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USACE / NAVFAC / AFCESA / NASA **UFGS 34 41 26.00 10 (April 2008)**

Preparing Activity: USACE **Superseding UFGS 34 41 26.00 10 (January 2007)**

UNIFIED FACILITIES GUIDE SPECIFICATIONS

References are in agreement with UMRL dated July 2008
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DIVISION 34 - TRANSPORTATION

SECTION 34 41 26.00 10

ACCESS CONTROL POINT CONTROL SYSTEM

04/08

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SECTION 34 41 26.00 10

ACCESS CONTROL POINT CONTROL SYSTEM

04/08

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NOTE: This specification covers the requirements for the design of an access control point control system.

Edit this guide specification for project specific requirements by adding, deleting, or revising text. For bracketed items, choose applicable items(s) or insert appropriate information.

Remove information and requirements not required in respective project, whether or not brackets are present.

Comments and suggestions on this guide specification are welcome and should be directed to the technical proponent of the specification. A listing of technical proponents, including their organization designation and telephone number, is on the Internet.

Recommended changes to a UFGS should be submitted as a Criteria Change Request (CCR).
****

PART 1 GENERAL

****
NOTE: The design of an ACP must be fully engineered to ensure compliance with the Army Standards for ACPs, the Office of the Provost Marshal General's Criteria for ACPs, and the Standard Definitive Design for ACPs. Using these standards and criteria, the designer must prepare an ACP project specific design including the drawings as indicated herein. The project specific drawings along with this edited performance specification must be included in the procurement documents for the Access Control Point Control System.

Drawings must identify the following: active and

passive vehicle barrier locations, over-speed and wrong way detection zones, Closed Circuit Television (CCTV) camera coverage areas, Intrusion Detection Sensor locations, traffic signal and warning beacon locations, actuated gate arm locations, and incidental construction. Also, include active barrier control panels and control schematics.

Standard Drawing E1.03 can be used for required control panels, and appropriate drawing among drawings E1.04 through E1.06 can be used for the control schematic. However, if changes to the control panels from drawing E1.03 are made, the designer is responsible for changing the control schematic (drawing E1.04, 5, or 6) to provide the security and safety measures required in the Army Standard for ACPs.

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1.1 REFERENCES

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NOTE: This paragraph is used to list the publications cited in the text of the guide specification. The publications are referred to in the text by basic designation only and listed in this paragraph by organization, designation, date, and title.

Use the Reference Wizard's Check Reference feature when you add a RID outside of the Section's Reference Article to automatically place the reference in the Reference Article. Also use the Reference Wizard's Check Reference feature to update the issue dates.

References not used in the text will automatically be deleted from this section of the project specification when you choose to reconcile references in the publish print process.

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The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)

AASHTO GDHS-5	(2004) A Policy on Geometric Design of Highways and Streets, 5th Edition
AASHTO LTS-4	(2006) Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
AASHTO RSDG-3	(2002; Errata 2004) Roadside Design Guide

INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)

IEEE C62.41.1	(2002) IEEE Guide on the Surges Environment in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE C62.41.2	(2002) IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits
IEEE Std 142	(1991; Errata 2006) Recommended Practice for Grounding of Industrial and Commercial Power Systems - IEEE Green Book (Color Book Series)
IEEE Std 802.3	WARNING: Text in tags exceeds the maximum length of 300 characters

INSTITUTE OF TRANSPORTATION ENGINEERS (ITE)

ATC Version 5.2a2	(2006) Advanced Transportation Controller (ATC) Standard

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)

IEC 60068-2-27	(2008) Basic Environmental Testing Procedures Part 2: Tests - Test EA And Guidance: Shock
IEC 60068-2-30	(2005) Environmental Testing - Part 2-30: Tests - Test Db: Damp Heat, Cyclic (12 H + 12 H Cycle)
IEC 61000-4-5	(2005) Electromagnetic Compatibility (EMC) - Part 4-5: Testing and Measurement Techniques; Surge Immunity Test

ISA - THE INSTRUMENTATION, SYSTEMS AND AUTOMATION SOCIETY (ISA)

ISA 5.5	(1985) Graphic Symbols For Process Displays

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)

NEMA 250	(2003) Enclosures for Electrical Equipment (1000 Volts Maximum)
NEMA ICS 1	(2000; R 2005) Standard for Industrial Control and Systems General Requirements
NEMA TS-1	(1989; R 2005) Traffic Control Systems
NEMA TS-2	(2003) Traffic Controller Assemblies with NTCIP Requirements - Version 02.06

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 70	(2007) National Electrical Code - 2008 Edition

U.S. ARMY (DA)

DA AR 55-80	(2003) DOD Transportation Engineering Program

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety -- Safety and Health Requirements

U.S. FEDERAL HIGHWAY ADMINISTRATION (FHWA)

MUTCD	(2000) Manual of Uniform Traffic Control Devices
NCHRP 350	(1993) Recommended Procedures for the Safety Performance Evaluation of Highway Features

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

21 CFR 1040	Performance Standards for Light-Emittng Products

UNDERWRITERS LABORATORIES (UL)

UL 1076	(1995; Rev thru Mar 2005) Standard for Safety Proprietary Burglar Alarm Units and Systems
UL 796	(2006; Rev thru Feb 2008) Printed-Wiring Boards

1.2 ACRONYM LIST

a. ACP - Access Control Point
b. ACPCS - Access Control Point Control System
c. AIE - Automated Installation Entry
d. AVB - Active Vehicle Barrier
e. AVBCS - Active Vehicle Barrier Control System
f. BMS - Balanced Magnetic Switch
g. CCTV - Closed Circuit Television System
h. CPU - Central Processing Unit (Computer)
i. CSMS - Central Security Monitoring Station (e.g., Installation Police Station)
j. DTS - Data Transmission System
k. EFO - Emergency Fast Operate (active barrier emergency fast close control)
l. ESS - Electronic Security System
m. FAT - Factory Acceptance Test
n. GCC - Gatehouse Control Console
o. IDS - Intrusion Detection System
p. PLC - Programmable Logic Controller
q. PVT - Performance Verification Test
r. SDDC - Surface Development and Distribution Command
s. UPS - Uninterruptible Power Supply
t. VCC - Visitors Control Center
u. VPD - Vehicle Presence Detector

1.3 SYSTEM DESCRIPTION

Furnish and install a complete and functional ACPCS for the Access Control Point including active vehicle barriers, active vehicle barrier controls, traffic signals, traffic signal controls, traffic warning signals, traffic signs and pavement markings, actuated traffic arms, vehicle over speed and wrong-way detectors, vehicle presence detectors, building intrusion detectors, duress alarms, Alarm Display, Alarm Panel(s), Sequence of Events Recorder, CCTV system, communications systems, and all interconnecting conduit and wiring. Provide a Health and Safety Plan in accordance with EM 385-1-1.

1.3.1 Design Strategy

The primary objective of the ACP is to prevent an unauthorized vehicle from entering the Installation. The overall design strategy to meet this objective is to detect the vehicle as early in its attack as possible and to delay the threat vehicle a sufficient amount of time to allow ACP guards time to deploy the active vehicle barriers before the threat vehicle enters the Installation.

1.3.1.1 Detection

ACP guards in the Gatehouse, Guard Booths, and Overwatch Position (if provided) are the primary means of detecting a threat vehicle. The ACP design includes technology to aid guards in detecting possible threat vehicles. Detection technology includes over speed detection of a threat vehicle attempting to run the gate and wrong-way detection of a threat vehicle attempting to enter the Installation in the outbound lanes. Assessment technology includes CCTV.

1.3.1.2 Deploy the Barrier

Once ACP guards detect a threat vehicle, they will initiate the Emergency Fast Operate (EFO) command on their respective control panel. The EFO command will start a sequence to close all active vehicle barriers in the barriers' emergency fast operate mode. The active barrier close sequence will include safety features to ensure that innocent vehicles obtain sufficient warning of barrier deployment such that they can either clear the barrier before it deploys or stop safely in front of it.

1.3.1.3 Delay

The ACP design includes features to delay the threat vehicle to allow guards time to deploy the active vehicle barriers. Delay features take into consideration the point in the ACP where the threat vehicle is detected, the speed of the threat vehicle at the point of detection, the maximum acceleration rate of the threat vehicle, and any ACP features that will limit the acceleration of the threat vehicle or require it to slow down, e.g., turns, chicanes, serpentines, etc. Delay features are included in the overall ACP design and are not part of this contract.

