
MEMORANDUM

TO: All Plan Holders

FROM: City of Kirkwood

PROJECT: Geyer Road Resurfacing – Phase 2

DATE: July 13, 2023

SUBJECT: Addendum No. 1

PROJECT NUMBER: STP-5502 (609)

This addendum forms a part of the Contract Documents for the Geyer Road Resurfacing – Phase 2 Project. Contractors are required to acknowledge the receipt of addenda by signing and including all addenda with each bid form. FAILURE TO ACKNOWLEDGE RECEIPT OF ADDENDUM MAY SUBJECT BIDDER TO DISQUALIFICATION.

Notice to Bidders:

1. Revised Bid Book.

- Page 14 shall be replaced in the Bid Book. Item 902-99.02, Uninterruptible Power Supply has been added to the bid form.
- Page 31 shall be replaced in the Bid Book. JSP PP. Uninterruptible Power Supply, has been added to the table of contents.
- Pages 110A through 110L shall be added to the Bid Book. These pages are for JSP PP. Uninterruptible Power Supply.

2. Added Line Item on Ionwave.

- Item 902-99.02, Uninterruptible Power Supply has been added as a line item on Ionwave, under the Line Items tab.

3. Revised Plans.

- Sheet 78 of 82 shall be replaced in the Plan Set. Pay Item and note was added for Uninterruptible Power Supply.
- Sheet 82 of 82 shall be replaced in the Plan Set. Detail and callout for Uninterruptible Power Supply was added.

Name and Title of Signer (Print or type)
Contractor / Bidder Signature
_____ (Signature of person authorized to sign)
Date Signed:

End of Addendum No. 1

SIGNAL ITEMS					
902-05.13	SIGNAL HEAD, TYPE 3B	EACH		8	
902-08.11	SIGNAL HEAD, TYPE 1S, PEDESTRIAN	EACH		8	
902-08.33	SH-FLAT SHEET-SIGNAL SIGN	S.F.		30	
902-08.34	SIGNAL SIGN, MOUNTING HARDWARE	EACH		4	
902-27.08	POST, SIGNAL 8 FT. OR 2.4 M (POWDER COATED BLACK)	EACH		4	
902-32.20	POST, TYPE C, 20 FT. ARM OR 6.1 M ARM (POWDER COATED BLACK)	EACH		2	
902-32.25	POST, TYPE C, 25 FT. ARM OR 7.6 M ARM (POWDER COATED BLACK)	EACH		1	
902-32.35	POST, TYPE C, 35 FT. ARM OR 10.7 M ARM (POWDER COATED BLACK)	EACH		1	
902-42.81	CONTROLLER ASSEMBLY HOUSING, KEYBOARD ENTRY, 8 PHASE NEMA CONTROLLER (POWDER COATED BLACK)	EACH		1	
902-49.75	VIDEO DETECTION SYSTEM	EACH		1	
902-53.00	CONDUIT, 3 IN., TRENCH WITH TRACER WIRE	L.F.		140	
902-72.00	CONDUIT, 2 IN., PUSHED WITH TRACER WIRE	L.F.		126	
902-73.00	CONDUIT, 3 IN., PUSHED WITH TRACER WIRE	L.F.		219	
902-82.08	CABLE, 8 AWG 1 CONDUCTOR, POWER	L.F.		570	
902-83.08	CABLE, 16 AWG 2 CONDUCTOR	L.F.		1,000	
902-83.10	CABLE, 16 AWG, 5 CONDUCTOR	L.F.		1,010	
902-83.11	CABLE, 16 AWG 7 CONDUCTOR	L.F.		1,280	
902-86.10	POWER SUPPLY ASSEMBLY, TYPE 1	EACH		3	
902-88.10	PULL BOX, PREFORMED CLASS 1	EACH		2	
902-88.11	PULL BOX, PREFORMED CLASS 2	EACH		3	
902-88.12	PULL BOX, PREFORMED CLASS 3	EACH		1	
902-91.00	BASE, CONCRETE	C.Y.		13.4	
902-99.02	EDGE LIT LED STREET SIGN	EACH		4	
902-99.02	ACCESSIBLE PEDESTRIAN PUSHBUTTON	EACH		8	
902-99.02	UNINTERRUPTIBLE POWER SUPPLY	EACH		1	
Signal Pay Items Subtotal					

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JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

(Job Special Provisions shall prevail over General Special Provisions whenever in conflict therewith.)

