to prevent any corrosion. Each mounting assembly shall utilizing two (2) 3/4" diameter x 6" long grade 8 bolts and two (2) heavy duty springs. The assembly design shall allow the body and subframe to act as one (1) component, separate from the chassis. As the chassis frame twists under driving conditions, the spring mounting system shall eliminate any stress from being transferred into the body. The spring loaded body mounts shall also prevent frame side rail or body damage caused by unevenly distributed stress and strains due to load and chassis movement.

Body mountings that do not allow relief from chassis movement will not be acceptable.

10" REAR STEP BUMPER

The full width rear bumper shall be constructed from 2" x 2" x 1/4" aluminum tubing frame and covered with 3/16" NFPA compliant aluminum tread plate. The bumper shall extend from the rear vertical body panel 10" and provide a rear step with a minimum of 1/2" space at body for water drainage.

REAR TOW EYES

There shall be two (2) heavy duty rear mounted tow eyes securely attached to the body subframe, below the apparatus body. The tow eyes shall be fabricated from 3/4" thick steel plate and shall have a black powder coat finish.

GROUND LIGHTS

There shall be two (2) OnScene 9" Night Axe LED lights installed below bumper capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting shall be switchable but activated automatically when the vehicle park brake is set.

WHEEL WELL EXTERIOR PANEL

The exterior panel of the body wheel well enclosure shall be constructed from 3/16" smooth aluminum panels.

STAINLESS STEEL BODY FENDERS

The body wheel well openings shall be provided with round radius, polished stainless steel fenderettes. The fenderettes shall be bolted and easily replaceable if damaged. The fenderettes shall be installed using a rubber gasket to reduce

buildup of moisture and/or debris.

WHEEL WELL LINERS

The wheel wells shall be provided with an easily removable polymer, circular inner fender liner. The inner liner shall be bolted to the wheel well with stainless steel bolts and spaced away from the wheel well so the liner will not accumulate dirt or water.

BODY PAINT SPECIFICATIONS

BODY PAINT PREPARATION

After the body and components have been fabricated they shall be disassembled prior to painting so when the vehicle is complete there shall be finish paint beneath the removable components. The body shall be totally removed from chassis during the paint process to insure the entire unit is covered. The body and components shall be metal finished as follows to provide a superior substrate for painting.

The exterior body shall undergo a thorough cleaning process starting with a biodegradable phosphoric acid solution to begin the etching process followed by a complete clear water rinse. The next step shall consist of a chemical conversion coating applied to seal the metal substrate and become part of the metal surface for greater film adhesion. If the compartment interior is to be painted the interior shall be acid etched as described above then primed with an epoxy primer and all seams caulked.

All bright metal fittings, if unavailable in stainless steel or polished aluminum, shall be chrome plated. Iron fittings shall be copper under plated prior to chrome plating.

PAINT PROCESS

The paint process shall follow the strict standards set forth by PPG Industries guidelines. Painters applying PPG products will be PPG Certified Commercial Technicians, and re-certified every two (2) years.

The body shall go through an eight-stage paint process;

13) Clean bare metal using a solvent base wax & grease remover.
14) Finish all exterior body seams as necessary, followed by a thorough sanding of all bare metal to be painted.
15) Re-clean bare metal using a solvent base wax & grease remover.
16) Bare Metal Epoxy Primer Coat - PPG Delfleet® Evolution corrosion resistance epoxy primer to be applied at 1.0-2.0 mills DFT over clean abraded bare metal.
17) Primer Filler Coat - PPG Delfleet® Evolution urethane build primer to achieve total thickness of 3.0-6.0 mils DFT after sanding.
18) Base coat (Color) - PPG Delfleet® Evolution High Solids Polyurethane Base coat. Apply 1.0-3.0 mils DFT of base coat color to achieve full hiding.
19) Clear coat PPG Delfleet® Evolution polyurethane premium quality clear coat with improved mar resistant finish. The clear coat shall be applied to achieve a total dry film thickness of 2.0-3.0 mils.
20) Curing process of the painted body shall go through a force dry/bake cycle process. The painted components shall be baked 180 degrees for 2 hours to achieve a complete coating cure on the finished product.

MACHINE POLISHED

After the force dry/bake cycle and ample cool down time, the coated surface shall be sanded using 1,000, 1,500, and or 3,000 grit sandpaper to remove surface defects. In the final step, the surface shall be buffed then polished to an extra high gloss smooth finish. Total dry film thickness of paint will average between 8.0-12.0 mils.

PAINT - ENVIRONMENTAL IMPACT

The contractor shall meet or exceed all current State (his) regulations concerning paint operations. Pollution control shall include measures to protect the atmosphere, water and soil. PPG Delfleet® Evolution paint shall be free of all heavy metal (lead & chromate) components. Paint emissions from sanding and painting shall be filtered and collected. All paint wastes shall be disposed of in an environmentally safe manner. Solvents used in cleanup operations shall be collected, sent off-site for distillation and returned for reuse.

FASTENERS

Prior to the assembly and reinstallation of exterior components; i.e. warning and DOT lights, handrails, steps, door hardware, and miscellaneous items, an isolation tape, or gasket shall be used to prevent damage to the finish painted surfaces. These components shall be fastened to body using either a plastic insert into body metal with stainless steel screws or zinc coated nutserts into body surface using stainless steel bolts to prevent corrosion from dissimilar metals.

ELECTROLYSIS CORROSION CONTROL

The apparatus shall be assembled using ECK or similar corrosion control on all high corrosion potential areas.

ECK protects aluminum and stainless steel against electrolytic reaction, isolates dissimilar metals and gives bedding protection for hardware and fasteners. ECK contains anti-seizing lubricant for threads. ECK is dielectric and perfect for use with electrical connectors.

PAINT FINISH - SINGLE COLOR

The body shall be painted with a single color of PPG Delfleet® Evolution paint per approved customer sprayout.

Touch-up paint shall be provided with completed vehicle.

- Paint Color: Match cab/chassis supplied paint color.

BODY UNDERCOATING

The entire underside of body shall be sprayed with black automotive undercoating. Undercoating shall cover all areas underside of body and wheel well area to help prevent corrosion under the vehicle.

UNDERCOAT WARRANTY

The body undercoating shall have a warranty provided by the manufacturer for the lifetime of the vehicle or twenty (20) years, whichever occurs first. The warranty shall be transferable between vehicle owners. Should the undercoating material applied to the underside of the body and wheel wells of the vehicle ever flake off, peel, chip or crack due to drying out, the damaged area shall be re-sprayed without charge to the vehicle owner.

PAINT WARRANTY

The vehicle shall be provided with a ten (10) year non-prorated warranty to the original owner. Warranty is provided by PPG Inc. A warranty sheet with all conditions and maintenance procedures shall be provided with the delivered vehicle. **Pro-rated warranties will not be acceptable.**

COMPARTMENT INTERIOR FINISH

The compartment interiors shall be treated with phosphoric acid and then sprayed with an epoxy primer applied 1.0 mil thick. All body seams will be caulked with urethane seam sealer and painted with two (2) coats of Multicolor Specialties Inc. polyurethane waterborne multicolor finish. The Multicolor paint shall be solvent and oil resistant, impact and abrasion resistant, stain and household chemical resistant, as well as mildew and fungus resistant. Paint color shall be silver gray.

REFLECTIVE STRIPE REQUIREMENTS

Material

All retroreflective materials shall conform to the requirements of ASTM D 4956, *Standard Specification for Retroreflective Sheeting for Traffic Control*, Section 6.1.1 for Type I Sheeting.

All retroreflective materials used that are colors not listed in ASTM D 4956, Section 6.1.1, shall have a minimum coefficient of retroreflection of 10 with observation angle of 0.2 degrees and entrance angle of -4 degrees.

Any printed or processed retroreflective film construction used shall conform to the standards required of an integral colored film as specified in ASTM D 4956, Section 6.1.1.

Minimum Requirements

A retroreflective stripe(s) shall be affixed to at least 50 percent of the cab and body length on each side, excluding the pump panel areas, and at least 25 percent of the width of the front of the apparatus.

The stripe or combination of stripes shall be a minimum of 4 in. (100 mm) in total width.

The 4 in. (100 mm) wide stripe or combination of stripes shall be permitted to be interrupted by objects (i.e., receptacles, cracks between slats in roll up doors) provided the full stripe is seen as conspicuous when approaching the apparatus.

