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- G. PASS/FAIL CRITERIA
- 3. THE FAT PROCEDURE SHALL MAKE REFERENCE TO ALL APPLICABLE MATERIALS
  - A. DETAILED DESIGN DRAWINGS
  - B. SHOP DRAWINGS (APPROVED)
  - C. PROCESS NARRATIVES
  - D. SOFTWARE PROGRAMMING REQUIREMENTS
  - E. NETWORK CONFIGURATION DOCUMENTS
  - F. P&IDS
- 4. NETWORK PERFORMANCE CRITERIA
- 5. VIDEO SYSTEM PERFORMANCE CRITERIA
- 6. TRAFFIC CONTROL DEVICES PERFORMANCE CRITERIA
- E. FACTORY TESTING FORMS FOR EACH OF THE SYSTEMS TO BE TESTED, FOR APPROVAL BY THE ENGINEER AND THE AUTHORITY.
- F. THE APPROVED FORMS SHALL BE USED FOR RECORDING THE TEST RESULTS DURING THE PROCEDURE AND INCLUDE SPACES FOR ENGINEER, CONTRACTOR/INTEGRATOR AND ODOT/ITS SIGN-OFF.
  - 1. AN ORIGINAL FORM PLUS FOUR COPIES SHALL BE REQUIRED. THE FOUR COPIES MAY BE IN DIGITAL FORMAT WITH DIGITAL SIGNATURES.
  - 2. THE FORM SHALL BE SIGNED BY THE PROJECT MANAGER, WORKING FOR THE CONTRACTOR/CONTROL SYSTEM INTEGRATOR.

**3.2 SAT (SAT ACCEPTANCE TEST),**

- A. THE CONTRACTOR SHALL SUBMIT INFORMATION ON THE SITE ACCEPTANCE TESTING INCLUDING BUT NOT LIMITED TO SCHEDULE, TESTING PROCESS SEQUENCING, AND PROCEDURES TO VERIFY THAT TESTING SHALL FULFILL THE REQUIREMENTS AS SPECIFIED HEREIN. SUBMITTAL SHALL BE MADE AT LEAST 30 CALENDAR DAYS IN ADVANCE OF ANY SCHEDULED TESTING AND SHALL INCLUDE DATES OF SCHEDULED TESTS.
- B. THE SAT PROCEDURES DOCUMENT SHALL CONTAINED A COMPREHENSIVE SCHEDULE. THE SAT SCHEDULE MUST BE CONGRUENT WITH THE PROJECT IMPLEMENTATION SEQUENCING.
- C. THE SAT PROCEDURES DOCUMENT SHALL INCLUDE A CONTINGENCY PLAN BY WHICH THE CONTROL SYSTEM INTEGRATOR SHALL DESCRIBE HOW THEY WILL MAINTAIN THE OPERATIONAL STATUS OF THE TUNNEL IN CASE OF FAILURE OF THE ONGOING TEST. THE CONTINGENCY PLAN SHALL CONSIDER GOING BACK TO THE PREVIOUS STATE IN ORDER TO MAINTAIN THE CONTINUOUS OPERATION OF THE TUNNEL.
- D. SITE ACCEPTANCE TEST PROCEDURES DOCUMENT SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
  - 1. DETAILED DESCRIPTION OF THE EQUIPMENT TO BE INSTALLED AND TESTED