A.	General – Federal JSP-09-02J
B.	Project Contact For Contractor/Bidder Questions
C.	Work Zone Traffic Management Plan (WZTMP) JSP-02-06M
D.	Emergency Provisions And Incident Management JSP-90-11
E.	Utilities JSP-93-26F
F.	ADA Compliance and Final Acceptance of Constructed Facilities LPA-15-07A
G.	Supplemental Revisions JSP-18-01X
H.	Project Coordination
I.	Final Payment Documents
J.	Disadvantaged Business Enterprise (DBE) Program Requirements
K.	Liquidated Damages Specified for Entrance Construction
L.	Earthwork Payment
M.	Relocated Signs
N.	Special Lit Stop Sign
O.	Rectangular Rapid Flashing Beacon System
P.	Daily Earthwork Duty
Q.	Field Verification
R.	Location of Existing Edge of Pavement
S.	Electronic Information for Bidder's Automation
T.	Do Not Disturb Items
U.	Sawcuts
V.	Stormwater Compliance Requirements NJSP-15-38
W.	Sidewalk Trench Drain
X.	Adjust to Grade Items
Y.	Existing Irrigation Systems
Z.	Curb Reflector
AA.	Pavement Marking Paint
BB.	Property Owner Agreements
CC.	Section 4(f) Mitigation Measures For Temporary Occupancy Report
DD.	Edge Lit LED Street Signs
EE.	Contractor Verification of Signal Base Locations
FF.	Lighting Cabinet Mounted on Signal Cabinet
GG.	Painting of Signal Equipment
HH.	Disposition of Existing City Equipment
II.	Accessible Pedestrian Pushbuttons And Signing
JJ.	Pedestrian Signal Heads
KK.	Video Detection System
LL.	16-Position Back Panel Wiring – Traffic Signal Cabinet
MM.	Metropolitan Sewer District of St. Louis Permit (No. 23MSD-00009)
NN.	Metropolitan Sewer District of St. Louis As-Built Submittals (No. 23MSD-00009)
OO.	Railroad Coordination, Flagging, and Insurance
PP.	Uninterruptible Power Supply

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PP. UNINTERRUPTIBLE POWER SUPPLY

1.0 Description. This specification establishes the minimum requirements for a complete emergency battery back-up system for use at traffic signals utilizing Light Emitting Diodes (LED) signals and pedestrian heads.

The Uninterruptible Power Supply (UPS) shall include, but not be limited to the following:

- UPS with Inverter, Charger, Tap Switching Transformer and Internal Power Transfer Switch.
- Automatic / Manual Bypass Transfer Switch unit.
- Batteries
- Cabinet
- Mounting hardware
- Wiring

The UPS shall provide reliable emergency power to a traffic signal in the event of a power failure or interruption.

2.0 Operation.

2.1 General. The UPS shall provide the following operational modes when operating on battery power:

- Full operation of all traffic signal devices
- Flash operation
- Combination of full and flash operation

2.2 Run Time. The UPS shall provide a minimum of 8.0 hours of full time operation with a 450 watt load. The minimum battery size requirement is listed in section 7.0, Battery Type.

2.3 Compatibility. The UPS shall be compatible with Model 332, 336, and 337 cabinets; an ITS cabinet; model 170 and 2070 controllers and any NEMA style cabinet and enclosures; an advanced transportation controller; and all cabinet components for full time operation.

2.4 Output Capacity. The UPS shall provide a minimum of 1100W/1100VA@25°C active output capacity with 83 percent minimum inverter efficiency with 30% minimum loading.

2.5 Output Voltage. When operating in backup mode, The UPS output shall be 120VAC \pm 2%, pure sine wave output, \leq 3%THD, 60Hz \pm 0.3 Hz.

2.6 DC System Voltage. The UPS DC system voltage shall be 48VDC nominal.

2.7 Transfer Time. The maximum transfer time allowed, from disruption of normal utility line voltage to stabilized inverter line voltage from batteries, shall be 5 milliseconds (ms). The same maximum allowable time shall also apply when switching from the inverter line voltage to utility-line voltage. Transfers to and from battery operation shall not interfere with the operation of the other equipment in the intersection.

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2.8 Operating Temperature. The UPS and all components shall operate without performance degradation over a temperature range of -40°C to +74°C with a maximum load of 70% of rated output of the UPS inverter.