GRAPHICS PROOF

A color graphics proof of the reflective striping layout shall be provided for approval by Surrey Fire Department prior to installation. The graphics proof shall be submitted to Surrey Fire Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

REFLECTIVE STRIPE - CAB SIDE

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1" Scotchcal reflective stripe located 1" above and a second 1" Scotchcal reflective stripe located 1" below the main stripe.

- This reflective stripe shall be red in color.

CAB TWO-TONE PAINT LINE

A 1/2" gold reflective stripe shall be placed on top of the two-tone paint sepration line.

REFLECTIVE STRIPE - CAB FRONT

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1" Scotchcal reflective stripe located 1" above and a second 1" Scotchcal reflective stripe located 1" below the main stripe.

- This reflective stripe shall be red in color.

REFLECTIVE STRIPE - CAB DOOR INTERIOR

Any door of the apparatus designed to allow persons to enter or exit the apparatus shall have at least 96 in.2 (62,000 mm2) of retroreflective material affixed to the inside of the door.

The stripe material shall be 3M Scotchlite 680.

- This reflective stripe shall be white in color.

REFLECTIVE STRIPE - BODY SIDES

The reflective stripe material shall be 4" wide, 3M Scotchcal 680 series.

- This reflective stripe shall be white in color.

There shall be a 1" Scotchcal reflective stripe located 1" above and a second 1" Scotchcal reflective stripe located 1" below the main stripe.

- This reflective stripe shall be red in color.

The stripe shall extend from the front of cab in a straight line, then just ahead of the rear wheels the stripe shall angle up and extend straight back to the rear of the body.

REFLECTIVE 6" FLAG, STRAIGHT

There shall be two (2) 6" reflective Canada flags provided, locations to be determined.

CHEVRON REFLECTIVE STRIPE - REAR SIDES PANELS

At least 50 percent of the rear-facing vertical surfaces, visible from the rear of the apparatus, excluding any pump panel areas not covered by a door, shall be equipped with retroreflective striping in a chevron pattern sloping downward and away from the centerline of the vehicle at an angle of 45 degrees. Each stripe shall be 6" width.

The rear side panels only of the body shall have a Chevron style reflective stripe layout, and cover as much of the rear side panels as possible. Each chevron panel shall be a full sheet and shall have a 3M UV over laminate to protect from UV rays, scene damage, and everyday use. Chevron panel shall have a minimum 10 year warranty for material failure, and colorfastness.

The stripe material shall be 3M Diamond Grade.

This reflective chevron stripe shall alternate red and fluorescent yellow-green in color.

LETTERING

GRAPHICS PROOF

A color graphics proof of the lettering layout shall be provided for approval by Surrey Fire Department prior to installation. The graphics proof shall be submitted to Surrey Fire Department on 8.5" x 11" sheets with front, sides, rear and plan views, each on one (1) sheet. In addition if there is any special art work an additional sheet shall be provided showing all details.

The following lettering shall be provided and installed on the completed unit as follows;

UPPER BODY SIDE LETTERING

There shall be twenty eight (28) 10" high reflective letters furnished and installed on the vehicle.

"AIR SUPPORT UNIT"

- This reflective lettering shall be gold in color.

SUPPLIED DECALS

The bidder shall install two (2) Surrey Fire Department supplied decal(s) on the vehicle, located on the.

EXTERIOR COMPARTMENT DOORS

ROLL-UP DOOR CONSTRUCTION - ROBINSON (ROM)

The apparatus shall be equipped with Robinson ROM Series III roll-up exterior compartment doors. Robinson roll-up doors shall be complete with the following features;

- Doors shall be front roll with drum positioned at upper front portion of compartment to afford maximum clearances and head room for mounting equipment to ceiling of compartment

- There shall be a non-abrasive side brush seals
- Every slat must have interlocking end shoes to prevent slat from moving side-to-side and binding the door
- Between each slat must be a co-extruded PVC inner seal to prevent metal-to-metal contact and to repel moisture. This inner seal is not visible to detract from appearance of door
- Slats are to have interlocking joints with a folding locking flange to provide security and prevent penetration by sharp objects
- Slats to be double-wall extrusion 1.366" high by .315" thick. Exterior surface to be flat and interior surface to be concave to prevent loose equipment from interfering with door operation
- Latch system to be a full width one piece lift bar operable by one (1) hand
- A 2" wide finger pull integrated into the bottom rail extrusion for easy one (1) hand opening and closing
- Clip system that connects the curtain slats to the operator drum which allows for easy tension adjustment without tools
- Each roll-up door shall have a 4" diameter counterbalance operator drum to assist in lifting the door.
- Track shall be one-piece aluminum that has an attaching flange and finishing flange incorporated into its design
- Drip rail will have specially designed seal that prevents the seal from scratching the door
- Bottom rail extrusion must have smooth back to prevent loose equipment from jamming the door
- Bottom rail to have "V" shaped double seal to prevent water and debris from entering the compartment
- Standard replacement parts to be shipped from the United States and available in as little as 48 hours
- Will be free from manufacturing defects for a period of up to 7 years from date of purchase provided that the Product is used under conditions of normal use, that regular periodic maintenance and service is performed and that the product was installed in accordance with R•O•M's instructions.

Each shutter door shall decrease the compartment door frame opening approximately 2.00" in width and approximately 4.50" in height for the bottom section of door assembly.

The specified retroreflective stripe material shall be applied on the roll-up compartment doors. The stripe shall be precision machine cut for each door slat of the roll-up doors. Under no circumstance will the stripe material be cut on roll-up door surface.

EXTERIOR COMPARTMENT DOORS

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.

The doors shall be flush mounted so that the outer surface is in line with the side body surface. Lap or bevel type constructed doors, doors framed with extrusions, or doors requiring rubber bumpers to prevent unnecessary contact are NOT ACCEPTABLE.

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.

Each door shall be capable of being opened or 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.

The door handle type and door check type of hinged compartment doors shall be as specified with each door.

BODY HEIGHT MEASUREMENTS

The vertical body dimensions shall be as follows:

AHEAD OF REAR AXLE

	Description	Dimension
A	Bottom of Subframe to Top of Body	94.5"
B	Bottom of Subframe to Bottom of Body	22.5"
C	Total Body Height	117"
D	Compartment Height Above Frame	48.0"
E	Compartment Height Below Frame	25.0"
F	Vertical Door Opening - (Full Height Compartment):	
	-with roll-up door	76.0"
	-with hinged door	68.0"
G	Vertical Door Opening (Below Frame Compartment):	
	-with hinged door	19.0"

ABOVE REAR AXLE

	Description	Dimension
H	Vertical Door Opening - Above Rear Wheel	
	-with roll-up door	43.5"
	-with hinged door	37.0"

BEHIND REAR AXLE

	Description	Dimension
I	Bottom of Subframe to Bottom of Body	20.0"
J	Compartment Height Above Frame	48.0"
K	Compartment Height Below Frame	22.5"
L	Vertical Door Opening - (Full Height Compartment):	
	-with roll-up door	73.0"
	-with hinged door	65.0"
M	Vertical Door Opening - (Below Frame Compartment):	
N	-with hinged door	16.5"

GENERAL

	Description	Dimension
O	Bottom of Drip Rail to Top of Body	34.25"
P	Walk-in Interior Height	78.0" (min.)

(Dimensions are general and subject to change during the actual design process)

BODY WIDTH DIMENSIONS

The body shall be 100.0" wide, not including drip rail or non-permanent fixtures. Interior compartment depth dimensions shall be approximately:

Area Description	Dimension
Transverse Area above Subframe	95.0"
Compartment Depth below Subframe	24.5"

STREETSIDE COMPARTMENT - FRONT (S1)

The interior useable compartment width shall be approximately 49.0" wide.

The compartment door opening shall be approximately 42.0" wide.

- This compartment shall have a horizontally hinged, drop down style box pan 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.

COMPARTMENT LAYOUT

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

HINGED DOOR REFLECTIVE STRIPING

1-1/2" x required lengths of 3M™ Diamond Grade™ conspicuity striping shall be provided on door edges facing outward on all vertical and horizontal hinged door(s), The striping shall be red/white in color.

- The 12 volt electrical distribution panel shall be located in the front lower compartment.