1.3.2 Over Speed and Wrong-Way Sensors

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NOTE: Choose on of the following three over speed sensor paragraphs per the ACP design.
****

1.3.2.1 Point Over Speed at the ACP Entrance

Over speed detectors shall be installed to detect any vehicle traveling 16 km/hr 10 mph over the posted ACP speed limit at the ACP entrance. Sensors can be induction loops, radar, lidar, video motion, or other technologies capable of detecting the speed of vehicles as they enter the ACP.

1.3.2.2 Continuous Over Speed Detection - One Zone

****

NOTE: Normally, the speed detectors should be set at 16 km/hr (10 mph) over the posted speed limit. When the ACP posted speed limit is 24 km/kr (15 mph) or less, the over speed detector may be set at 8 km/hr (5 mph) over the posted speed limit. Once set, this speed setting cannot be changed as it determines the required distance between the ID Check area and the active vehicle barriers.

The continuous over speed detection defined above covers the ACP entrance; therefore, when security considerations require continuous over speed detection, the point detectors described for the ACP entrance are not required.

****

Over speed detectors shall be installed to detect a vehicle traveling [_____] km/hr mph over the posted ACP speed limit in any of the inbound lanes anywhere between the ID Check Position and the ACP Entrance. Over speed detectors shall be mounted from the canopy roof, from trusses spanning over the entry lanes, from light poles, or from other locations that provide unobstructed view of the detection area. Speed detectors shall be forward or reverse looking. Sensors shall use radar, lidar, video motion, or other technologies capable of detecting a speeding vehicle over a continuous range between the ID Check Area and the ACP entrance.

1.3.2.3 Continuous Over Speed Detection - Two Zones

****

NOTE: Normally, the posted speed limit at the ACP entrance should be no more 40 km/hr (25 mph) and the over speed detector should be set at 16 km/hr (10 mph) over the posted speed limit or 56 km/hr (35 mph).

The speed limit immediately in front of the ID Check area should be posted at 24 km/hr (15 mph). The over speed detector for this zone may be set as low as 32 km/hr (20 mph). Once set, this speed setting cannot be changed as it determines the required distance between the ID Check area and the active vehicle barriers.

The continuous over speed detection defined above covers the ACP entrance; therefore, when security considerations require continuous over speed detection, the point detectors described for the ACP entrance are not required.

****

Two sets of over speed detectors shall be installed. The first set shall cover a zone (Zone 1) from the ACP entrance to [_____] meter feet in front of the ID Check Area. The Second Set shall cover a zone (Zone 2) from [_____] meter feet in front of the ID Check Area to the ID Check Area. Zone 1 over speed detectors shall be set at [_____] km/hr mph over the posted ACP speed limit. The ACP speed limit will be reduced to [_____] km/hr mph at 75 m 250 feet in front of the ID Check Position. Zone 2 over speed detectors should be set at [_____] km/hr mph. Over speed detectors shall be mounted from the canopy roof, from trusses spanning over the entry lanes, from light poles, or from other locations that provide unobstructed view of the detection area. Speed detectors shall be forward or reverse looking. Sensors shall use radar, lidar, video motion, or other technologies capable of detecting vehicle speeds over a continuous range in the zones described above.

1.3.2.4 Wrong Way Detection

Wrong way detectors shall be installed to detect vehicles traveling the wrong way in the outbound lanes. As a minimum, wrong way detectors shall be installed at the ACP entrance and at each turn-around in the ACP. Sensors shall be induction loops, radar, lidar, video motion, or other technologies capable of detecting a vehicle traveling the wrong way.

1.3.3 Active Vehicle Barrier Safety System

****

NOTE: Select one of the following barrier safety systems. Include the appropriate Appendix, at the end of this specification, in the Performance Specifications.

****

The [Signs and Signals] [Presence Detection] [Normally Deployed] Safety System, as approved by the Surface Development and Distribution Command (SDDC), shall be installed and programmed to ensure the safety of innocent motorists. See Appendix A for the required features and operational sequences of this safety system.

1.3.4 Interoperable Systems

The ACPCS shall consist of the following 2 interoperable systems.

1.3.4.1 Active Vehicle Barrier Control System (AVBCS)

The AVBCS shall control the active vehicle barriers and all signal and warning lights including the traffic signal for each barrier.

1.3.4.2 Electronic Security System (ESS)

The ESS shall perform intrusion detection of selected buildings and enclosures, CCTV surveillance and assessment of selected ACP areas, over speed and wrong-way detection of potential threat vehicles, duress alarming for ACP guards, annunciation of alarms at the Gatehouse, Guard Booths, and Overwatch Position, and recording and logging of sequence of events.

1.4 SUBMITTALS

****

NOTE: Review submittal description (SD) definitions in Section 01 33 00 SUBMITTAL PROCEDURES and edit the following list to reflect only the submittals required for the project. Submittals should be kept to the minimum required for adequate quality control.

A "G" following a submittal item indicates that the submittal requires Government approval. Some submittals are already marked with a "G". Only delete an existing "G" if the submittal item is not complex and can be reviewed through the Contractor's Quality Control system. Only add a "G" if the submittal is sufficiently important or complex in context of the project.

For submittals requiring Government approval on Army projects, a code of up to three characters within the submittal tags may be used following the "G" designation to indicate the approving authority. Codes for Army projects using the Resident Management System (RMS) are: "AE" for Architect-Engineer; "DO" for District Office (Engineering Division or other organization in the District Office); "AO" for Area Office; "RO" for Resident Office; and "PO" for Project Office. Codes following the "G" typically are not used for Navy, Air Force, and NASA projects.

Choose the bracketed Government approval only when needed. Choose the first bracketed item for Navy, Air Force and NASA projects, or choose the second bracketed item for Army projects.

****

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for [Contractor Quality Control approval.] [information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government.] The following shall be submitted in accordance with Section 01 33 00 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

Group I Technical Data Package[; G][; G, [_____]]

a. Functional System Block Diagram, identifying all major equipment, interconnecting wire types and quantities, approximate distances, and communications protocols.

b. Block and Wiring Diagrams of each subsystem (AVBCS and ESS).

c. Drawing showing layout and dimensions of the Gatehouse Control Console with the Alarm Display, CCTV monitor and controls, and the barrier Master Control Panel.

d. Drawing showing equipment layout in the Gatehouse including the Gatehouse Control Console, UPS, and other hardware intended to be located in the Gatehouse.

e. Drawing showing equipment layout around the active vehicle barriers including the active vehicle barriers, active vehicle barrier control box(es), vehicle presence detectors, Stop Lines, Traffic Signals, Wig-Wag warning signals (if applicable), and Traffic Arms (if applicable).

f. Device wiring and installation drawings.

g. Details of connections to power sources, including power supplies and grounding.

h. Details of surge protection device installation.

i. Intrusion Detection System block diagram and sensor layout.

j. Over speed, wrong-way, and vehicle presence detector locations and sensor detection patterns.

Group IV Technical Data Package[; G][; G, [_____]]

a. Graphic alarm presentation.

b. Color print of the graphical user interface (GUI) screens on 216 x 292 mm 8-1/2 by 11 inch paper.

c. ACP Processing and Control database on 216 by 292 mm 8-1/2 by 11 inch paper.

d. Listing of scripts developed for the screen displays.

e. Diagram showing how screens are organized and linked together.

Group V Technical Data Package[; G][; G, [_____]]

Final system drawings, as specified.

Traffic Signal Supports[; G][; G, [_____]]

Drawings of components as specified.

SD-03 Product Data

Group I Technical Data Package[; G][; G, [_____]]
Contractor Quality Control Plan[; G][; G, [_____]]

The software data package consisting of descriptions of the operation and capability of all subsystem software.

Key control plan for all Contractor provided enclosures requiring locks and all keyed control switches. The key control plan shall include the following: 1) Procedures that will be used to log and positively control all keys during installation. 2) A listing of all keys and where they are used. 3) A listing of all persons allowed access to the keys.

Quality Control Plan for approval. The QC Plan shall describe all Contractor and subcontractor activities during design, manufacture, and installation of the ACPCS. The QC Plan shall include all Contractor and subcontractor technical data reviews,

inspections, certifications, and approvals and the QC documentation procedures.