2.9 Feedback Level. The UPS shall be tested and certified to Electrical Standards UL 1778 and CSA 107.3.

2.10 Surge Protection. The UPS shall have surge protection compliant with IEEE/ANSI C.62.41 Cat. A & B.

2.11 Reliability. The UPS system shall have a minimum Mean-Time-Before-Failure (MTBF) of 150,000 hours at a temperature of 25 degree C (77 degree F) and 100,000 hours at a temperature of 50 degree C (122 degree F).

2.12 Power and Control Connections. The UPS shall be easily installed, replaced, or removed by using easily removable cables for AC input, AC output, DC input, external transfer control/alarm and battery temperature sense.

2.12.1 AC Connection. The AC input and output shall be hard wired connections.

2.12.2 DC Connection. The DC connection shall be a recessed one piece connector rated to handle the maximum DC current required by the inverter while running on batteries.

2.12.3 Temperature Probe Connections. The battery temperature sensor inputs shall be panel-mounted connector.

2.13 Unit Failure. In the event of inverter/charger failure, battery failure or complete battery discharge, the automatic bypass transfer switch shall revert to Normally Closed (NC) (de-energized) state, where utility line power is connected to the cabinet.

2.14 Overload. The UPS Inverter Module must be able to shut down in order to protect against internal damage in the event of an overload at the output. The Inverter shall support an overload up to 115% for 2 minutes and then turn off the inverter output. The fault recovers when the overload is removed and line power returns.

2.15 Schedule.

2.15.1 The UPS shall provide a (2) time-of-day schedule settings programmable by the user.

2.15.2 The time-of-day schedule shall allow the user to program schedule operational modes as required, per intersection.

2.15.3 The UPS time-of-day function when programmed shall automatically change operational modes based on the time-of-day schedule. Operational modes shall be Red Flash or Full Operation.

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2.15.4 The UPS shall not switch from Flash Operation to Full Operation mode when the remaining battery capacity is ≤ 40 percent.

2.16 AC Feedback. The UPS shall prevent a malfunction feedback to the cabinet or from feeding back to the utility service.

2.17 UPS Failure Mode. In the event of UPS failure (inverter/charger or battery) or complete battery discharge, the internal power transfer relay shall revert to Normally Closed (de-energized) state and provide utility power to the intersection when utility line power is available to the cabinet.

2.18 Automatic Shutdown. The UPS shall initiate an automatic shutdown when battery output reaches 42.5VDC.

2.19 Destructive Discharge or Overcharge. The UPS shall be equipped with an integral system to prevent the battery from destructive discharge or overcharge.

3.0 Automatic Bypass Transfer Switch.

3.1 Rating. The UPS shall include an Automatic/Manual Transfer Switch rated at 120VAC/30 amps.

3.2 Automatic & Manual Bypass Switch. The Automatic Bypass Transfer Switch shall be a combination automatic/manual bypass switch. Placing the bypass switch in the "Bypass" mode shall transfer the intersection load from the UPS output directly to utility power. AC utility power must still be available to the UPS input, allowing the UPS to keep the batteries charged. An Inverter Input breaker shall be provided and located on the Bypass Switch so to shut off utility power to the UPS input, allowing safely disconnecting and removing the inverter. With the inverter turned off, the batteries can be safely disconnected from the system.

3.3 Indicator Light. The Automatic Bypass Transfer Switch shall include a bypass indicator light that automatically notifies the user when the Manual bypass switch is in Bypass position. The indicator light shall be illuminated when in UPS mode.

3.4 Status Relay. The Automatic Transfer Switch shall have an optional bypass status relay with normally open, dry contacts that automatically close when the Manual bypass switch is in Bypass position.

3.5 Integrated Switch. The manual bypass switch and the automatic transfer relay shall be integrated together within the Automatic Bypass Transfer Switch allowing the manual bypass switch to be rated at 15 Amp and to be integrated with the bypass indicator light.

3.6 Terminal Blocks. The Automatic Bypass Transfer Switch shall have terminal blocks capable of accepting #6 AWG wiring for the AC input and output with #10 AWG from the Automatic Bypass Transfer Switch to inverter/charger module.

4.0 Functionality.

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4.1 Output Voltage Regulation Mode.