STREETSIDE COMPARTMENT - AHEAD OF REAR WHEELS (S2)

The interior useable compartment width shall be approximately 64.0" wide.

The compartment door opening shall be approximately 57.0" wide.

- This compartment shall have a horizontally hinged, drop down style box pan 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.

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" Night Axe LED compartment light, horizontally mounted at the top of the compartment toward the door opening.

DOOR REFLECTIVE STRIPING

1-1/2" x required lengths of 3M™ Diamond Grade™ conspicuity striping shall be provided on door edges facing outward on all vertical and horizontal hinged door(s), The striping shall be red/white in color.

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

STREETSIDE COMPARTMENT - ABOVE REAR WHEELS (S3)

The interior useable compartment width shall be approximately 64.0" wide.

The compartment door opening shall be approximately 57.0" wide.

This compartment shall have a ROM roll-up door.

- 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.

- There shall be NO keyed lock on this roll-up compartment door.

- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.

- One (1) aluminum drip pan/door finish guard shall be provided with the rollup 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

- Two (2) OnScene 36" Night Axe LED compartment lights, vertically mounted.

- A Bauer model K-22.42-30-E3 air compressor with a recharging rate of 35.9 SCFM @ 6,000 PSI shall be provided, . Compressor skid shall include 30 HP, 3-phase soft start electric motor, P10 Securus purification system, electronic CO monitor and calibration kit, and fill station inter-connecting harness.

    - A boost system shall be provided and controlled from fill station compressor electronic control panel. Boost system components shall be located on air compressor skid.

    - An Appleton inlet and base for providing shore power shall be provided on streetside for operating compressor system from in-house electrical building system. The matching Appleton plug shall be provided loose with delivered unit. Any building wiring shall be responsibility of Surrey Fire Department.

- Air storage system consisting of six (6) 491 SCF @ 6,000 PSI, ASME cylinders with gauges and valves shall be provided.

    - There will be a welded reinforcement above the body frame to carry specified DOT or ASME cylinders. The mounting of the cylinders will be with adjustable track and powder coated steel band straps to securely hold all cylinders in place.

- The Bauer compressor shall be free from defects in material and workmanship for a period of two (2) years. The foregoing warranty period shall be extended to five (5) years from the date of shipment from Bauer for Customers that are Municipal Fire Departments with respect to the compressor block (breathing air application), provided that such extended warranty period shall only apply to product parts with proof of proper maintenance being completed in accordance with published Bauer factory recommendations. To be eligible for this limited warranty to cover Customer's product, Customer must return a properly completed start-up/warranty registration form to Bauer within ninety (90) days from the date of start-up.

- Training and instruction shall be provided by compressor manufacturer at Surrey Fire Department location on proper use of complete air compressor system.

- The NFPA required air quality test shall be completed by manufacturer prior to delivery. Complete results of test shall be provided to Surrey Fire Department upon delivery.

STREETSIDE COMPARTMENT - REAR (S4)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a ROM roll-up door.

- 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.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup 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 located on right side of vertical partition. 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) 400 lbs. slide-out tray(s) approximately 24" deep located on floor on right side of vertical partition. 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.
- There shall be one (1) slide-out smooth aluminum vertical tool board(s) approximately 24" deep located on left side of vertical partition. Each tool board(s) 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. Each board shall be rated for a maximum 200 lbs. evenly distributed load. Each tool board shall utilize a pneumatic cylinder to hold the tool board in both the opened and closed positions.
    - The vertical tool board material shall be 3/16" (.188) 3003H-14 aluminum alloy sheet.
    - Each tool board will be bolted to compartment floor.
- There shall be one (1) bolt-in vertical compartment partition(s) dividing the compartment into left and right sides.
- There shall be four (4) Zico 1000 series KD-UH walkaway type SCBA air pack bracket(s) with high cycle coated spring clips and angled foot plate (no CRS strap inc.) mounted on specified tool board.
- The floor of the compartment above the frame rails shall cover the area directly above the frame rails ONLY (non-extended floor).
- One (1) Hannay ECR1618-17-18 electric cable reel(s) capable of storing 200' of 10/3 electric cable. Reel(s) shall be designed to hold 110% of the capacity of cord length, with fully enclosed 45 amp, three (3) conductor collector rings. Reel(s) shall be mounted to channel structure that allows for side-to-side adjustment of reel position.

- Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and not be more than 72 in. (1830 mm) above the operator's standing position, and shall be marked with a label indicating its function.

– A label shall be provided in a visible location adjacent to reel with following information: Current rating, Current type, Phase, Voltage, and Total cord length.

– The cable reel shall equipped with 200' of 10/3 SEOW yellow cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.

– One (1) Akron model EJB series, cast aluminum electrical power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall meet all requirements described in NFPA 1901. The power distribution box shall include the following outlets mounted on a backlit face plate;

– The electric junction box shall be direct wired to cable on the cord reel. The outlet configuration shall include:

- One (1) 120 VAC, 5-15 duplex straight-blade receptacle.

– One (1) 120 VAC, 5-15 duplex straight-blade receptacle.

– One (1) 120 VAC, 5-15 duplex straight-blade receptacle.

– One (1) 120 VAC, 5-20 GFCI duplex straight-blade receptacle wired to protect all outlets in box.

– One (1) Akron formed aluminum treadplate vertical mounting bracket shall be provided for specified power distribution box.

Junction box holder shall be mounted to the Fairlead roller extension.

– The fairlead rollers shall be an OnScene Solutions extendable type to allow hoses or cords to be extended away from compartment door edges, slide trays, or shelving that may result in wear damage.

- Two (2) OnScene 63" Night Axe LED compartment lights, vertically mounted.

- One (1) OnScene 9" Night Axe LED ground light shall be provided below the body.

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

CURBSIDE COMPARTMENT - FRONT (C1)

The interior useable compartment space shall be approximately 70.0" wide.

The compartment door opening shall be approximately 63.0" wide.

This compartment shall have a ROM roll-up door.

- 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.

- There shall be NO keyed lock on this roll-up compartment door.

- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.

- One (1) aluminum drip pan/door finish guard shall be provided with the rollup 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 two (2) 400 lbs. slide-out work bench(s) approximately 24" deep located side-by-side directly below the spare SCBA storage. The work bench top shall be fabricated from 3/16" 3003 aluminum sheet with a 2" 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.

- There shall be two (2) 400 lbs. slide-out tray(s) approximately 24" deep located side-by-side on lower floor. 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.

- There shall be one (1) SCBA cylinder storage module for 8" OD (maximum) SCBA bottles. The maximum length of the SCBA cylinder shall be 24.75". The module shall have an exterior shell fabricated from 1/8" (.125) 3003H-14 aluminum alloy sheet. The module shall have a shall be level front to back to allow pass-thru storage from either interior or exterior. The SCBA cylinder storage tubing shall be fabricated from PVC pipe to prevent damage or abrasion to cylinders. In addition there shall be rubber matting provided in the base of each storage tube for bottle protection and to prevent slipping.

The Fire Departments spare air cylinders shall be MSA brand, 2216 PSI, 30 Min cylinders.

SHOP NOTES

Brand: _____

Diameter: _____" (Must be less than 7.625")

Length: _____" (with valve)

- The SCBA cylinder module shall be capable of storing thirty five (35) SCBA cylinders up to 7.5" diameter.

- Two (2) OnScene 18" Night Axe LED compartment lights, vertically mounted below the extended floor area only.

- There shall be one (1) underbody slide-out step. Platform shall be constructed from 9" deep "Diamond Back" non-slip vented aluminum stair treads mounted to underbody using Delron plastic slides for corrosion resistance. Step slide shall be securely held in both out and stored position, utilizing a heavy duty pneumatic cylinder designed to have an

over center location which will assist the step in both extension and retraction. Each step shall be designed to hold 500 lbs.

- One (1) OnScene 9" Night Axe LED ground light shall be provided below the body.

CURBSIDE COMPARTMENT - AHEAD OF REAR WHEEL (C2)

SIDE ENTRY DOOR

Access to the interior body compartment shall be provided through a side entry door. The door opening shall be approximately 29" wide x 86" high.

Construction of the side entry door shall be with 1/8" aluminum exterior smooth plate, the interior door pan being constructed from 1/8" aluminum tread plate.