Group II Technical Data Package[; G][; G, [_____]]

Current site conditions report, as specified.

Group IV Technical Data Package[; G][; G, [_____]]

a. Computers and peripherals.

b. User enrollment.

c. System start-up and shutdown procedures.

d. Use of system and application software.

e. Recovery and restart procedures.

f. Use of report generator and generation of reports.

g. Data entry.

h. Operator commands.

i. Alarm and system messages and printing formats.

j. System entry requirements.

Group V Technical Data Package[; G][; G, [_____]]

Group IV Manuals, as specified.

SD-05 Design Data

Group I Technical Data Package[; G][; G, [_____]]

The data package including system descriptions, analyses, and calculations used in sizing equipment specified. Descriptions and calculations shall show how the equipment will operate as a system to meet the performance of this specification. The data package shall include the following:

a. Communications speeds and protocol descriptions.

b. CD-ROM/CD-RW/DVD-RW drive speed and protocol descriptions.

c. Floppy disk size and configuration.

d. Alarm response time calculations.

e. Command response time calculations.

f. Start-up operations including system and database backup operations.

g. Expansion capability and method of implementation.

h. Sample copy of sequence of events report.

i. Color output of typical graphics, if provided.

j. System throughput calculations.

k. The overall system reliability calculations data package shall include manufacturer's reliability data for each critical equipment and calculations showing overall systems reliability. As a minimum, critical equipment shall include over speed and wrong way sensors, the Annunciator, CCTV, Traffic Signal Controller, Traffic Signals, Warning Signals, Vehicle Presence Detectors, and active vehicle barriers.

Traffic Signal Supports[; G][; G, [_____]]

..Design calculations, as specified.

SD-06 Test Reports

Group III Technical Data Package[; G][; G, [_____]]

a. Test Plan for the Factory Acceptance Test.
b. Factory Acceptance Test Report.

Group IV Technical Data Package[; G][; G, [_____]]

a. Test Plan for the Performance Verification Test.

b. Test Plan for the Endurance Test.

c. Performance Verification Test and Endurance Test Reports.

d. Contractor Field Test Report.

SD-07 Certificates

Group I Technical Data Package[; G][; G, [_____]]

Certifications from the manufacturers of the following equipment shall be submitted with the data package: Active Vehicle Barrier, Traffic Signal Controller, Traffic Arm, Warning Signal, Annunciator, Sequence of Events Recorder, Alarm Panels, CCTV system, and all sensors including over speed, wrong-way, vehicle presence, intrusion detection, and tamper.

Technical Specialists[; G][; G, [_____]]

Names and qualifications for each of the technical specialists for the Active Vehicle Barriers, the Traffic Signal Controller subsystem, the CCTV subsystem, and the Security Monitoring subsystem.

SD-08 Manufacturer's Instructions

Group I Technical Data Package[; G][; G, [_____]]

The data package shall include manufacturer's data for all equipment and end devices provided under these specifications.

1.5 QUALITY ASSURANCE

1.5.1 Project Manager Qualifications

Designate a Project Manager for all work under this contract. The Project Manager shall provide technical and managerial leadership to all contractor personnel and subcontractors during the design, manufacturer, and installation phases of the contract. The Project Manager shall be the primary point of contact for the Government on the contract. The Project Manager shall have a minimum of 5 years of experience in the design, manufacture, and installation of similar systems.

1.5.2 Installation Superintendent Qualifications

Designate an Installation Superintendent responsible for onsite installation team direction and leadership. The Superintendent shall provide first line supervision of tradesmen and subcontractors. The Superintendent shall be responsible for job planning and shall coordinate the work with trades, subcontractors, vendors, and site personnel. The Superintendent shall be responsible for scheduling materials, equipment, and labor to maintain the flow of work commensurate with the task schedule. The Superintendent shall administer and execute the provisions of the Accident Prevention Plan. The Superintendent shall have a minimum of 5 years of experience in the installation, operation, and testing of similar systems.

1.5.3 QC Representative Qualifications

Provide a Quality Control Representative responsible for establishing, executing and reporting on the Government approved Contractor Quality Control Plan as required in the Group I Technical Data Package. Quality Control Representative shall report independently to the Project Manager on matters of quality control. The Quality Control Representative shall have a minimum of 5 years experience in performing quality control duties.

1.5.4 Technical Specialists Qualifications

Provide the services of technical specialists for the Active Vehicle Barriers, the Traffic Signal Controller subsystem, the CCTV subsystem, and the Security Monitoring subsystem. The technical specialists shall have a minimum of 5 years of experience in the installation, operation, and testing of all components, software, and interconnecting wiring of their particular equipment/subsystem. In addition, the technical specialist for the Traffic Signal Controller subsystem shall have valid International Municipal Signals Association (IMSA) certifications for Traffic Signals and Work Zone Safety. Submit the names and qualifications (including proof of IMSA certifications for the Traffic Signal Controller subsystem technical specialist) of the candidate technical specialists to the Contracting Officer for approval. Each technical specialist shall be present in the factory during manufacture and assembly of the subsystem, during Factory Tests as described below, during subsystem installation in the field, and shall serve as the Contractor's Commissioning Specialist for their designated equipment/subsystem for the commissioning tests as specified.

1.5.5 Line Supervision

1.5.5.1 General

All signal and Data Transmission System (DTS) lines shall be supervised by

the system. The system shall supervise the signal lines by monitoring the circuit for changes or disturbances in the signal and for conditions as described in UL 1076 for line security equipment. The system shall initiate an alarm in response to a current change of [5] [10] percent or greater. The system shall also initiate an alarm in response to opening, closing, shorting, or grounding of the signal and DTS lines.

1.5.5.2 Data Transmission System (DTS)

****
NOTE: Include in the project specification one or more of the following UFGS for the appropriate Data Transmission required at the project site: Section 27 15 19.00 WIRE LINE DATA TRANSMISSION SYSTEM; Section 40 95 33.00 10 FIBER OPTIC DATA TRANSMISSION SYSTEM; or Section 33 82 33.00 10 COAXIAL CABLE DATA TRANSMISSION SYSTEM.
****

Provide DTS as specified in Section [_____] and as shown.

1.6 DELIVERY OF TECHNICAL DATA AND COMPUTER SOFTWARE

****
NOTE: The acquisition of technical data, databases, and computer software items that are identified herein will be accomplished in accordance with the Federal Acquisition Regulation (FAR) and the Department of Defense Acquisition Regulation Supplement (DOD FARS).

Those regulations, as well as the specific Service implementation thereof, should also be consulted to ensure that a delivery of critical items of technical data is not inadvertently lost. Specifically, the Rights in Technical Data and Computer Software Clause, DOD FARS 52.227-7013, and the Data Requirements Clause, DOD FARS 52.227-7013, as well as any requisite software licensing agreements will be made a part of the CONTRACT CLAUSES or SPECIAL CONTRACT REQUIREMENTS of the contract. In addition, the appropriate DD FORM 1423 Contract Data Requirements List, will be filled out for each distinct deliverable data item and made a part of the contract. Where Necessary, DD FORM 1664, Data Item Description, shall be used to explain and more fully identify the data items listed on the DD FORM 1423.

It is to be noted that all of these clauses and forms are required to assure the delivery of data in question and that such data is obtained with the requisite rights to use by the Government. Include with the request for proposals a completed DD FORM 1423, Contract Data Requirements List. This form is essential to obtain delivery of all documentation. Each deliverable will be clearly specified, both description and quantity being required. Include a payment schedule in the SPECIAL CONTRACT

REQUIREMENTS of the request for proposals. This payment schedule will define payment milestones and percentages at specific times during the contract period.

The designer must show all salient features of the ACPCS on the drawings. Also, show any work required in restricted or hazardous locations and include the type of hazard, class, and group.

****

All items of computer software and technical data (including technical data which relates to computer software), which is specifically identified in this specification shall be delivered in accordance with the CONTRACT CLAUSES, SPECIAL CONTRACT REQUIREMENTS, and in accordance with the Contract Data Requirements List (CDRL), DD FORM 1423, which is attached to and thereby made a part of this contract. All data delivered shall be identified by reference to the particular specification paragraph against which it is furnished.

1.6.1 Group I Technical Data Package

Provide the Group 1 Technical Data Package 30 days after receipt of the Notice to Proceed. The data package shall include the items listed in the Submittals paragraph as required.