4.1.1 The UPS shall include AVR (Auto Voltage Regulation) Functionality.

4.1.2 AC Input Voltage Range for Output Regulation. The Buck/Boost mode shall have a minimum range of 88 - 175 VAC

4.1.3 Transfer Set Points. There shall not be any user definable transfer set points for the buck boost mode.

4.1.4 Regulated Voltage. Whenever AVR mode is selected the output of the system shall be regulated between 108-130VAC. When the output of the system can no longer be maintained with this range, the UPS shall transfer to Backup Mode.

4.2 Circuit Breakers.

4.2.1 The UPS shall be equipped with an AC Input circuit breaker that protects both the UPS and the loads connected to the output.

4.2.2 Should the AC Input breaker on the UPS trip, it shall allow the UPS to go to inverter mode to power the intersection off of batteries.

4.2.3 Should an overload condition still exist when the inverter is energized the inverter will revert to its internal electronic protection, preventing damage to the inverter due to the overload or short circuit condition, on the output. Once this overload condition is cleared the inverter will energize and power the intersection utilizing the available battery power. If the condition does not clear itself, the inverter will stay in the standby mode until manually cleared by a technician.

4.2.4 The UPS shall have a flush mounted Battery circuit breaker installed on the front panel of the UPS inverter module.

4.3 Line Qualify Time. The UPS shall have a user definable line qualify time. The user shall be able to select a minimum of six (6) possible settings. The settings shall be 3, 10, 20, 30, 40 and 50 seconds. The default line qualify time shall be 3 seconds.

4.4 Battery Charger.

4.4.1 The UPS shall have an integral charger that is compatible with Gel and AGM battery topology. The charger shall be an intelligent charger with control systems that automatically incorporates bulk, absorption and float charging modes.

4.4.2 Battery Temperature Compensation. The integral Intelligent Charger shall use temperature compensation. The charging system shall compensate over a range of 2.5 - 6.0mV/°C per cell, user adjustable when required.

4.4.3 Battery Temperature Sensor. A temperature probe which plugs into the front panel of the UPS shall be used to monitor the internal temperature of the batteries. The Temperature

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sensor shall be 2 meter in length, external to the inverter/charger module and taped to the side of a center battery within the battery string.

4.4.4 Battery Temperature Charging. The batteries shall not be recharged whenever the battery temperature exceeds 50°C.

4.4.5 Recharge Time. The recharge time for the batteries from “protective low-cutoff” to 90 percent or more of full charge capacity shall not exceed 12 hours. The UPS charger shall be capable of providing 15 amps at 54VDC.

5.0 User Interfaces and Displays.

5.1 Inverter/Charger Display. The UPS inverter/charger unit shall include a backlit LCD display for viewing all status and configuration information. The screen shall be easily viewable in both bright sunlight and in darkness.

5.1.1 Screen Size. The screen shall be large enough to display the following information with the use of menu scrolling buttons to read required information. All active readings shall be real time.

- Operating Mode (Line, Standby, Backup, Buck / Boost)
- Utility input voltage
- UPS output voltage and current
- Battery Temperature
- Input Frequency
- Output Power
- Battery Voltage
- Charger Current
- Shed Timer Relays time to activation
- Ethernet MAC Address and IP Address
- Accumulated output power in kW hours
- Battery Runtime Remaining
- Unit Serial number
- Unit Firmware Version
- Any alarms and faults

5.1.2 Keypad. The UPS inverter/charger unit shall include a keypad for navigating system information.

5.2 Web-based Interface. The UPS shall be provided with a web-based-interface for user configuration and management through a web browser.

5.2.1 Minimum Capabilities. The UPS shall allow the user to do the following through the web browser

- View Logs
- Change modes of operation

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- Configure email alarms
- Adjust line qualify time
- Program relay contacts
- Configure network parameters.
- Inverter/charger firmware to be upgradeable remotely via Ethernet.
- Communication module firmware upgradeable remotely.

5.2.2 Status LEDs. The UPS shall have discrete status LED indications on the front of the inverter/charger.

5.2.3 Green Output LED. This LED will be ON any time that the output of the UPS is in normal mode. When the UPS output is either in Backup Mode or AVR Modes the LED will flash On and Off.

5.2.4 Red Fault LED. This LED will be Solid On any time that there are any faults in the system

5.2.5 Red Flashing Alarm LED. This LED will Flash On and Off any time that there are any alarms in the system.

5.2.6 Event Log. The UPS shall maintain an event log containing a minimum of 200 of the most recent events recorded by the UPS. These events shall be down loadable remotely via Ethernet and automatically reported to the central monitoring software. The Events Log shall be date and time stamped.