The door shall be hung on full height 14 gauge stainless steel hinge, with a 1/4" stainless steel pin. The hinge shall be bolted to the door and body with stainless steel machine screws at offset 5" centers. The hinge shall be slotted horizontally and vertically for ease of adjustment. A polyester barrier film gasket shall be placed between the stainless steel hinge and door.

The latch mechanism shall include a paddle handle on inside and a locking offset bent "D"-ring handle on exterior. A polyester barrier film gasket shall be placed between the stainless steel handles and the aluminum door panels. The door latch shall be a double catch two-point safety slam latch recessed inside the double panel door with strike plate mounted top and bottom of door frame.

- 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.

- One (1) OnScene 9" Night Axe LED ground light shall be provided below the body.

ENTRY HANDRAILS

There shall be two (2) handrails provided at entry door, one (1) 24" vertical on exterior of body on door handle side, and one (1) 48" on inside of door. The interior handrail shall be angled for optimum use when entering or exiting the walk-in portion of the body.

Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

WINDOW(S)

There shall be one (1) 18" wide x 22" high, double-paned insulated, non-sliding window(s) installed in the entrance door. Window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

WINDOW(S)

There shall be one (1) 18"wide x 22" high, double-paned insulated, vertical sliding window(s) installed in the entrance door. Window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish.

CURBSIDE COMPARTMENT - ABOVE REAR WHEEL (C3)

The interior useable compartment width shall be approximately 64.0" wide.

The compartment door opening shall be approximately 57.0" wide.

This compartment shall have a ROM roll-up door.

- 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.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup 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

- Two (2) OnScene 36" Night Axe LED compartment lights, vertically mounted.
- Bauer air compressor with air storage module.

CURBSIDE COMPARTMENT - REAR (C4)

The interior useable compartment width shall be approximately 56.0" wide.

The compartment door opening shall be approximately 49.0" wide.

This compartment shall have a ROM roll-up door.

- 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.

- There shall be NO keyed lock on this roll-up compartment door.

- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.

- One (1) aluminum drip pan/door finish guard shall be provided with the rollup 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 located on left side of vertical partition. 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) 400 lbs. slide-out tray(s) approximately 24" deep located one (1) on each side of vertical partition. 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.

- There shall be one (1) slide-out smooth aluminum vertical tool board(s) approximately 24" deep located on left side of vertical partition. Each tool board(s) 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. Each board shall be rated for a maximum 200 lbs. evenly distributed load. Each tool board shall utilize a pneumatic cylinder to hold the tool board in both the opened and closed positions.

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

    - Each tool board will be bolted to compartment floor.

- There shall be one (1) bolt-in vertical compartment partition(s) dividing the compartment into left and right sides.

– There shall be four (4) Zico 1000 series KD-UH walkaway type SCBA air pack bracket(s) with high cycle coated spring clips and angled foot plate (no CRS strap inc.).

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

- One (1) Hannay ECR1618-17-18 electric cable reel(s) capable of storing 200' of 10/3 electric cable. Reel(s) shall be designed to hold 110% of the capacity of cord length, with fully enclosed 45 amp, three (3) conductor collector rings. Reel(s) shall be mounted to channel structure that allows for side-to-side adjustment of reel position.

    - Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and not be more than 72 in. (1830 mm) above the operator’s standing position, and shall be marked with a label indicating its function.

- A label shall be provided in a visible location adjacent to reel with following information: Current rating, Current type, Phase, Voltage, and Total cord length.

- The cable reel shall equipped with 200' of 10/3 SEOW yellow cable, a molded plastic ball clamp, and a single heavy duty L5-30 twist-lock female plug at the end.

– One (1) Akron model EJB series, cast aluminum electrical power distribution box with yellow powder coat painted finish shall be provided. The power distribution box shall meet all requirements described in NFPA 1901. The power distribution box shall include the following outlets mounted on a backlit face plate;

  – A 12" pigtail that terminates in an L5-30 configuration to match the cable on the cord reel. The outlet configuration shall include:

  – One (1) 120 VAC, 5-15 duplex straight-blade receptacle.

  - One (1) 120 VAC, 5-15 duplex straight-blade receptacle.

  – One (1) 120 VAC, 5-15 duplex straight-blade receptacle.

  – One (1) 120 VAC, 5-20 GFCI duplex straight-blade receptacle wired to protect all outlets in box.

– One (1) Akron formed aluminum treadplate vertical mounting bracket shall be provided for specified power distribution box.

Junction box holder shall be mounted to the Fairlead roller extension.

– The fairlead rollers shall be an OnScene Solutions extendable type to allow hoses or cords to be extended away from compartment door edges, slide trays, or shelving that may result in wear damage.

– Two (2) OnScene 63" Night Axe LED compartment lights, vertically mounted.

Command Light Control in Compt

- One (1) OnScene 9" Night Axe LED ground light shall be provided below the body.

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

REAR COMPARTMENT - CENTER (RC1)

The rear center compartment shall be closed to both side rear compartments.

The rear center compartment shall start at the bottom of the body, between the frame rails, and shall be as high as the body permits. The frame shall extend to the back of the body, stopping just inside the door opening.

The interior useable compartment width shall be approximately 45.0" wide.

The compartment door opening shall be approximately 42.0" wide.

This compartment shall have a ROM roll-up door.

- 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.
- There shall be NO keyed lock on this roll-up compartment door.
- One (1) nylon strap shall be provided to assist in closing the door. The strap shall be fastened to the left side of the lower inside door sill. The strap shall extend from the left side of the lower inside door sill to a footman loop attached to the center of the left side of the door frame.
- One (1) aluminum drip pan/door finish guard shall be provided with the rollup 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) adjustable shelf/shelves approximately 56" deep. Each shelf shall be fabricated from 3/16" 3003 aluminum sheet with a 2" vertical flange along the front and rear edges.
- 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.
- There shall be one (1) OnScene Solutions 81 series aluminum tray base with 100% extension, and rating of 1,000 lbs. Slide-out tray(s) base shall be approximately 56" 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 cable operated, spring loaded latch complimented by a large hand opening and red pull handle (Pull to Release) 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 shall be one (1) vertical partition(s) installed on tray dividing the tray into left and right sides. Vertical partition shall be horizontally adjustable; mounted on aluminum shelf trac on tray floor. Specified tripod lights to be mounted to partition.
- One (1) Hannay EFH1520-17-18 high pressure air hose reel(s) shall be provided in this compartment. Reel shall be designed to hold 110% of the capacity needed.
    - Power rewind control(s) shall be in a position where the operator can observe the rewinding operation and shall be marked with a label indicating its function and shall be guarded to prevent accidental operation.
    - A label shall be provided in a visible location adjacent to reel with following information: (1) Utility air or breathing air, (2) Operating pressure, (3) Total hose length, (4) Hose size (ID).

- The hose reel shall be equipped with 600' of 3/16" Parker 6,000 PSI, high pressure air hose. A molded plastic ball clamp shall be provided on the hose to stop it at the 4-way roller. The hose shall be Gray in color with a red color coded end.
  - The fitting on the end of the high pressure air hose reel shall be a CGA-347 high pressure fitting.
  - The air supply shall be from the mobile breathing air system. A reel shut-off valve, pressure regulator, and 0-6,000 psi gauge shall be provided at the air control panel.
- The air supply shall be from the mobile breathing air system.

- The fairlead rollers shall be an OnScene Solutions extendable type to allow hoses or cords to be extended away from compartment door edges, slide trays, or shelving that may result in wear damage.
- Two (2) OnScene 63" Night Axe LED compartment lights, vertically mounted.

PLASTIC FLOOR AND SHELF TILE

All compartment floors, shelves, and trays shall be covered with Dri-Dek plastic interlocking grating.

- The plastic floor tile shall be black.
- The plastic edge trim shall be red.

SIDE BODY PROTECTION - RUB RAIL

OnScene Solutions rub rails shall be provided below the compartment door openings on both the streetside and curbside.

The rub rail shall be fabricated from 6063 extruded aluminum, measuring approximately 2-3/4" high x 1-3/8" thick with tapered aluminum end caps. The rub rail shall be bolted to the body using stainless steel bolts and 1-1/2" diameter x 5/8" thick rubber mount isolators to prevent damage to the body.

The rails shall incorporate LED clearance marker lighting recessed into the rail fascia to avoid damage to the light in case of impact. The rub rail shall have an accessory mounting track integrated into the backside of the rail to allow mounting of accessories such as ground lighting.