1.6.2 Group II Technical Data Package

Submit the Group II Technical Data Package within 60 days of Notice to Proceed. Prepare and submit a report of "Current Site Conditions" to the Government documenting site conditions that significantly differ from the design drawings or conditions that affect performance of the system to be installed. Provide specification sheets, or written functional requirements to support the findings, and a cost estimate to correct those site changes or conditions. Do not perform any field work until the "Current Site Conditions" report is approved by the Government. Do not correct any deficiencies identified in the report without written permission from the Government.

1.6.3 Group III Technical Data Package

Submit a Test Plan, as specified in the Submittals paragraph, a minimum of 30 days before the scheduled start of the tests. Submit the factory acceptance test report no more than 2 weeks after the Factory Acceptance Test.

1.6.4 Group IV Technical Data Package

Provide the Group IV Technical Data Package 30 days prior to the start of Commissioning. The data package shall include the items specified in the Submittals paragraph as required. Submit the test reports no more than 2 weeks after the tests. The data package shall contain an Operator's Manual fully explaining all procedures and instructions for the operation of the system, including:

1.6.4.1 Active Vehicle Barrier Controls

Describe operation of barrier control modes, barrier control switches, barrier normal and emergency operation, traffic signals, warning beacons,

vehicle presence detectors, and actuated traffic arms. Include descriptions of security strategy for defeating a threat vehicle and the SDDC approved barrier safety system for protecting innocent vehicles from barrier operations.

1.6.4.2 Over-speed and Wrong-way detection

Include descriptions of the security strategy for detecting potential threat vehicles, the coverage and operation of the sensors, and the man machine interfaces for over-speed and wrong way alarms.

1.6.4.3 Traffic Control Plan for the Maintenance Traffic

Provide a Traffic Control Plan for maintenance of traffic during construction per Section 08C of EM 385-1-1. Describe plans for taking one or more active barriers out of service for maintenance or testing purposes, while other barriers at the ACP remain in service. As a minimum, include requirements for traffic signal indications and for temporary passive barriers and signage, e.g., Type 3 passive barriers, per MUTCD. Include both short term (less than an hour) and long term plans.

1.6.4.4 Application Software

Where an application software installed on a computer (computers) is involved, provide the default (manufacturer's standard) software installation package on CD (CDs). Provide also, on CD (CDs) separate from the default software, the complete image of the installed software, with all custom changes and configuration data specific for the installed system. The software image shall be the same as that of the system used when it is put in operation before the final acceptance tests, and a subsequent one that is used for the final (30-day) acceptance tests, after all pending corrections and adjustments have been implemented.

1.6.4.5 Software Manual

The software manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation. The manual shall include:

a. Definition of terms and functions.
b. Use of system and application software.
c. Procedures for system initialization, start-up and shutdown.
d. Alarm reports.
e. Reports generation.
f. Database format and date entry requirements.
g. Directory of all disk files.
h. Description of all communication protocols, including data formats, command characters, and a sample of each type of data transfer.
i. Interface definition.

1.6.4.6 Hardware Manual

The hardware manual shall describe all equipment furnished including:

a. General description and specifications.
b. Installation and checkout procedures.
c. Equipment electrical schematics and layout drawings.
d. System schematics and layout drawings.
e. Alignment and calibration procedures.

f. Manufacturer's repair parts list indicating sources of supply.
g. Interface definition.

1.6.4.7 Functional Design Manual

The functional design manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes.

1.6.4.8 Maintenance Manual

The maintenance manual shall include descriptions of maintenance for all equipment including inspection, periodic prevention maintenance (include specific time intervals for each recommended preventative maintenance tasks), fault diagnosis, and repair or replacement of defective components.

1.6.4.9 Training Documentation

Lesson plans and training manuals for the training phases, including type of training to be provided, and a list of reference material, shall be delivered for Government approval.

1.6.4.10 Data Entry

Enter all data needed to make the system operational. Deliver the data to the Government on data entry forms, utilizing data from the contract documents, Contractor's field surveys, and other pertinent information in the Contractor's possession required for complete installation of the database. Identify and request from the Government, any additional data needed to provide a complete and operational ACPCS. The completed forms shall be delivered to the Government for review and approval at least 30 days prior to the Contractor's scheduled need dates. When the ACPCS database is to be populated in whole or in part from an existing or Government furnished electronic database, demonstrate the field mapping scheme to correctly input the data.

1.6.4.11 Graphics

****
NOTE: The designer will show on the drawings the areas that are to be incorporated into the graphics package, if required.
****

Where graphics are required and are to be delivered with the system, create and install the graphics needed to make the system operational. Utilize data from the contract documents, Contractor's field surveys, and other pertinent information in the Contractor's possession to complete the graphics. Identify and request from the Government, any additional data needed to provide a complete graphics package. Graphics shall have sufficient level of detail for the guard to assess alarms. Supply hard copy, color examples at least 200 x 250 mm 8 x 10 inch in size, of each type of graphic to be used for the completed system. The graphics examples shall be delivered to the Government for review and approval at least 30 days prior to the Contractor's scheduled need date.

1.6.5 Group V Technical Data Package

****
NOTE: The designer will specify the correct number of manuals on DD FORM 1423. Unless the installation has a specific requirement, specify 2 copies of all manuals, except the Operator's Manual, which should be specified to be 6 copies.
****

Provide the Group V Technical Data Package within 30 days after completing the Endurance Test. The data package shall include:

1.6.5.1 Group IV Manuals

Final copies of the Group IV Manuals bound in hardback, loose-leaf binders. The draft copy used during site testing shall be updated with any changes required prior to final delivery of the manuals. Each manual's contents shall be identified on the cover. Each manual shall include names, addresses, and telephone numbers of each subContractor installing equipment and systems, and the nearest service representative for each item of equipment. The manuals shall have a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning of each appendix. The final copies delivered after completion of the endurance test shall include modifications made during installation, checkout, and acceptance. The number of copies of each manual to be delivered shall be as specified on DD FORM 1423.

1.6.5.2 Final System Drawings

Maintain a separate set of drawings (including site, civil, electrical, mechanical, structural, and architectural plans, elevations, and details), elementary diagrams, wiring diagrams, and ladder control diagrams of the system to be used for final system drawings. This set shall be accurately kept up-to-date with all changes and additions to the ACPCS and shall be delivered to the Government with the final endurance test report. In addition to being complete and accurate, this set of drawings shall be kept neat and shall not be used for installation purposes. Final drawings submitted with the endurance test report shall be finished drawings on CD-ROM in [Microstation Version 8] [AutoCAD 2002] [_____] format.

1.7 WARRANTY

****
NOTE: The maintenance and service to be provided during first year's warranty period will be included as a separate bid item, and must be funded with O & M funds. The designer will coordinate funding requirements with the installation.
****

Provide all labor, equipment, and materials required to maintain the entire system in an operational state as specified, for a period of two years after formal written acceptance of the system to include scheduled and nonscheduled adjustments.

1.8 MAINTENANCE AND SERVICE

1.8.1 Description of Work

The adjustment and repair of the system includes all vehicle barriers, traffic arms, traffic signals, warning signals, computer equipment, CCTV system components, sequence of events recorder, software updates, communications transmission equipment and DTS, local processors, over speed and wrong-way sensors, vehicle presence detection sensors, IDS sensors, facility interface, and support equipment. All repair, calibration, and other work shall be provided and performed in accordance with the manufacturer's documentation and instruction. Responsibility shall be limited to Contractor installed equipment.

1.8.2 Service Personnel

Service personnel shall be certified in the maintenance and repair of the specific type of equipment installed and qualified to accomplish work promptly and satisfactorily. The Government shall be advised in writing of the name of the designated service representative, and of any change in personnel.

1.8.3 Schedule of Work

Perform two minor inspections at 6 month intervals (or more often if required by the manufacturer), and two major inspections offset equally between the minor inspections to effect quarterly inspection of alternating magnitude.

1.8.3.1 Minor Inspections

Minor inspections shall include visual checks and operational tests of active vehicle barriers (cleaning pit if necessary), traffic arms, traffic signals, console equipment, peripheral equipment, local processors, sensors, and electrical and mechanical controls.