- 2. DETAILED DESCRIPTION OF EACH OF THE TESTS TO BE PERFORMED, STEP BY STEP AND ITS EXPECTED SYSTEM RESPONSE. THIS SHALL INCLUDE BUT NOT LIMITED TO THE FOLLOWING:
  - A. FIELD I/O VERIFICATION
  - B. COMMUNICATION, EXPECTED RESPONSES
  - C. FIELD EQUIPMENT FAILURE SCENARIOS
  - D. SYSTEM ALARMS
  - E. PASS/FAIL CRITERIA
- 3. THE SAT PROCEDURE SHALL MAKE REFERENCE TO ALL APPLICABLE MATERIALS
  - A. DETAILED DESIGN DRAWINGS
  - B. SHOP DRAWINGS (APPROVED)
  - C. PROCESS NARRATIVES
  - D. SOFTWARE PROGRAMMING REQUIREMENTS
  - E. NETWORK CONFIGURATION DOCUMENTS
- 4. NETWORK PERFORMANCE CRITERIA
- 5. VIDEO SYSTEM PERFORMANCE CRITERIA
- 6. VOIP PHONES PERFORMANCE CRITERIA
- 7. TRAFFIC CONTROL DEVICES PERFORMANCE CRITERIA
- E. SITE TESTING FORMS FOR EACH OF THE SYSTEMS TO BE TESTED, FOR APPROVAL BY THE ENGINEER AND THE AUTHORITY.
- F. THE APPROVED FORMS SHALL BE USED FOR RECORDING THE TEST RESULTS DURING THE PROCEDURE AND INCLUDE SPACES FOR ENGINEER, CONTRACTOR/INTEGRATOR AND ODOT/ITS SIGN-OFF.
- G. AN ORIGINAL FORM PLUS FOUR COPIES SHALL BE REQUIRED. THE FOUR COPIES MAY BE IN DIGITAL FORMAT WITH DIGITAL SIGNATURES.
- H. THE FORM SHALL BE SIGNED BY THE PROJECT MANAGER, WORKING FOR THE CONTRACTOR/CONTROL SYSTEM INTEGRATOR.

**PART 4 - MEASUREMENT AND PAYMENT**

- 4.1 MEASUREMENT:
  - A. NO MEASUREMENT SHALL BE MADE OF THE WORK OF THIS SECTION.
- 4.2 PAYMENT
  - A. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: COMMUNICATION MEDIUM (FIBER OPTIC CABLE, FIBER PATCH CABLES, CAT6 AND ACCESSORIES, FIBER TESTING) SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS NECESSARY TO COMPLETE THE WORK.
  - B. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: MAIN NETWORK CABINET INCLUDING NETWORK HARDWARE AND SOFTWARE, LOCAL HMI, SERVERS HARDWARE AND SOFTWARE, SUPPLY INTALLATION SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS TO COMPLETE THE WORK

- C. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: MAIN PLC CABINET INCLUDING HARDWARE AND SOFTWARE, SUPPLY AND INTALLATION SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS TO COMPLETE THE WORK
- D. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: SOUTH PORTAL COMM. RACK INCLUDING HARDWARE AND SOFTWARE, SUPPLY AND INTALLATION SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS TO COMPLETE THE WORK
- E. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: NORTH PORTAL COMM. RACK HARDWARE AND SOFTWARE, SUPPLY AND INTALLATION SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS TO COMPLETE THE WORK
- F. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: SCADA PROGRAMMING AND CONFIGURATION PLC/HMI (PROGRAMMABLE LOGIC CONTROLLER AND HUMAN MACHINE INTERFACE) PROGRAMMING AND CONFIGURATION, INCLUDING SCADA SERVERS, HISTORIAN, PAGING SOFTWARE AND NAS SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS TO COMPLETE THE WORK
- G. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: DOCUMENTATION SUBMITTALS (SHOP DRAWINGS, CUT SHEETS, AS BUILT RECORD DRAWINGS, USER MANUALS, OPERATIONS MANUAL) AND TRAINING SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS TO COMPLETE THE WORK
- H. PAYMENT FOR ITEM 633 - CONTROLLER, MISC.: HMI/PLC (HUMAN MACHINE INTERFACE/PROGRAMMABLE LOGIC CONTROLLER) TESTING AND COMMISSIONING, INCLUDING FACTORY ACCEPTANCE TEST (FAT), SITE ACCEPTANCE TEST (SAT) AND FINAL COMMISSIONING. SHALL BE MADE AT THE LUMP SUM CONTRACT PRICE, INCLUDING BUT NOT LIMITED TO ALL WORK, LABOR, EQUIPMENT, AND MATERIALS NECESSARY TO COMPLETE THE WORK.

<b>HAM-71-01.34</b>	<b>SCADA - NETWORK SPECIFICATIONS - SHEET 5 OF 5</b>	DESIGN AGENCY HATCH MOTT MACDONALD 18013 CLEVELAND PKWY. SUITE 200 CLEVELAND, OH 44135
PID No. 87268	BRIDGE NO. HAM-71-0134 I-71 LYTLE TUNNEL UNDER LYTLE PARK	DATE 08/19/14
263/296	REVISION RF 3106578	DRAWN MS CZ
521 555	DESIGNED MS KS	CHECKED KS