3M™ Diamond Grade™ Conspicuity striping shall be provided in the rub rail. The striping shall be ~~red~~/white in color.

FRONT GRAVEL GUARDS

Gravel guards shall be provided on front lower body corners. Guards shall be 18" high, extend from behind cab or step and wrap around to the front compartment door opening fabricated from 20 gauge brushed stainless steel.

REAR BODY HANDRAILS

There shall be two (2) 24" vertical handrails on the rear of the body. Handrails shall be NFPA compliant 1-1/4" knurled 304 stainless steel with welded end stanchions.

ELECTRIC STEP

There shall be one (1) Kwikee 39 Series 12 volt, electric folding step(s) furnished and installed on completed vehicle under entry door. Step shall be 24" wide and shall fold up under the body to improve ground clearance during travel. Upon activation, the step shall drop out and down using electric actuators. The distance from the ground to the first step shall be no more than 24" per in accordance with NFPA 1901 guideline. The top surface of the step shall be covered with an NFPA 1901 nonskid compliant aluminum tread plate.

Step shall activate when the entry door is opened or closed.

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

The control for the awning shall be located inside the side body entry door in a convienent location.

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.

The awning control shall be located on the inside of the side access door.

AWNING HOUSING COLOR

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

ROOF ACCESS HATCH COVER

One (1) roof access hatch cover(s) shall be provided in the roof structure to allow for installation or removal of large equipment into the compartment area. The roof around the hatch opening shall be reinforced as necessary to prevent deflection in the roof area. The hatch cover shall overlap a 2" vertical lip on the body roof to prevent entry of moisture. It shall be sealed with automotive type rubber molding to provide a weather resistant seal.

The hatch cover shall have a lift-up type door hinged on the front side. The door shall be fabricated from 3/16" aluminum treadplate with a pair of pneumatic type cylinders mounted to hold the door in the open position. The door shall be

mounted using a full length 14 gauge stainless steel hinge, with 1/4" stainless steel pin. A polyester barrier film gasket shall be placed between the stainless steel hinge and any dissimilar metals as necessary to prevent corrosion.

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.

CAB TO BODY TALK THROUGH

The rescue body and cab shall be interconnected through a flexible weatherproof pass through opening at the front center of the body.

Opening shall be as large as possible and match the cab rear window so that minimum amount of rework is performed on cab.

The connection shall be completely watertight and weatherproof, yet providing a flexible connection between the two units. The flexible collar shall be a rubber liner, mounted to metal angle and tubing framework the body and cab. The edges of the opening shall be protected with aluminum angle moldings with stainless sheet metal screws. The collar and rubber liner shall be easily replaceable in future years if necessary.

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 Dow Thermax, or equal 1-1/2" glass-fiber reinforced polyisocyanurate foam core laminated between 1.0 mil smooth, reflective aluminum foil facers on both sides, with an R9.8 value. The reinforcement, along with chemical modifications, contributes to fire resistance and dimensional stability . 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.

The dividing wall between the Bauer compressor compartment and front walkin filling area shall be insulated with sound insulation material.

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.

INTERIOR WALKWAY FLOOR

There shall be Lonseal, Loncoin-II Flecks installed on the floor substrate. Loncoin II Flecks is a heterogeneous resilient sheet vinyl with a decorative raised coin texture, breathtaking color, and intriguing style. The fleck coloration provides camouflage for simpler maintenance while the raised coin embossing provides enhanced traction. Excellent for interior, retail, commercial, or institutional use where design parameters call for a high performance, sophisticated flooring solution.

Loncoin II Flecks is composed of polyvinyl chloride (PVC) resin, plasticizers, fillers, and pigments. The co-calendared wear layer is formulated to provide maximum resistance to foot traffic and most commercial and healthcare chemicals.

The middle layer provides dimensional stability, sound-absorbing properties, and resiliency under foot. The backing layer provides strength and stability of the flooring and enhances the bonding strength of the adhesive.

The material shall be black in color (Loncoin-II Flecks - Onyx).

Lonseal, Inc. warrants that Lonseal flooring products shall be free from manufacturing defects for a period of one (1) year from the date of purchase and that, when properly installed and maintained, shall not wear through as a result of normal foot traffic for a period of 7 years from the date of installation.

INTERIOR SUB-FLOOR

Above the body subframe shall be an isolation sheet that shall prevent outside elements from permeating the full length sound and thermal barrier of 3/4" thick grade plywood. The sheet shall be fabricated from the same type of material as is used in the subframe. The isolation sheet shall be flanged on both sides with a 1" high vertical break.

HEATER

The apparatus shall be provided with one (1) 35,000 BTU hot water type heater(s). The heater(s) shall be connected to the chassis engine cooling system and have three-speed, 12 volt blower. The cooling system lines shall be insulated and be provided with shut-off valves to isolate system, if required.

AIR CONDITIONER

One (1) Dometic Penguin, model 641835C 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.
Each unit shall be rated at minimum of 13,500 BTU cooling capacity. There shall be no heating element installed in this air conditioner.

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.

STREETSIDE INTERIOR AREA (IS1)

- One (1) Bauer model CFS5.5 3M, NFPA 1901 compliant containment type three (3) cylinder filling station with compressor controls rated for cylinder pressures up to 5,500 PSI shall be provided with proper reinforcement for

weight of fill station and venting thru floor opening. Fill station will be approximately 46.75" wide x 50.25" high x 21" deep, and weigh approximately 340 pounds.

- Filling operation shall be controlled with manual controls mounted on front of fill station. An air flow selector valve to fill from either compressor or storage, and manual valves and gauges for each air storage cylinder (maximum of four (4).
- An air storage refill port shall be provided on the fill station.
- One (1) high pressure air hose reel gauge(s), adjustable regulator(s), and fill control(s) shall be provided on front panel with outlet port located on the rear of the fill station.
- One (1) fill station fill line(s) shall have a quick disconnect with 2,216 psi fill adapter(s) and pressure relief valve.
  - The fill station fill whip(s) shall terminate in a high pressure 4,500 PSI, CGA-347 threaded SCBA connectors.

- 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.

Locate the two 110v outlets on the body interior as follows:

(1) shall be on the streetside offset towards the rightr hand side of the work surface, and (1) shall be located towards the right hand side above the fill station.

STREETSIDE INTERIOR AREA (IS2)

WINDOW(S)

There shall be one (1) 36" wide x 22" high, double-paned insulated, horizontal sliding window(s) installed. The window shall slide open towards the front of the vehicle such that wind pressure would tend to shut the window. Window shall have tinted automotive type safety glass mounted in an extruded aluminum frame. The frame shall have a black anodized finish. Sliding style windows shall be complete with a sliding screen.

- There shall be two (2) interior counter 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 30" W x 42" H x 18" D.
  - The above cabinet(s) shall have a 4" x 4" toe kick area at the base to allow for the top surface to be used as a working surface.

- The above cabinet(s) shall have double vertically hinged aluminum door(s) and painted with a hammer tone powder coat paint finish to match cabinet color choice.
  - There shall be one (1) vertically adjustable shelf in each of the above cabinets. It shall have a 1.25" lip to contain items while minimizing space used.

INTERIOR CABINET - WORK SURFACE

There shall be a work surface installed above the specified cabinet(s). The work surface shall be fabricated with 1/8" thick smooth aluminum, and painted with a hammer tone powder coat paint finish for a hard durable surface. Paint color shall be gray.

A flat work surface shall be installed on the top of the air fill station. There shall be a 1" lip installed to retain any equipment. Top shall be finished to match the rest of the interior color.

CURBSIDE INTERIOR AREA (IC1)

- The interior deck area over the top of the exterior side compartments shall be powder coat painted smooth aluminum.

CURBSIDE INTERIOR AREA (IC2)

There shall be a side entry door located in this area.

REAR INTERIOR AREA (IR1)

FLIP-UP SEAT

There shall be a flip-up seat sized for two (2) person/people. The seat bottom cushion shall be mounted to a spring loaded bracket system which shall return the cushion to vertical when not in use. The cushion shall be approximately 3" thick with a wood platform for stability. The cushion shall be covered with Duraware heavy duty fabric material in dark gray color.

There shall be a 3-point style seat belt for each position. The seatbelt(s) shall be red in color and comply with NFPA 1901 requirements. Seat(s) shall be connected into seat belt Occupant Restraint Indicator (ORI) and Vehicle Data Recorder (VDR).