1.8.3.2 Major Inspections

Major inspections shall include work described under paragraph Minor Inspections and the following work:

a. Clean interior and exterior surfaces of all system equipment and local processors, including workstation monitors, keyboards, and console equipment.

b. Perform diagnostics on all equipment.

c. Check, walk test, and calibrate each sensor.

d. Run all system software diagnostics and correct all diagnosed problems.

e. Resolve any previous outstanding problems.

f. Purge and compress data bases.

g. Review network configuration.

1.8.3.3 Scheduled Work

Scheduled work shall be performed during regular working hours, Monday through Friday, excluding federal holidays.

1.8.4 Emergency Service

****
NOTE: In some cases the designer may determine a less rapid response time is acceptable when weighed against the cost of the service. The designer must insert a time based upon input from the user.
****

The Government will initiate service calls to the Contractor when the system is not functioning properly. Qualified personnel shall be available to provide service to the complete system. The Government shall be furnished with a telephone number where the service supervisor can be reached at all times. Service personnel shall be at site within [2] [4] [_____] hours after receiving a request for service. The system shall be restored to proper operating condition within 8 hours after service personnel arrive onsite and obtain access to the system.

1.8.5 Operation

Performance verification test procedures shall be used after all scheduled maintenance and repair activities to verify proper component and system operation.

1.8.6 Records and Logs

Keep records and logs of each performed task, and shall organize cumulative records for each component, and for the complete system chronologically resulting in a continuous log to be maintained for all devices. The log shall contain all initial settings. Complete logs shall be kept and shall be available for inspection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished for the system.

1.8.7 Work Requests

Record separately each service call request, as received. The form shall include the serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the material to be used, the time and date work started, and the time and date of completion. Deliver a record of the work performed within 5 days after work is accomplished.

1.8.8 System Modifications

Make any recommendations for system modification in writing to the Government. System modifications shall not be made without prior approval of the Government. Any modifications made to the system shall result in the updating of the operation and maintenance manuals as well as any other documentation affected.

1.8.9 Software

Provide a description of all software updates to the Government, who will

then decide whether or not they are appropriate for implementation. After notification by the Government, implement the designated software updates and verify operation in the system. These updates shall be accomplished in a timely manner, fully coordinated with system operators, and shall be incorporated into the operation and maintenance manuals, and software documentation. Make a system image file prior to implementing any software update so the system can be restored to its original state if the update adversely affects system performance.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Materials and Equipment

Units of equipment that perform identical, specified functions shall be products of a single manufacturer. All material and equipment shall be new and currently in production. Each major component of equipment shall have the manufacturer's model and serial number in a conspicuous place.

2.1.2 Field Enclosures

2.1.2.1 Interior Sensors

Sensors to be used in an interior environment shall have a housing that provides protection against dust, falling dirt, and dripping non-corrosive liquids.

2.1.2.2 Exterior Sensors

Sensors to be used in an exterior environment shall have a housing that provides protection against windblown dust, rain and splashing water, and hose directed water. Sensors shall be undamaged by the formation of ice on the enclosure.

2.1.2.3 Interior Electronics

Systems electronics to be used in an interior environment shall be housed in enclosures which meet the requirements of NEMA 250, Type 12.

2.1.2.4 Exterior Electronics

Systems electronics to be used in an exterior environment shall be housed in enclosures which meet the requirements of NEMA 250, Type 4X.

2.1.2.5 Corrosion Resistant

System electronics to be used in a corrosive environment as defined in NEMA 250 shall be housed in non-metallic non-corrosive enclosures which meet the requirements of NEMA 250, Type 4X.

2.1.3 Nameplates

Nameplates shall be provided for major components of the system. Nameplates shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a corrosion resistant plate secured to the item of equipment. Nameplates will not be required for devices smaller than 25 by 75 mm 1 by 3 inch.

2.1.4 Fungus Treatment

****

NOTE: Fungus treatment should only be used on equipment to be installed in climates that are known to have problems with fungus growth. Examples are extremely tropical climates or humid, poorly ventilated areas. If these conditions do not exist, delete the fungus treatment requirement.

****

System components located in fungus growth inductive environments shall be completely treated for fungus resistance. Treating materials containing a mercury bearing fungicide shall not be used. Treating materials shall not increase the flammability of the material or surface being treated. Treating materials shall cause no skin irritation or other injury to personnel handling it during fabrication, transportation, operation, or maintenance of the equipment, or during use of the finished items when used for the purpose intended.

2.1.5 Tamper Switches

Equipment enclosures for the AVBCS, ESS, and the active vehicle barrier shall have hinged doors or removable covers. The doors or covers shall be provided with cover operated, corrosion-resistant tamper switches, arranged to initiate an alarm signal when the door or cover is moved. The enclosure and the tamper switch shall function together and shall not allow direct line of sight to any internal components before the switch activates. Tamper switches shall be inaccessible until the switch is activated; have mounting hardware concealed so that the location of the switch cannot be observed from the exterior of the enclosure; be connected to circuits which are under electrical supervision at all times, irrespective of the protection mode in which the circuit is operating; shall be spring-loaded and held in the closed position by the door or cover; and shall be wired so that the circuit is broken when the door or cover is disturbed.

2.1.6 Locks and Key-Lock Switches

****

NOTE: Either round key or conventional key type locks are acceptable for use in the system. Selection should be based on hardware availability at the time of design and the requirements for matching locks currently in use at the site. If the locks do not have to be matched to locks in use, and the designer has no preference, all brackets may be removed.

****

2.1.6.1 Locks

Locks shall be provided on system enclosures for maintenance purposes. Locks shall be UL listed, [round-key type with 3 dual, 1 mushroom, 3 plain pin tumblers] [or] [conventional key type lock having a combination of 5 cylinder pin and 5-point 3 position side bar]. Keys shall be stamped "U.S. GOVT. DO NOT DUP". The locks shall be arranged so that the key can only be withdrawn when in the locked position. Maintenance locks shall be keyed alike and only 2 keys shall be furnished for all of these locks. These keys shall be controlled in accordance with the key control plan as

specified in paragraph Key Control Plan.

2.1.6.2 Key-Lock-Operated Switches

Key-lock-operated switches required to be installed on system components shall be UL listed, [round-key type, with 3 dual, 1 mushroom, and 3 plain pin tumblers] [or] [conventional key type lock having a combination of 5 cylinder pin and 5-point 3 position side bar]. Keys shall be stamped "U.S. GOVT. DO NOT DUP". Key-lock-operated switches shall be 2 position, with the key removable in either position. All key-lock-operated switches shall be keyed differently and only 2 keys shall be furnished for each key-lock-operated-switch. Keys shall be removable in the positions described in these specifications or as shown on the drawings. Keys shall be controlled in accordance with the key control plan as specified in paragraph Key Control Plan.

2.1.6.3 Construction Locks

A set of temporary locks shall be used during installation and construction. The final set of locks installed and delivered to the Government shall not include any of the temporary locks.

2.1.7 System Components

System components shall be designed for continuous operation. Electronic components shall be solid state type, mounted on printed circuit boards conforming to UL 796. Printed circuit board connectors shall be plug-in, quick-disconnect type. Power dissipating components shall incorporate safety margins of not less that 25 percent with respect to dissipation ratings, maximum voltages, and current carrying capacity. Control relays and similar switching devices shall be solid state type or sealed electro-mechanical.

2.1.7.1 Modularity

Equipment shall be designed for increase of system capability by installation of modular components. System components shall be designed to facilitate maintenance through replacement of modular subassemblies and parts.

2.1.7.2 Maintainability

Components shall be designed to be maintained using commercially available tools and equipment. Components shall be arranged and assembled so they are accessible to maintenance personnel. There shall be no degradation in tamper protection, structural integrity, EMI/RFI attenuation, or line supervision after maintenance when it is performed in accordance with manufacturer's instructions.

2.1.7.3 Interchangeability

The system shall be constructed with off-the-shelf components which are physically, electrically and functionally interchangeable with equivalent components as complete items. Replacement of equivalent components shall not require modification of either the new component or of other components with which the replacement items are used. Custom designed or one-of-a-kind items shall not be used without explicit approval from the Contracting Officer. Interchangeable components or modules shall not require trial and error matching in order to meet integrated system

requirements, system accuracy, or restore complete system functionality.

2.1.7.4 Product Safety

System components shall conform to applicable rules and requirements of NFPA 70. System components shall be equipped with instruction plates including warnings and cautions describing physical safety and any special or important procedures to be followed in operating and servicing system equipment.