5.2.7 Events, Alarms and Faults. The UPS shall display and log the following events, alarms and faults.

- Operating Mode
- Weak Battery
- Overload
- High and Low Temperatures
- User Input,
- Line Frequency out of specifications
- No temperature probe
- Low Battery
- Battery Breaker Open
- UPS is performing a Self-Test
- Fan Fail
- Incorrect Firmware
- AC Input Breaker Open
- Short Circuit
- Output Voltage High
- Output Voltage Low
- Battery Voltage High
- Battery Voltage Low
- Isolation Relay Fail
- Temperature High

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5.2.8 Counters. The UPS shall keep track of the following:

- The number of times that the unit was in Backup Mode
- The accumulated number of hours and minutes that the unit has operated in Backup mode since the last reset.

5.3 Programmable Relay Contacts. The UPS shall provide the user six (5) programmable dry relay contacts and one (1) 48VDC relay contact. As a minimum, the programmable options shall be On Battery, Low Battery, Timer, Alarm, Fault, and Off. The UPS shall also have three (3) input dry relay contacts. UPS Self Test, User Alarm, and UPS Shutdown.

5.3.1 Relay Contact Terminals. The relay contacts shall be made available on the front panel of the UPS via 6, 3 position plug-in terminal blocks with screw down wiring connections.

5.3.2 Contacts. Each relay (1 through 5), shall have their own common and their own set of normally open (NO) and normally closed (NC) terminals. The terminals for each relay shall be oriented as NO-C-NC on the terminal block. Contact 6 shall provide continuous 48 VDC voltage for powering of enclosure DC fan.

5.3.3 Labeling. The contacts on the terminal block shall be labeled 1-18, left to right. Additionally, each set of contact shall be labeled with the NO-C-NC designation, as well as C1...C6 from left to right. Printed labels noting all alarms and faults shall be provided with the UPS Inverter/Charger to be installed when required.

5.3.4 Rating. The relay contacts shall be rated at a minimum of 1 amp @ 250 VAC.

5.3.5 On Battery Relay Contact. The dry relay contacts that are configured for “on battery” shall only energize when the Inverter is operating in Backup Mode

5.3.6 Timer Relay Contacts. The UPS shall include a timer that will energize the “timer” configured dry relay contact after the user configured time has elapsed. The timer is started when the UPS enters Backup Mode. The user shall be able to configure the timer to the required time. The format shall be Hours, Minutes, Seconds.

5.3.7 Low Battery Relay Contact. The UPS shall have an adjustable low battery relay setting. This setting shall be adjustable so that the user can set the point at which the low battery relay contact is energized.

6.0 Communications

6.1 Serial Interface. The UPS shall be equipped with an industry standard RS-232 serial connection for user configuration and management. The serial port shall be an EIA-232 (DB9-Female) connector.

6.2 Ethernet Interface. The UPS shall have an internal Ethernet communication interface for user configuration and management. The Ethernet Port shall be an RJ-45, EIA 568B Pin Out Connector.

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6.3 Remote Monitoring. The UPS shall include remote monitoring & alarms transmission capabilities through the Ethernet RJ-45 IP Addressable Port, using SNMP protocol.

6.4 Notification. System shall have the capability of notifying Operations, Maintenance or Engineering personnel via e-mail of any alarms, faults or events, user selectable. E-mail set up must allow for different levels of notifications based on the criticalness of the alarms.

6.5 User Configuration Menus. All UPS configuration and System menus shall be accessible and programmable from the RS-232 and Ethernet Port.

6.6 Communication Protocols. The UPS shall support TCP and UDP over IP protocol communications.

6.7 Application Layer Protocols. The UPS shall support FTP, Telnet, and HTTP.

6.8 Simple Network Management Protocol (SNMP). The UPS shall be SNMP compliant.

7.0 Batteries

7.1 Battery Type. The battery shall be comprised of extreme temperature, float cycle, GEL VRLA (Valve Regulated Lead Acid) or AGM components.

7.1.1 Individual batteries shall meet the following specifications:

- Voltage Rating: 12V
- Amp-hour rating: 109 AH, at the 20 hour rate, to 1.75 Volts per cell, minimum battery rating.

7.1.2 Larger AH batteries are acceptable providing they do not exceed the group size listed below (Case 31):

- Group size: Case 31
- Batteries shall be easily replaced and commercially available off the shelf
- Batteries shall provide 100% runtime capacity out-of-box. Each battery must meet its specification without the requirement of cycling upon initial installation and after the initial 24 hour top off charge.