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*
- SAE J553, *Circuit Breakers*
- SAE J554, *Electric Fuses (Cartridge Type)*
- SAE J1888, *High Current Time Lag Electric Fuses*
- 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:

21) The propulsion engine and transmission
22) All legally required clearance and marker lights, headlights, and other electrical devices except windshield wipers and four-way hazard flashers
23) 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)
24) 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
25) The minimum optical warning system, where the apparatus is blocking the right-of way
1) The continuous electrical current required to simultaneously operate any fire pumps, aerial devices, and hydraulic pumps
2) 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 MULTIPLEX CONTROL CENTER

The apparatus shall be equipped with a Weldon V-MUX multiplexed 12 volt electrical system that will provide complete diagnostic capability, No Exception. The system shall have the capability of delivering multiple signals via a CAN bus, utilizing specifications set forth by SAE J1939. The system shall be node based to maximize stability so that failure of one node does not affect the operation of the other nodes. The system shall use shielded twisted-pair wire for transmission of system function signals. The shielded wire shall provide protection against EMI and RFI noise interruptions.

The multiplex system shall be responsible for providing power management functions as well as load shedding. The warning light system shall be controlled by the multiplex system. The system shall be capable of displaying text and/or graphic messages on a display module. The system shall be based on solid-state technology and shall include self-contained diagnostic indicators.

Outputs:
The outputs shall perform all the following items without added modules to perform any of the tasks;

1. Load Shedding: The system shall have the capability to load shed with 8 levels any output. This means you can specify which outputs (barring NFPA restrictions) you would like load shed. Level 1 12.9v, Level 2 12.5V, Level 3 - 12.1V, Level 4 - 11.7V, Level 5 11.3V, Level 6 10.9V, Level 7 10.5, Level 8 10.1. Unlike conventional load shedding devices you can assign a level to any or all outputs.

2. Load Sequencing: The system shall be able to sequence from 0 8 levels any output. With 0 being no delay and 1 being a 1 second delay, 2 being a 2 second delay and so on. Sequencing reduces the amount of voltage spikes and drops on your vehicle, and can help limit damage to your charging system.

3. Output Device: The system shall have solid-state output devices. Each solid-state output shall be a MOS-FET (Metal Oxide Semiconductor - Field Effect Transistors); MOS-FETs are solid-state devices with no moving parts to wear out. A typical relay when loaded to spec has a life of 100,000 cycles. The life of a FET is more than *100 times* that of a relay.

4. Flashing Outputs: The system shall be able to flash any output in either A or B phase, and logic is used to shut down needed outputs in park, or any one of several combined interlocks. The flash rate can be selected at either 80, 160 or 200 FPM. This means any light can be specified with a multiplex truck with no need to add flashers. Flashing outputs can also be used to warn of problems or other unique idea you may come up with.

5. PWM: The modules shall have the ability to PWM at some outputs so that a headlight PWM module is not needed.

6. Diagnostics: An output should be able to detect either a short or open circuit. The system should be able report in “real time” a text based message that points the maintenance person to a specific output.

Inputs:
1. The inputs shall have the ability to switch by a ground or vbatt signal.

2. The inputs shall be filtered for noise suppression via hardware and software so that RF or dirty power will not trick an input into changing its status.

Auto-Throttle:

The multiplex system shall be able to perform automatic high idle via a network gateway or by using an existing output on a module to provide the proper signals to an OEM Engine ECU. This task should be handled with existing inputs and outputs.

Displays:

Displays shall be able to provide real time information regarding load shedding and system status, such as network traffic/errors or shorts and open circuits.

System Network:

The multiplex system shall contain a Peer-to-Peer network. A Master Slave Type network is not suitable for this type of unit. A Peer-to-Peer network means that all the modules are equal on the network; a Master is not needed to tell other nodes when to talk, **No Exceptions.**

System Reliability:

The multiplex system shall be able to perform in extreme temperature conditions, from 40° to +85° C (-40° to +185° F.) The system shall be sealed against the environment, moisture, humidity, salt or fluids such as diesel fuel, motor oil or brake fluid. The enclosures shall be rugged to withstand being mounted in various locations or compartments around the vehicle. The modules shall be protected from over voltage and reverse polarity.

WELDON CERTIFICATION

A letter shall be provided with bid submittal that the Contractor has successfully completed the Weldon training requirements for Level 1 of the V-MUX Certified Supplier Program and is authorized to design, build, and service V-MUX electrical systems.

MULTIPLEX SYSTEM VISTA IV V-MUX COLOR DISPLAY

One (1) Weldon V-MUX Vista IV shall be provided. The Vista IV shall have seven switches with custom legends and a wide temperature operating range. The four wires shall control all lighting. The Vista IV shall have color changes for button status. The display shall be pre-programmable (OEM Level) and be colored. The auto climate control shall display temperature set point and outside temperatures. The Vista IV shall be ready for back-up camera, thermal cameras and DVDs. Virtual switches, GPS, on-board diagnostics, 6” and 9” Pana Vise options and large font size shall also be included.

The Vista IV allows for peer to peer networking. The Vista IV shall have the ability to automatically change screens based on a predetermined state or condition for warning message or status.

The V-Mux display shall be located in the cab centered on the cab dash for control of all master and emergency lights.

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 model Auto Charge 1200 single battery conditioner, with 120 VAC input and 40 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 manual eject shore power inlet with a gray weather resistant snap cover shall be provided. The protective ground from the shoreline inlet shall be bonded to the vehicle frame.

3) The shore power plug shall be located below the driver's door area, in the cab step riser.

ENGINE COMPARTMENT LIGHT

There shall be one (1) light(s) mounted in the engine compartment with integral switch with a light output of at least 20 candlepower (250 lumens). The engine compartment light(s) shall operate only when the master battery switch is turned "On".

MAP LIGHT

A Havis Shields C-MAP-TL, 18" goose neck 12 volt map light(s) shall be provided and installed on the officer side dash area.

35 WATT HANDHELD HID SPOT LIGHT

An FRC Collins model CD-CL-HID-1 handheld light shall be supplied. The spot light fixture shall have a textured powder-painted black housing and cast handle with overall dimensions no more than 8-1/4" long, 7-3/4 wide, and 11 3/4 high. It shall have a 35 watt Xenon HID bulb with an integral 12 volt ballast. The fixture shall have an on/off/momentary on rocker switch located on the handle. Operating current shall be 3.5 amps with a maximum inrush current of 6 amps. The light shall be powered through a nine (9) foot coiled power cord with a dashboard power outlet plug.

Location of spotlight(s) shall be determined by the Surrey Fire Department at the pre-construction meeting.

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:

4) Any passenger or equipment compartment door is not closed.
5) Any ladder or equipment rack is not in the stowed position.
6) Stabilizer system is not in its stowed position.
7) 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

An electronic back-up alarm shall be supplied and installed by the cab/chassis manufacturer. The back-up alarm shall actuate automatically when the transmission gear selector is placed in reverse.

INTERIOR LED LIGHTS

Five (5) OnScene Solution model #70156, 10” x 10” x 7/8”, 10-30 VDC, surface mount dual red and white LED light(s) with clear lens shall be provided throughout the vehicle. Each light shall be individually switched with a high/low intensity setting switchable at the entry door(s). In addition light(s) will be capable of a five (5) second delay after switching off.

TAIL LIGHTS

Rear body tail lights shall be vertically mounted and located per Federal Motor Vehicle Safety Standards, FMVSS and Canadian Motor Vehicle Safety Standards CMVSS. The following lights shall be furnished;

- Two (2) Federal amber LED QL64Z-ARROW turn signal lights
- Two (2) Federal red LED QL64Z-BTT stop/tail lights
- Two (2) Federal white LED QL64Z-BACKUP back-up lights

Each of the lights above shall be mounted in a QL64MC, individual chrome finish bezel.

MIDSHIP MARKER/TURN SIGNAL

Two (2) Whelen model T0A00MAR 2" round amber LED midship body clearance marker/turn signal lights shall be provided and installed, one (1) light on each side of the body, in forward wheel well of rear axle. Midship marker/turn lights shall be wired to the headlight circuit of the chassis.

