

**Exhibit 1-B  
Additional Requested Elements**

**A.1 ARE #1 – Protection of Power Circuits for Fire Alarm and CCTV**

**A.1.1 Related Documents**

~~AREs shall follow the requirements of the Contract. Drawings and general provisions of the Contract, including General and Supplementary Conditions, Book 1, Book 3, Controls and Instrumentation and System Commissioning apply to this section.~~

**A.1.2 Summary**

General scope of work includes:

The site has had issues with power surges causing outages with the FFSS and CCTV systems. Power conditioners or another technical solution is needed to ensure better resiliency and reliability for power to the systems. All new equipment must be compatible with the existing equipment. It is recommended to provide a Programmable Logic Controller (PLC), manufactured by Stormin Protection Products, Inc., or approved equal, as well as replacement and upgrades to the existing Uninterruptible Power Supplies associated with the Fire Alarm and CCTV systems, including all workstations and power to all control equipment.

**A.1.3 Definitions**

- A. FFSS - Fixed Fire Suppression System
- B. CCTV - Closed Circuit Television

**A.1.4 Action Submittals**

- A. Bill of Materials: A listing shall include all panels, racks, instruments, components, and devices provided under this section.
- B. Product Data: Drawings and descriptive (catalog) data and brochures of each item of equipment including technical data sheets for all equipment and components.

**A.1.5 Shop Drawings**

- A. Detail equipment assemblies, method of field assembly, components, and location and size of each field connection.
- B. Wiring Diagrams: Power, signal, and control wiring

**A.1.6 Quality Assurance**

- A. Installer Qualifications: Minimum 5 years of experience in the design and installation of fire alarm and CCTV systems. Factory trained by Edwards Systems Technology and Aviligon in the design and installation of the associated systems.

1. Maintenance Proximity: Not more than two (2) hours' normal travel time from Installer's place of business to Project site.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.
- D. Comply with NFPA 72.

**A.1.7 Demonstration**

Experienced system designer or installer to train Owner's maintenance personnel. Owner's training shall consist of two (2), four (4) hour trainings with Owner's Maintenance & Operations Personnel.

**A.1.8 Operation and Maintenance Manuals**

Provide two (2) hard copy sets and digital copy of operation and maintenance documents. Include final as-built wiring interconnect diagrams, product data sheets, installation manuals, recommended spare parts list and routine inspection, testing and maintenance procedures.

**A.2 ARE #2 – Label Manholes and Walls for Ease of Maintenance Access with Signage**

Reserved

**A.3 ARE #3 – Update Fire Alarm System Custom Label Programming**

**A.3.1 Related Documents**

Drawings and general provisions of the Contract, including General and Supplementary Conditions, Book 1, Book 3, Controls and Instrumentation and System Commissioning apply to this section.

**A.3.2 Summary**

General scope of work includes:

Provide programming to update the existing zone and device descriptions in the fixed fire suppression control equipment and graphical workstations to align with the current tunnel zone naming conventions used by CDOT. All graphical maps and descriptions in the workstations are to be updated. Upon completion of the programming, perform field verification testing of each zone and all associated devices by simulating alarm conditions through the LIOS linear heat detection system and operation of all valves, switches, etc. for each deluge zone.

**A.3.3 Definitions**

- A. CDOT - Colorado Department of Transportation
- B. LIOS - Manufacturer name, LIOS Technologies

**A.3.4 Action Submittals**

- A. Custom Point Description List: Provide a list showing the new custom descriptions with associated address prior to programming.
- B. Testing Schedule: Provide a schedule and method of testing the system after programming is complete.

**A.3.5 Shop Drawings**

Provide drawings showing the correlation of the zones with the custom labels.

**A.3.6 Quality Assurance**

- A. Installer Qualifications: Minimum 5 years of experience in the programming of Edwards System Technology fire alarm systems. Factory trained by Edwards Systems Technology.
- B. Comply with NFPA 72.

**A.3.7 Demonstration**

Demonstrate program changes during testing to CDOT personnel.

**A.3.8 Operation and Maintenance Manuals**

Provide electronic copy of fire alarm system program. Provide electronic and hard copy of fire alarm system points list.