7.2 Battery String. Batteries used for the UPS shall consist of 4 batteries configured for a 48 VDC battery buss system.

7.3 Operating Temperature. The battery system shall consist of one or more strings of extreme temperature; float cycle GEL VRLA or AGM batteries. Batteries shall be certified to operate at extreme temperatures from -40°C to +71°C.

7.4 Construction.

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7.4.1 Terminals. The batteries shall have maintenance-free threaded insert terminals eliminating annual torqueing. Battery terminals that require annual torqueing of each post connection shall not be permitted.

7.4.2 Ability to Function. An integral lifting handle should be provided on the batteries for ease of removal/installation.

8.0 Cabinet.

8.1 General.

8.1.1 UPS Cabinet Dimensions. The dimensions for the UPS cabinet shall not exceed 50 inches in height, 17 inches in width and 17 inches in depth.

8.1.2 Inverter/Charger Mounting. The Inverter/Charger Unit shall be shelf or rack mounted on a standard EIA19" rack.

8.1.3 Automatic Transfer Switch Mounting. The Automatic Transfer switch shall be mounted on EIA 19" Rail.

8.1.4 Interconnect Wiring. All interconnect wiring shall be provided and shall be UL Style 1015 CSA TEW.

8.2 UPS Replacement. The UPS equipment and batteries shall be easily replaced and shall not require any special tools for installation.

8.3 Hot Swappable. The UPS inverter and batteries shall be hot swappable. There shall be no disruption to the Traffic Signal when removing the inverter or batteries for maintenance.

8.4 Quick Disconnects. All inverter and battery connections shall be of the quick disconnect type for ease of maintenance

8.5 Ancillary Installation Hardware. All necessary installation hardware (bolts, fasteners, washers, shelves, racks, etc.) shall be included.

8.6 Cabinet Sizing. The external cabinet shall be capable of housing batteries up to a group 31 size, inverter/charger power module, automatic transfer switch, control panels, wiring, wiring harnesses, and all other ancillary equipment.

8.7 Cabinet Type. The UPS shall be installed as side-mounted to a Traffic Controller cabinet with no mounting brackets required.

8.8 Rating. All external cabinets shall be NEMA 3R rated. The enclosure shall be made of 0.125 (5052-H32) aluminum.

8.9 Ventilation.

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8.9.1 The external cabinet shall be ventilated through the use of louvered vents, filter, and one thermostatically controlled fan. The filter shall be the re-usable type and matching the dimensions of the louver with both located on the bottom half of the door.

8.9.2 The cabinet fan shall be DC operated for longer reliability.

8.10 Ancillary Hardware. The UPS cabinet shall come with all bolts, washers, nuts required to mount it to a Controller cabinet.

8.11 Accessibility. All components, terminations, terminal blocks, relays, etc. shall be fully accessible.

8.12 Shelves. Battery shelves shall be located in the bottom half of the enclosure. Air must be allowed for flow from the bottom of the cabinet and up the back internal wall. Neither the top battery shelf nor the Power Module shelf shall inhibit the airflow to the top of the cabinet.

8.13 Locking. The cabinet shall include a 3 point locking system, including a Type 2 Corbin lock and utilize a handle with pad locking capability.

8.14 Cabinet Options. The following options shall be available for the cabinet:

- On-Battery lamp mounted externally on the top of the cabinet that illuminates when the UPS is operating in inverter mode.
- Battery Heater Mats to increase battery capacity in cold climates.
- Receptacle plate assembly that mounts on the transfer switch panel to provide utility power to the battery heater mats.
- Automatic Generator Transfer switch that senses a generator is connected and automatically switches to the generator source.
- Internal lamp with door push-button switch to illuminate the interior of the cabinet.
- Status monitoring dry contacts for the Automatic Transfer Switch and the Generator Transfer Switch.

9.0 Maintenance.

9.1 Probe Jacks. The UPS shall provide voltmeter standard probe input-jacks (+) and (-) to read the exact battery voltage drop at the inverter input.

9.2 Self-Testing. The UPS Inverter Module shall be programmable to perform automatic self-testing, programmed in weekly intervals and programmed by the user to meet their specific requirements or manufacturer's recommendation. During self-test the UPS Inverter Module shall identify a weak battery or multiple batteries in the string that have reached a weak state and notify maintenance by initiating a Weak Battery Alarm.