2.1.8 Controls and Designations

Controls and designations shall be as specified in NEMA ICS 1, Special Test Equipment. Provide all special test equipment, special hardware, software, tools, and programming or initialization equipment needed to start or maintain any part of the system and its components. Special test equipment is defined as any test equipment not normally used in an electronics maintenance facility

2.1.9 System Integration

The ACPCS shall be supplied as an integrated system, and shall include all sub systems specified hereafter. Hardware and software integration shall be required for the ACPCS to function as one integrated system. The Contractor is responsible for all integration and appetencies required for the system to behave as one system. Supply of separate sub systems without integration is not acceptable. The extent and nature of integration shall be extensively documented and demonstrated in the Group 1 Technical Data Package.

2.2 ACTIVE VEHICLE BARRIER CONTROL SYSTEM (AVBCS)

2.2.1 General Requirements

****
NOTE: Check for approved version of the Advanced Traffic Controller Standard. It is scheduled to be published in the Spring of '06
****

The AVBCS shall collect alarm, status, and control switch inputs at the ACP and provide control signals to the Active Vehicle Barriers, Traffic Signals, Traffic Arms, and Warning Beacons. The AVBCS shall provide alarm, status, and control information via high speed Ethernet to the ESS for annunciation of alarms, recording of alarms and events, and controlling CCTV camera presets. Alarms and status changes shall be received and annunciated and/or recorded by the ESS in no more than 10 mili-seconds after the condition occurs (e.g. alarm/status point contact closure). The AVBCS shall conform to the requirements of the Advanced Traffic Controller Standard (Ballot Copy for the Joint Committee on the ATC for Joint Adoption by AASHTO, ITE, and NEMA, ATC Version 5.2a2 dated 26 January 2006).

2.2.2 Timing Requirements

The processing and update time for the total number of required input and output points shall be 1 mili-second or less. Compliance of this requirement shall be specifically supported with manufacturer's documentation during the shop-drawing approval phase, demonstrated during the FAT at the supplier's premise, and demonstrated during acceptance

testing on site after completion of the installation. The AVBCS shall automatically initiate a call once per day to the NIST clock to obtain the correct time and date and update the real time clock. The AVBCS shall generate a report showing the time difference. The AVBCS shall provide date and time (with 1 second resolution) stamps for all discrete alarm and status changes. The controller shall be equipped with conflict monitor and phase selector. Upon detection of a conflict, the conflict monitor shall instruct the AVBCS to go into a fail safe mode where all barrier controls are locked out and the all traffic signals change to Flashing Red.

2.3 ELECTRONIC SECURITY SYSTEM (ESS)

****

NOTE: Edit Section 28 20 01.00 10 to include appropriate project features of the ESS.

Coordinate with Installation to determine requirements for the communications link between the AVBCS and the CSMS and include here.

****

The ESS shall be configured to alert ACP guards of unauthorized entry attempts through the ACP and unauthorized entry attempts into secured ACP facilities, to provide video surveillance of selected ACP areas, and to provide video assessment for alarm activations. The ESS shall include a gatehouse control console (GCC), alarm panels for guard booths and the overwatch position, facility IDS sensors, duress alarms, over speed detection, wrong-way detection, CCTV system, communications and processing equipment, data transmission system (DTS), and tamper detection as described below. See Section 28 20 01.00 10 ELECTRONIC SECURITY SYSTEMS for additional specifications. The ESS/AVBCS shall provide alarm and status information and CCTV video images to the Installation's Central Security Monitoring Station (CSMS). The ESS/AVBCS shall be capable of providing and receiving high speed data to and from a computer for a future Automated Installation Entry (AIE) system. The ESS shall provide totally automatic communication of status changes, commands, field initiated interrupts and any other communications required for proper system operation. System communication between the AVBCS and all ESS systems and devices shall not require operator initiation or response. System communication shall return to normal operation after any partial or total network interruption such as power loss or transient upset. The ESS shall automatically annunciate communication failures to the operator with identification of the communication link that has experienced a partial or total failure. A communications controller may be used as an interface between the operator's display system and the field device network. The communications controller shall provide those functions needed to attain the specified network communications performance.

2.4 GATEHOUSE CONTROL CONSOLE (GCC)

****

NOTE: Coordinate with Installation and select two means of communications between Gatehouse, each Guard Booth, the Overwatch Position, Search Area, VCC, and the CSMS. Include requirements for the selected communications systems at the Gatehouse in the Gatehouse Control Console

****

Provide a GCC with all necessary displays and controls to allow the operator to view real-time ACP alarms, discrete point status changes, and CCTV video images and to control ACP equipment including the Active Vehicle Barriers. The GCC shall be mounted in the gatehouse in a manner to allow a Gatehouse guard to easily use the controls and monitor the displays while, at the same time, oversee ACP operations. The GCC shall include the following:

a. Alarm Display. See next paragraph for description and requirements.

b. CCTV Monitor and Controls. The CCTV system monitor and controls shall be included in the Gatehouse Control Console. See paragraph CCTV SYSTEM for requirements.

c. Active Vehicle Barrier Controls. The Active Barrier Master Control Panel, as shown on the drawings, shall be included in the Gatehouse Control Console.

d. Communications. [_____].

2.5 ALARM DISPLAY IN THE GCC

2.5.1 General Requirements

Alarms identified in Appendix B, when activated, shall be displayed on a computer monitor or touch screen capable of displaying up to 10 alarms simultaneously. An alarm message up to 60 characters shall be displayed for each alarm. Alarms shall initiate an audible alarm in the Gatehouse.

2.5.2 Controls

Controls shall be provided to allow a guard to acknowledge each alarm, which shall silence the audible alarm, and to reset an alarm, which will clear the alarm from the display. Only one (1) operator action (mouse click, function key or touch screen button) shall be required to acknowledge an alarm and only one (1) operator action (mouse click, function key or touch screen button) shall be required to reset an alarm. The system shall immediately annunciate changes in status. While the system is annunciating an unacknowledged alarm, keyboard or touch screen operations at the GCC, other than alarm acknowledgment, shall not be possible.

2.5.3 Operator Command

Upon operator command, the Alarm Display shall display the current status of IDS sensor zones. The system shall provide the capability to change IDS zone status from alarm (after alarm acknowledgment) or access to secure; from alarm (after alarm acknowledgment) or secure to access, or from access to secure by simple control operations. If the operator attempts to change and IDS zone status to secure while there is an alarm output for that zone, the system shall immediately annunciate an alarm for that zone. The ACPCS shall track the activation of each vehicle presence detector (VPD) and generate an alarm when the activation of the VPD exceeds a set duration. The duration for each VPD shall be finalized during commissioning but shall be initially set at 30 seconds for all VPD's.

2.5.4 Map Displays/Graphic Screens

****

NOTE: Map displays or graphics screens are optional for CPU based ACPCS. Delete this paragraph and its subparagraphs if neither is required.

****

Provide process and system overview display screens with animated attributes. Process data points shall be displayed on backgrounds depicting the actual geographic layout of the related area, with each data point placed in proximity of its actual position on the background. The display attributes shall be updated and changed as per related data status received from internal and external devices. Status of alarm points shall be green for normal and flashing red for alarm conditions, status of actuated devices shall be green when related devices are not activated, and flashing red when activated. Status for traffic signal indications shall be red, yellow or green corresponding with the activated light color. Measured vehicle speeds shall be displayed as numbers in unit of mph, rounded off to the closest integer. The display screens shall include the following as minimum:

a. Health and maintenance status overview for the ACPCS including status of all connected communication lines and any separate controllers for the traffic signals, active vehicle barriers, and actuated traffic arms.

b. Overview of the ACP System, showing status of all vehicle presence detectors, AVB position status, activated traffic arms position status, EFO status, and traffic signal indication colors.

c. Time chart showing On/Off status of all vehicle presence detectors, AVB position status, EFO push-buttons and traffic signal indications relating to each AVB lane. Make provision to allow the user to enter the start and end times of such display, and export the data on a removable storage device for printing in a standard Windows application such as Excel Spreadsheet.

d. Trending page (pages) with provision to trend a minimum of 8 discrete process signals.

e. Demand Trending page (pages) for trending of user selectable points, on demand; this shall have provision to trend a minimum 8 discrete process signals. All trending parameters in this trending page shall be accessible by the user.

f. Tuning page for tuning of all alarms and status points and trending parameters for the Trending Page (Pages). Provide supervisor-level login and password checking for "Write" access to this page (pages).

g. Alarm and Event Logging page. This page shall list in chronological order all alarms and events that shall include as a minimum the following:

1) Alarm activation, alarm acknowledgement and cancellation of alarm conditions;
2) Status point changes;
3) Change to process tuning parameters.