**A.4 ARE #4 – Electric System Analog to Digital Conversion**

**A.4.1 Related Documents**

Drawings and general provisions of the Contract, including General and Supplementary Conditions, Book 1, Book 3, Controls and Instrumentation and System Commissioning apply to this section.

**A.4.2 Summary**

General scope of work includes but is not limited to:

Converting the remaining electrical system analog monitoring and controls to digital on both west and east electrical 24.9kV, 2400V and 480V systems. Parts of the electric systems have been converted to or installed as digital on past projects. This project will

complete the system conversion to be fully digital and capable of being monitored and controlled from the Tunnel Operators in the control room. The new digital system shall be fully integrated and compatible with the existing digital hardware, software and firmware. The existing hardware, software and firmware shall be upgraded as required. The existing Power Control Board (PCB) is located in the East Ventilation Building Control Room. At project completion, the PCB shall no longer be required and / or used and shall be removed. Existing Power Control Board is shown in Reference Documents. Contractor shall repair area building elements to match existing room finishes.

Specific scope of work includes but is not limited to:

- 1) Create a new communications tie between East and West Switchboards through SCADA system.
- 2) The SCADA system shall display/monitor status of breakers and give Open / Close commands.
- 3) Assign I.P. addresses to the PXG900 Gateway and test system functionality of breakers.
- 4) Check position signals on all breakers and Open / Close command to spare breakers.
- 5) West Electric Room - Convert remaining (8) eight 480V circuit breakers from DIGITrip 550 to model equal to DIGITrip 1150 units capable of digital control and monitoring.
- 6) East Electric Room - Install an EATON PXG900 Gateway device.
- 7) East Electric Room - Convert (16) sixteen circuit breakers from Eaton DIGITrip 550 to model equal to DIGITrip 1150 units capable of digital control and monitoring.
- 8) East and West Electric Room - Remove retired-in-place MP3000 motor protection relays and all associated wiring and equipment. Provide and install new doors / front covers.
- 9) East and West Portal - Replace analog counters / timers on south tunnel fans with digital electronic timers to record motor run times. New timers shall be connected to existing SCADA system. Provide SCADA system upgrades as required.

#### A.4.3 Definition

- A. CDOT - Colorado Department of Transportation
- B. EJMT - Eisenhower Johnson Memorial Tunnel

#### A.4.4 References

- A. International Electrical Testing Association:
  1. NETA ATS - Acceptance Testing Specifications

B. National Fire Protection Association:

1. NFPA 502 - Standard for Road Tunnels, Bridges, and Other Limited Access Highways
2. NFPA 70 - National Electric Code

**A.4.5 Action Submittals**

- A. Bill of Materials: A listing shall include all panels, racks, instruments, components, and devices provided under this section.
- B. Product Data: Drawings and descriptive (catalog) data and brochures of each item of equipment including technical data sheets for all equipment and components.

**A.4.6 Shop Drawings**

- A. Detail equipment assemblies, method of field assembly, components, and location and size of each field connection.
- B. Wiring Diagrams: Power, signal, and control wiring

**Deliverables by the Contractor**

Deliverable	Review, Acceptance, or Approval	Schedule
Digital Monitoring and Control System - Submittals and Shop Drawings	Acceptance	Per Design Schedule
Digital Monitoring and Control System - SCADA Integration Report	Approval	Within 90 days prior to integration
Digital Monitoring and Control System - Field Quality Control and System Start Up	Approval	Per Construction Schedule
Digital Monitoring and Control System - Commissioning and Training	Approval	Per Construction Schedule

**A.4.7 Quality Assurance**

- A. Installer Qualifications: Minimum of 10 years experience with control systems installation and integration of similar complexity.

1. Maintenance Proximity: Not more than two (2) hours' normal travel time from Installer's place of business to Project site.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

#### **A.4.8 Demonstration**

Experienced Integrator to train Owner's maintenance personnel. Owner's training shall consist of two (2), four (4) hour trainings with Owner's Maintenance & Operations Personnel.

#### **A.4.9 Operation and Maintenance Manuals**

Provide two (2) hard copy sets and digital copy of operation and maintenance documents. Include final as-built wiring interconnect diagrams, control logic, parameters, settings, I/O points, IP Addresses and schedules. This includes Software Overview, Maintenance, Troubleshooting, and Operation.