9.3 Remote Battery Monitoring Specifications.

9.3.1 Provide a remote battery monitor system (RBMS) to be permanently installed into the UPS/Battery cabinet to monitor the four UPS batteries (4-12V battery blocks).

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9.3.2 The RBMS shall have the ability to monitor, read and record both the battery string and individual battery voltages, admittance (internal battery resistance), individual battery temperatures and to provide a real-time evaluation of the battery bank health.

9.3.3 The RBMS shall have a built in web interface for communications over Ethernet. The device shall be hardened and operate at a temperature range of -40C to +65C. The device shall include individual 12 volt battery sensors and operate in the range of -40C to +80C. Communications shall be SNMP via TCP/IP.

9.3.4 The RBMS shall include software to automatically poll each intersection, up to 100 per software program, reading individual battery voltage, admittance and temperature, confirming each is within its user programmable parameters.

9.3.5 The system shall have the ability to program the intervals as to when each reading is taken, by days, weeks or months. The software shall be provided as part of the system cost.

9.3.6 The RBMS shall also perform as a battery balancer, continuously monitoring all batteries in the string and to interface with the UPSs charger voltage/current so to keep the batteries equal with all batteries within the battery string.

9.3.7 The RBMS shall allow for any single 12V battery within the battery string to be replaced without replacing all batteries in the string during the battery warranty period.

10.0 Warranty.

10.1 Battery Backup System.

10.1.1 The UPS System shall include a five-year warranty on parts and labor on the entire UPS System, including batteries, to the Agency when utilizing the UPS Manufacturers own designed enclosure, meeting the above cabinet specifications.

10.1.2 Should the agency decide not to use the enclosure provided by the UPS Manufacturer, the manufacturer must provide a three-year warranty on parts and labor on the UPS Inverter Module only.

10.2 Batteries. The UPS Manufacturer must provide a 5 year unconditional full replacement warranty for every battery sold to the City with the UPS under this specification. Under the warranty time period, the battery must provide a minimum of 70% of its original capacity; otherwise it will be considered to be non-compliant to the warranty and replaced at no cost to the City or MoDOT by the UPS manufacturer.

11.0 Vendor Support

11.1 Technical Support. The UPS manufacturer shall provide a toll-free technical support phone number. The toll-free phone number shall be included in the UPS manual.

11.2 Documentation. Equipment manuals must be provided for each UPS cabinet. Equipment manuals shall include installation, operation, programming, maintenance and troubleshooting.

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12.0 Quality Assurance.