2.6 ALARM AND EVENTS RECORDING

All alarms and events listed in Appendix B shall be stored with the

following data: identification of the alarm/event, date and time to the nearest second of occurrence, date and time of acknowledgement (alarm points only), date and time of reset (alarm points only), and an alarm/event message. Events may have multiple messages to describe all possible states, e.g., AVB #1 in Auto mode, AVB #1 in Manual mode, or AVB #1 in Maintenance mode. Provide means and user-initiated procedure to export the stored alarms and events to a removable storage device for printing in a standard Windows application such as Excel Spreadsheet. All alarms and status changes shall be received and annunciated and/or recorded by the ACPCS in no more than 10 mili-seconds after the condition occurs (e.g., alarm/status point contact closure).

2.7 ALARM PANELS AT THE GUARD BOOTHS

One or more Alarm Panels consisting of back-lit OVER SPEED and WRONG WAY messages shall be mounted outside of but near the Guard Booths. Alarm Panels shall include an audible alarm. The number and location of Alarm Panels shall be such as to allow any ACP guard either sitting in a Guard Booth or standing along side a Guard Booth at the ID Check position to see and hear at least one panel. The audible alarm shall be loud enough to be heard over ambient traffic noise. Alarm acknowledgement and clearing shall be from the Gatehouse alarm controls, except a control switch at each Guard Booth shall be provided to silence the audible alarm.

2.8 ALARM PANEL FOR THE OVERWATCH POSITION

An Alarm Panel consisting of back-lit OVER SPEED, WRONG WAY, and DURESS messages shall be mounted inside the Overwatch Position. Alarm Panels shall include an audible alarm. The audible alarm shall be loud enough to be heard over ambient traffic noise. Alarm acknowledgement and clearing shall be from the Gatehouse alarm controls, except a control switch at the Overwatch Position shall be provided to silence the audible alarm. For an Overwatch Position without a permanent building, the Alarm Panel shall be portable with a cord for plugging into a companion receptacle in the Overwatch Position junction box.

2.9 CCTV SYSTEM

****

NOTE: Edit Section 28 23 23.00 10 to include appropriate project features of the CCTV System.

Coordinate with Installation to determine storage requirements for digital CCTV images and to determine communications requirements.

****

Provide a CCTV System to monitor designated areas of the ACP, present critical CCTV images to the ACP guards, and record and store ACP images for future evaluation by security personnel. The CCTV system shall meet the requirements listed in Section 28 23 23.00 10 CLOSED CIRCUIT TELEVISION SYSTEMS, and the following:

a. The CCTV system shall provide Video Surveillance of the ACP areas shown on the drawings. The CCTV system shall also provide Video Assessment of IDS, Tamper, and Duress alarms. For Video Surveillance, the cameras and CCTV system shall operate full time to monitor the required ACP areas. For Video Assessment, the appropriate camera or cameras shall automatically focus on the alarmed area and the CCTV

system shall automatically bring the camera image to the operator's monitor when an alarm is activated.

b. CCTV monitoring and controls shall be included in the GCC to provide monitoring and display control of live CCTV images from any ACP camera. The CCTV subsystem shall also provide controls to display and view recorded video imagery.

c. The CCTV system shall provide digital video recording of all ACP video imagery cameras 24 hours per day, seven (7) days per week. The CCTV system shall be capable of storing up to [_____] days of video information of all connected CCTV cameras.

d. Provide an interface with the CSMS to allow the CSMS to monitor live CCTV images from any ACP camera or recorded images from the digital video recorder.

2.10 UNINTERRUPTABLE POWER SUPPLIES (UPS)

Provide UPS in the event of loss of normal electrical power for the following functions:

a. Primary communications system.

b. ESS system including CCTV, GCC, Alarm Panels, and all sensors for duress, IDS, over speed, wrong-way, tamper, etc.

c. AVBCS subsystem including all controls for active barriers, traffic signals, gate arms, and warning signals.

d. Active barrier activation systems for one complete operation cycle (open to close and close to open).

UPS shall be capable of carrying required loads for the time required for the Emergency Power Back-up source (e.g., Diesel Generator) to start, come on line, and pick-up 100% of its load upon loss of normal power. Submit calculations for all proposed UPS systems identifying all connected loads plus 50% spare capacity and submit in accordance with Group I Technical Data Package.

2.11 COMMUNICATIONS SYSTEMS

****
NOTE: Coordinate with Installation and select two means of communications between Gatehouse, each Guard Booth, the Overwatch Position, Search Area, Visitor Control Center (VCC), and the CSMS. Include requirements for the selected communications systems here.
****

[_____]

2.12 OVER SPEED, WRONG-WAY, AND VEHICLE PRESENCE DETECTORS

2.12.1 Photoelectric Type

Photoelectric sensors shall meet the requirements listed below. Photoelectric sensors shall be used for vehicle presence detection [and

over-height detection] as shown on the drawings.

a. Photoelectric detectors shall consist of separate transmitter and receiver units. Detector design or arrangement requiring reflector is not acceptable.

b. Light beam: laser or infrared, modulated and synchronized between the transmitter-receiver pair to minimize cross talk with adjacent detectors or other light sources. Where laser is used, the light source shall be rated laser Class II or lower as per 21 CFR 1040.10.

c. Provide shield cones for beam path to minimize and isolate interference from other light sources outside the detector aim cone and from other adjacent light sources.

d. The photoelectric detector set, including the mounting post shall be of robust design to withstand mechanical abuse such as plowed snow from roadway snow removal operations.

e. Provide TVSS for the power and sensor wire terminations. Ground the TVSS with minimum 10AWG insulated ground wire of high strand-count to the closest ground termination point.

f. Provide matching cable connector as required

g. Detector shall have a range of minimum 1.8 m 6 feet to no less than 19.5 m 65 feet.

h. Detector tuning shall be automatic, with temperature compensation.

i. Detector shall have user selectable sensitivity settings.

j. Detector response time shall be 15 milliseconds or less.

k. Detector output shall be a dry form C contact set, rated a minimum of 0.25 A at 24 Volts dc.

l. Detector enclosure rating shall be NEMA 4X or better.

m. Detector shall be capable of operating in a humidity range of 0 to 95% and a temperature range of -40 to +77 degrees C -40 to +170 degrees F.

n. Detector shall be capable of operating from 120V/60Hz power, or be provided with appropriate power module/assembly and appurtenance, which is suitable for operation with 120V/60Hz.

2.12.2 Induction Loops

Induction loops shall meet the requirements listed below. Induction loops may be used for vehicle presence detection, wrong-way detection, and point over-speed detection. Induction loops shall be capable of detecting passenger vehicles, bicycles, motorcycles, and high bed trucks. Tests for all three types of vehicles shall be conducted on each installed loop during the Performance Verification Test.

a. Tuning: automatic, with temperature compensation.

b. Loop input: to withstand minimum 2000V, both normal and common modes.

c. Loop Sensing frequency: minimum four user selectable frequencies to minimize cross talk with adjacent loops.

d. Sensitivity: user selectable, minimum 12 ranges, 20 to 2500 mH with a Q factor of minimum 5.

e. Diagnostic: provide diagnostics and related indication for short and open loop circuit.

f. Detector output: dry form C contact set, rated a minimum of 0.25 A at 24 Volts dc.

g. Operating humidity: 0 to 95%.

h. Operating temperature: -40 to 77 degrees C -40 to +170 degrees F.

i. Vibration: NEMA TS-2-2.1.9 or better.

j. Shock: NEMA TS-2-2.1.10 or better.

k. User selectable operation modes: presence, pulse on entrance, pulse on exit - factory set on presence mode.

l. User selectable operation: Fail Safe or Fail Secure - factory set at Fail Safe.

m. User selectable sensitivity boost feature, which boosts sensitivity after a presence detection and holds the increased sensitivity until the detection drops out, at which time sensor sensitivity returns to the original setting.

n. Power requirement: 120V/60Hz, or be provided with appropriate power module/assembly and appurtenance, which is suitable for operation with 120V/60Hz.

o. Loop Wire.