MARKER LIGHTS

The body shall be equipped with all necessary clearance lights and reflectors in accordance with Federal Motor Vehicle Safety Standards (FMVSS) and Canadian Motor Vehicle Safety Standards (CMVSS) regulations. All body clearance lights shall be Truck-Lite Model 18 LED to reduce the need for maintenance and lower the amp draw. Clearance lights shall be wired to the headlight circuit of the chassis.

CAB STEP LIGHTS / GROUND LIGHTS

There shall be two (2) OnScene 9" Night Axe LED light(s) installed on the vehicle capable of providing illumination at a minimum level of 2 fc (20 lx) on ground areas within 30 in. (800 mm) of the edge of the vehicle in areas designed for personnel to climb onto or descend from the vehicle to the ground level.

Lighting designed to provide illumination on areas under the driver and crew riding area exits shall be switchable but activated automatically when the exit doors are opened.

LICENSE PLATE LIGHT

One (1) Arrow #437 chrome plated LED license plate light shall be installed on the rear of the body. License plate light shall be wired to the headlight circuit of chassis. A fastener system shall be provided for license plate installation.

ELECTRONIC SIREN

One (1) Federal PA300-012MSC, 100 watt electronic siren with standard microphone shall be provided in cab. The siren shall be installed as close to the 12 volt control panel as possible.

SIREN SPEAKER

One (1) Federal Signal model ES100, 100 watt siren speaker shall be provided with model ESFMT polished trim ring with recess mount.

The siren speaker shall be located on the streetside of front bumper.

The specified speaker shall be upgraded with a stainless steel "F" style grille.

SURFACE MOUNT FLOODLIGHT(S) - LED

There shall be one (1) Whelen Pioneer Plus model PFP2 with dual panel Super LED light(s) on front face of the body. Light shall be 12 VDC, 12 amp, 150 watt, with 14,000 useable lumens.

Light shall be mounted in a PBA203, surface mounted, painted white housing with a 15 degree downward angle.

The lights shall be switched at the Vista display in the cab.

SIDE SCENE LIGHTS

There shall be four (4) Federal QL97LEDSCENE, 9” x 7” recess mounted LED scene lights provided on the upper body. Light quantity shall be divided equally per side. Each light will have a clear lens and chrome bezel.

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 Vista display in the cab.

REAR SCENE LIGHTS

There shall be two (2) Federal QL97LEDSCENE, 9” x 7” recess mounted LED scene lights provided on the upper rear body. Each light will have a clear lens and chrome bezel.

The lights shall be switched at the Vista display in the cab.

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

SIGTRONICS INTERCOM SYSTEM

The following Sigtronics intercom system shall be provided and installed to improve the safety of firefighters and rescue professionals through enhanced communication and hearing protection. System shall have the following major components as minimum;

Onw (1) US-45S Intercom system
One (1) SE-8SRPTT headset with slotted ear piece and radio PTT (driver)
One (1) SE-8RPTT headset with radio PTT (passenger)

Two (2) SE-8 headsets intercom (rear crew)

INTERCOM SYSTEM INSTALLATION

The above listed intercom system shall be installed in the cab locations as follows;

Front of Cab

- Driver's – Mounted above the right shoulder position on ceiling.
- Officer's – Mounted above the left shoulder position on ceiling.

Rear Crew Area

- Driver's side rear facing – Above the right shoulder on the wall or ceiling.
- Driver's side rear facing center – Above the left shoulder on the ceiling.
- Officer's side rear facing – Above the left shoulder on the wall or ceiling.
- Officer's side rear facing center – Above the right shoulder on the ceiling.
- Driver's side forward facing – Above the right shoulder on the rear wall or ceiling.
- Driver's side forward facing center – Above the left shoulder on the rear wall or ceiling.
- Officer's side forward facing – Above the left shoulder on the rear wall or ceiling.
- Officer's side forward facing center – Above the right shoulder on the rear wall or ceiling.

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) Federal Signal Corporation JetSolaris 54" model JLX5401-NFPA Solaris LED lightbar permanently mounted to the cab roof. The lightbar shall include eight (8) forward facing large Solaris reflectors, three (3) side facing small Solaris reflectors, and no rear facing lights.

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.

The lightbar shall be separately switched at the vista display in the cab.

ZONE B & D - SIDE WARNING LIGHTS

There shall be four (4) Federal Signal QuadraFlare model QL97SFRR, 9" x 7" split LED red/red lights provided, two (2) on each side of the apparatus in the upper corners. Each light shall have a clear lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONE C - REAR WARNING LIGHTS

There shall be two (2) Federal Signal QuadraFlare model QL97SFC-RA, 9" x 7" split LED red/amber lights provided, one (1) on each side of the apparatus in the upper corners. Each light shall have a clear lens and chrome flange.
Lights shall have a split lens where the upper half shall be the RED LED section, and the lower half shall be the AMBER LED section.

The lights shall be switched at the Vista display in the cab.

GTT OPTICOM

A GTT 795 Opticom emitter light shall be provided on the cab roof. The Opticom shall be activated with the light bar and de-activated when the park brake is set and the vehicle is in the blocking mode.

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) Federal Signal QuadraFlare model QL64XFR, 6" x 4" red LED lights provided, one (1) on each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

There shall be one (1) Federal Signal QuadraFlare model QL73XFC, 7" x 3" clear LED light provided in grille area. Light shall have a clear lens and chrome flange.

All clear lights shall shut down when the parking brake is set to comply with "Blocking" mode requirements as outlined in NFPA 1901.

The lights shall be switched at the Vista display in the cab.

ZONES B AND D - CAB INTERSECTOR LIGHT (CAB FRONT CORNERS)

There shall be two (2) Federal Vipor VPX802-4 LED lights provided, one (1) on each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

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

There shall be two (2) Federal Signal QuadraFlare model QL64XFR, 6" x 4" red LED lights provided, one (1) on each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

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

There shall be two (2) Federal Signal QuadraFlare model QL64XFR, 6" x 4" red LED lights provided, one (1) on each side. Each light shall have a red lens and chrome flange.

The lights shall be switched at the Vista display in the cab.

ZONE C - REAR WARNING LIGHTS (LOWER REAR CORNERS)

There shall be two (2) Federal Signal QuadraFlare model QL64XFR, 6" x 4" red LED lights provided, one (1) on each side. Each light shall have a red lens and chrome flange.

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

LINE VOLTAGE ELECTRICAL SYSTEM

LIMA PTO GENERATOR

The vehicle shall be equipped with a Lima MAC 360 series, single bearing generator system with a capacity of 40,000 watts at 120/208 volt, 3-phase. Current frequency shall be stable at 60 hertz.

The transmission's PTO port and PTO, or the split shaft PTO, and all associated drive shaft components shall be rated to support the continuous duty torque requirements of the generator's continuous duty rating as stated on the power source nameplate.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO, the driving compartment speedometer shall register when the generator drive system is engaged.

Where the generator is driven by the chassis engine and transmission through a split shaft PTO and a chassis transmission retarder is furnished, it shall be automatically disengaged for generator operations.

The direct drive generator shall be mounted so that it does not change the ramp breakover angle, angle of departure, or angle of approach as defined by other components, and it shall not extend into the ground clearance area.

The direct drive generator shall be mounted away from exhaust and muffler areas or provided with a heat shield to reduce operating temperatures in the generator area.

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.

GENERATOR ENGAGEMENT

A "Generator Engaged" indicator shall be provided in the driving compartment to indicate that the generator shift has been successfully completed.

An "OK to Operate Generator" indicator shall be provided in the driving compartment to indicate that the generator is engaged (if not always engaged), the transmission is in the proper gear (if required, automatic transmissions only), and the parking brake is engaged (if applicable).

An interlock system shall be provided to prevent advancement of the engine speed in the driving compartment or at any operator's panel unless the parking brake is engaged, and the transmission is in neutral or the output of the transmission is correctly connected to a pump or generator instead of the drive wheels.

WARRANTY PERIOD

Provided such goods are operated and maintained in accordance with Marathon's written instruction; Marathon warrants that the MAC series PTO continuous duty generators shall be free from defects in material and workmanship for a period of one (1) year, from the date of delivery to the first purchaser.

GENERATOR MOUNTING

The generator shall be mounted between the chassis frame rails. The generator mounting brackets shall be fabricated using heavy duty steel tubing, or structural channel. The generator mounting shall be bolted and removable so that the generator can be lowered from under apparatus for service, if necessary. The generator case shall not extend below the bottom edge of the apparatus body.