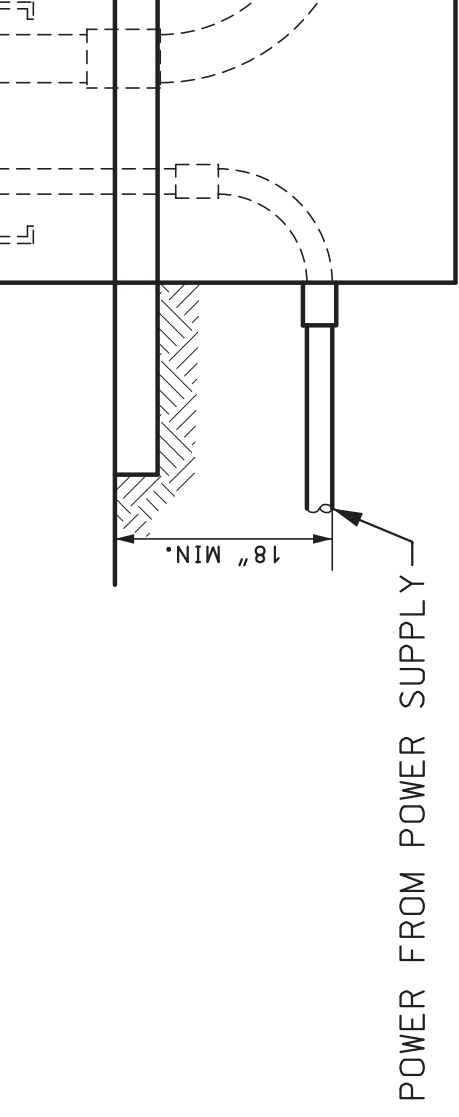
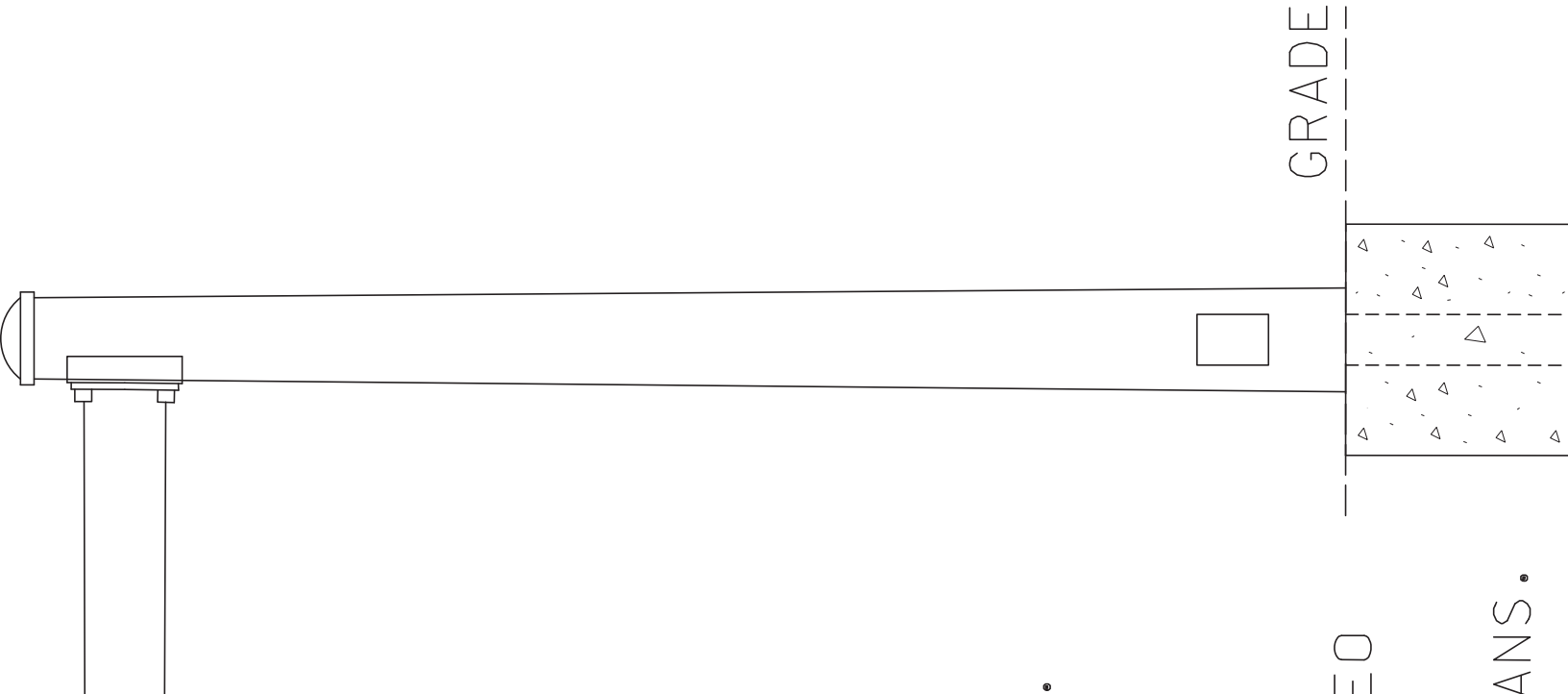
12.1 Design and Production. Each UPS shall be manufactured in accordance with a written manufacturer's Quality Assurance program. The QA program shall include, as a minimum, specific design and production QA procedures.

12.2 ISO Certified. The UPS Power Module manufacturer shall be ISO 9001 or ISO 9002 certified.

12.3 Design Qualification Testing. The manufacturer shall be certified to carry out the CSA and UL standards testing on the UPS system.

13.0 Method of Measurement. Method of measurement shall conform to Sec 902.

14.0 Basis of Payment. Payment will be for 1 unit per bid item "902-99.02 – Uninterruptible Power Supply". Payment will be considered full compensation for all labor, equipment and material to complete the described work.



POWER FROM POWER SUPPLY

18" MIN.

(LIGHTING CABINET MAY BE
RIGHT SIDE OF CABINET IF
TO PEDESTAL)

SIGNAL CONTROL
UNINTERRUPTIBLE
AND LIGHTING

CONTROLLER CABINET

CONTROLLER AND
SIGNAL BREAKER