POWER-TAKE-OFF GENERATOR DRIVE

There shall be a "Hot Shift" power-take-off (PTO) installed on the transmission PTO opening of the chassis. The "Hot Shift" PTO is provided to allow the engagement of the PTO at higher engine RPM speeds. The PTO output shall be connected to the generator through hollow tube type driveline with heavy duty universals.

The engagement of the PTO shall be in the chassis cab with a rocker switch and red pilot light to note engagement of the PTO or via the V-Mux screen if so equipped.

The power supply to the PTO engagement control shall be wired to the parking brake and a neutral position transmission switch to prevent engagement unless the vehicle is stopped and transmission has been placed in neutral.

The installation of the engine, transmission, driven accessories (power takeoffs (PTO), etc.) shall meet the engine and transmission manufacturers' installation recommendations for the service intended.

Model part number shall be Chelsea 277SMFJP-B5XV, 126% Ratio.

ENGINE SPEED CONTROL

An engine speed auxiliary control device (high idle switch or throttle) shall be installed to maintain a stable cycle output from generator when the apparatus is parked.

An interlock shall prevent the operation of the engine speed auxiliary control device unless the parking brake is engaged and the transmission is in neutral or park, or the parking brake is engaged and the engine is disengaged from the drive wheels.

The engine shall be prevented from regulating its own engine speed during times when engine rpm control is critical for consistent apparatus functions such as generator, water pump, or aerial operation.

LOADCENTER

The loadcenter shall be a Cutler Hammer, BR Series, specifically designed for protection and distribution of 120/208 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.

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 voltage, phase to neutral or phase to phase, in volts
- Line current in amperes

Individual line current and voltage shall be displayed at the push of a button.

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.

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:

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
- Frequency (Hz) meter
- 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:

- All line voltage power connections are made through receptacles on the power source and the receptacles are protected by integrated over current devices.

8) 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:

9) 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)
10) 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:

11) Separated by a minimum distance of 12 in. (300 mm) from exhaust piping or shielded from such piping
1) 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;

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

120/240 VAC SCENE LIGHTING

TRIPOD SCENE LIGHTS

Two (2) Fire Research Focus; model FCA656-S50, tripod telescopic light shall be provided. The light pole shall be anodized aluminum and have a knurled twist lock mechanism to secure the extension pole in position. The extension pole shall extend 28" and rotate 360 degrees. An internal brake shall slow the extension pole during lowering. The outer pole shall be a grooved aluminum extrusion. The folding legs shall be anodized aluminum tubing with plastic endcaps. The fully extended tripod system shall exceed a height of 8' and be less than 5' when collapsed. Wiring shall extend from the pole bottom with a 4' retractile cord.

The lamphead shall have one (1) 500 watt Optimum light installed. The bulb shall be accessible through the front. The lamphead shall direct 50 percent of the light onto the action area while providing 50 percent to illuminate the working area. The lamphead angle of elevation shall be adjustable at a pivot in the mounting arm and the position locked with a round knurled locking knob. The lamphead shall incorporate heat-dissipating fins and be no more than 5" deep by 3 3/8" high by 10" wide. Scene lights shall be provided with a lens or a means for preventing damage from water spray and shall be listed for wet location usage.

A weatherproof on-off toggle switch shall be mounted in a switchbox below the lamphead. A wire guard shall be furnished to protect the lamphead glass.

A tripod truck mount bracket set shall be provided for each light. Each set shall include a lower base plate, an upper lock with a quick release spring loaded locking pin, and a shim set.

Lights to be mounted in Compt. R1 vertical divider on slide-out tray.
SHOP NOTES
Make:Fire Research
Model: Focus
P/N: FCA656-S50-ON-6F3

LIGHT TOWER

One (1) Command Light Knight 2, KL450 Series light tower(s) shall be provided and installed on the completed unit. A flashing warning light shall be provided in cab, indicating when a light tower is not in nested position as required by NFPA 1901.

The Command Light shall be covered by a five (5) year limited warranty from defects in materials and workmanship. An operation, maintenance, and parts manual shall be provided with the completed unit.

The light tower shall extend 87-1/2" above the mounting surface and shall extend to full upright position in less than 15 seconds. The overall size of nested light tower shall be approximately 26" wide x 47" long x 13" high and weigh approximately 165 pounds.

Light Tower Construction and Design

The Command Light assembly shall be of aluminum construction, with stainless steel shafts and bronze bushings for long life and low maintenance.

The electrically controlled unit shall not require usage of the vehicle's air supply for operation, thereby eliminating the chance for air leaks in the vehicle braking system. Hydraulic or pneumatic type floodlights are not acceptable alternatives to the specified all electric light tower.

The light tower shall be tested to in wind conditions of 90 mph (150 kph) minimum. Other type floodlights that have not been tested to these conditions are not acceptable.

The light tower shall be capable of overhanging the side or back of the vehicle to provide maximum illumination to the vicinity adjacent to the vehicle for the safety of emergency personnel in high traffic conditions. Any tower that is only capable of rotations at the top of a pole is not an acceptable alternative to the specified tower.

Light Tower Electrical System

The light tower shall be a two-stage articulating device with a lighting bank on top of the second stage capable of continuous 360 degree rotation. The light shall be elevated by electric linear actuators, one (1) actuator shall elevate the light bank and one (1) actuator shall adjust the light bank angle from 0 to 110 degrees. Power for the light bank shall be supplied through power collecting rings thus allowing continuous 360 degree rotation in either direction.

The tower base shall have a light that illuminates the envelope of motion during any movement of the light tower mast per NFPA 1901.

Light Tower Floodlights

The Command Light model KL450 shall be equipped with the following bank of floodlights:

Floodlight manufacturer:	Optimum
Number of lamp heads:	Six (6) FQ 500 watt
Voltage:	120 volts
Watts of each lamp head:	500 watt
Total watts of light tower:	3,000 watts
Total lumens of light tower:	60,000 lumens
Configuration:	The light heads shall be mounted with three (3) on each side of the light tower, giving two (2) vertical lines of three (3) when the lights are in the upright position.

Light Tower Backlight Option

A backlight option shall be provided on the light tower. The lower pair of light heads shall be capable of being rotated about a horizontal axis 180 degree, providing light down on the vehicle or to the opposite side of the vehicle while allowing the fixed lights to remain pointed at the scene.

The hand-held remote control shall have an additional switch supplied for the backlight rotation option.

Light Tower Paint

The light tower shall be electrostatically powder coated with a hammer tone gray color.

Light Tower Controls: Wired Hand-held and Multiplex

The light tower(s) shall be controlled by both the specified Weldon multiplex Vista display in cab and with a hand-held 15-foot umbilical line remote control. The Vista display shall have a button programmed to take control from the wired controller. The program shall have four (4) different programmed quadrants to raise and face light tower too. System shall require a Weldon Node to control light tower system. The wired hand-held storage station shall have a switch to take control from the Vista display in cab.

The storage station for the remote control unit shall be equipped with a button to activate the "Auto-Park" automatic nesting feature. The remote control shall be located per the itemized compartment list and include;

Three (3) switches; one (1) for each pair of lights.
One (1) switch for light bank rotation.
One (1) switch for elevating lower stage.
One (1) switch for elevating upper stage.
One (1) switch for optional light bank rotation.
One (1) switch for the optional strobe.
One (1) indicator light to indicate when light bank is out of the roof nesting position.
One (1) indicator light to indicate when light bank is rotated to proper nesting position.

Light Tower Mounting

The specified light tower(s) shall be mounted on the roof of the apparatus body.

EQUIPMENT PAYLOAD WEIGHT ALLOWANCE

In compliance with NFPA 1901 standards, the special service vehicle shall be designed for an equipment loading allowance of 4,000 lbs. of Surrey Fire Department provided equipment based on a 30,001 - 40,000 pound gross vehicle weight rating.

EQUIPMENT

The following equipment shall be furnished with the completed special service vehicle;

(e) One (1) container of assorted stainless steel nuts, bolts, screws and washers used in the construction of the apparatus shall be provided with the completed apparatus.

REMAINING NFPA MINOR EQUIPMENT BY PURCHASER

All other minor equipment not specified above, but required by NFPA 1901, section 10.5.1 shall be supplied and mounted by Surrey Fire Department before the unit is placed in emergency service.