1) Provide number of inductive loops as per manufacturer's recommendations based on loop size and distance between loop and loop amplifier.

2) Ensure that the loop slots in which the loop wire is laid are free from debris, sharp objects, and are completely dry. Clean out slots with compressed air before installing loop wire.

3) Install loop wire in layers. Install backer rods over top wire at a minimum of 300 mm 1 foot spacing to ensure uniform placement of wire in the slot. Fill the loop slots with sealant per recommendation of the loop wire manufacturer.

4) Use 16AWG stranded cable with Cross Linked Polyethylene insulation installed in a PVC sleeve. Loop wire extending from the loop to the loop amplifier shall be twisted with a minimum twist pitch of 18 per m 6 per foot.

5) Check conductor resistance to ground with "megger" of 500V or higher. Remove and replace the whole installation if ground resistance of less than 10 mega-Ohms is measured.

6) Provide TVSS (Transient Voltage Surge Suppressor) for both loop-wire terminations at or near the loop detector module. Ground the TVSS with minimum 10AWG insulated ground wire of high strand-count to the closest ground termination point.

7) Loops shall be capable of detecting motorcycles, passenger vehicles, and high bed trucks with the same sensitivity setting.

2.12.3 Radar

****
NOTE: Select either Point or Continuous over speed detection as required
****

Radar detection sensors may be used for vehicle over speed detection. [Point Over speed Detection. The detector unit shall be capable of detecting the speed of one or more vehicles at a point near the entrance of the ACP and closing an alarm contact if the vehicle speed is over a preset value.] [Continuous Over speed Detection. The detector unit shall be capable of continuously detecting the speed of vehicles within preset zones as they approach the ID Check Area of the ACP. The Sensor shall close an alarm contact when the speed of any vehicle anywhere within the zone is above a preset value. See drawings for required detection zones and detector speed settings. For radar sensors which sense speed at multiple discrete points in the direction of travel instead of continuously, the distance between discrete points shall not be more than 5 m 15 feet.] Radar detection sensors shall meet the requirements listed below.

a. The detector unit shall have an operating temperature range of -40 to +77 degrees C -40 to +170 degrees F and a relative humidity range of 5 to 95 percent, non-condensing. The detector unit shall be equipped with means for automatic temperature compensation as is necessary to overcome adverse effects of temperature and humidity swings in the specified range.

b. The detector unit shall be resistant to vibration in accordance with NEMA TS-1, IEC 60068-2-30 (test Fc), or approved equivalent. The detector unit shall be resistant to shock in accordance with NEMA TS-1, IEC 60068-2-27 (test Ea), or approved equivalent.

c. The detector unit shall withstand voltage surge of minimum 1kV (rise time = 1.2 microsecond, hold = 50 microsecond) applied in differential mode to all lines, power and output, as defined by IEC 61000-4-5 standard.

d. The detector unit shall not emit a noise at levels exceeding 55 dBa when measured at a distance of one meter 3 feet away from its surface.

e. Each detector unit shall transmit on a frequency band of 10.525 GHz +/-25 MHz or another approved spectral band. The detector shall comply with the limits for a Class A digital device pursuant to Part 15 of the FCC rules or the appropriate Spectrum Management Authority. The detector unit shall not interfere with any known equipment. Transmitter power shall not exceed 10 mili-watts.

f. The detector unit shall detect vehicle speed with 95% accuracy or greater independent of the vehicle's direction of travel through the

detection zone.

g. The field of view of the detector unit shall cover an area defined by an oval shaped beam with a beam height and width of 15 degrees minimum and a range of 3 to 70 m 10 to 200 feet minimum.

h. The enclosure rating of the detector unit shall be NEMA 3R or better. The overall detector dimensions shall not exceed the nominal envelop of 200 by 254 by 150 mm 8 by 10 by 6-inch.

i. The power requirement of the detector unit shall be 120V/60Hz, or be provided with appropriate power module/assembly and appurtenance, which is suitable for operation with 120V/60Hz.

j. The detector unit output upon detection of a vehicle speed over the adjustable preset value shall be a dry form C contact set, rated a minimum of 0.25 A at 24 Volts dc.

k. The detector unit shall have a blind zone of not more than 3 m 10 feet in front of the unit.

l. The detector unit may be applied in either Side-fired or Forward-looking configuration.

m. Detector units may be mounted on existing ACP structures or utility poles if suitable for this purpose. When existing structures and utility poles are not suitable, provide mounting trusses or poles for mounting detector units. The support structure and the mounted detector units shall deflect less than 13 mm 0.5 inch at exposure to 160 km/h 100 mph winds with a gust factor of 1.3.

n. Set all detector unit parameters and adjust detectors to provide required zone coverages.

2.12.4 Video Detection

Video detectors may be used for vehicle presence, over speed, and wrong-way detection. Detection shall be derived from video image signals received from a CCTV video camera. The video vehicle detector set shall include the camera, hardware, software, and appurtenances required to perform the detection functions required on the drawings. The Video analytics system shall produce warning annunciation via alarm contacts when the required detection criteria are met. Refer to Section 28 23 23.00 10 CLOSED CIRCUIT TELEVISION SYSTEMS for requirement on the related video camera and video signal transmission system. Video detectors shall meet the requirements listed below.

a. The detector unit shall have an operating temperature range of -40 to +77 degrees C -40 to +170 degrees F and a relative humidity range of 5 to 95 percent, non-condensing.

b. The detector unit shall be resistant to vibration in accordance with NEMA TS-1, IEC 60068-2-30 (test Fc), or approved equivalent. The detector unit shall be resistant to shock in accordance with NEMA TS-1, IEC 60068-2-27 (test Ea), or approved equivalent.

c. The detector unit when used for continuous speed detection shall sense speed at multiple discrete points in the direction of travel. In order to adequately simulate continuous speed detection, the distance

between discrete points shall not be more than 5 m 15 feet.

d. The detector unit when used for speed detection shall detect vehicle speed with a 95% accuracy or greater, independent of the vehicle's direction of travel through the detection zone. The detector unit when used for presence or wrong-way detection shall identify the required condition with a 95% accuracy or greater.

e. The enclosure rating of the detector unit shall be NEMA 3R or better.

f. The power requirement of the detector unit shall be 120V/60Hz, or be provided with appropriate power module/assembly and appurtenance, which is suitable for operation with 120V/60Hz. The detector unit output upon detection shall be a dry form C contact set rated a minimum of 0.25 A at 24 Volts dc.

g. The detector unit may be applied in either Side-fired or Forward-looking configuration.

h. Detector units may be mounted on existing ACP structures or utility poles if suitable for this purpose. When existing structures and utility poles are not suitable, provide mounting trusses or poles for mounting detector units. The support structure and the mounted detector units shall deflect less than 13 mm 0.5 inch at exposure to 160 km/h 100 mph winds with a gust factor of 1.3.

i. Set all detector unit parameters and adjust detectors to provide required zone coverages.

2.13 BALANCED MAGNETIC SWITCH (BMS)

****
NOTE: Determine the type, number, and locations of BMS's and show them on the drawings.
****

Provide BMS detectors as shown on the drawings. The BMS shall detect a 6 mm 1/4 inch of separating relative movement between the magnet and the switch housing. Upon detecting such movement, the BMS shall activate and generate an alarm. BMS detectors shall meet the following requirements:

2.13.1 BMS Subassemblies

The BMS shall consist of a switch assembly and an actuating magnet assembly. The switch mechanism shall be of the balanced magnetic type or triple-biased reeds to provide detection of tamper attempts. The switches shall provide supervision and pry tamer capability. Each switch shall be provided with an overcurrent protective device, rated to limit current to 80 percent of the switch capacity. Switches shall be rated for a minimum lifetime of 1,000,000 operations. The magnet assembly shall house the actuating magnet.

2.13.2 Housing

The housings of surface mounted switches and magnets shall be made of nonferrous metal and shall be weatherproof. The housings of recess mounted switches and magnets shall be made of nonferrous metal or plastic.

2.13.3 Remote Test

A remote test capability shall be provided. The remote test shall be initiated when commanded by the alarm annunciation system. The remote test shall activate the sensor's switch mechanism causing an alarm signal to be transmitted to the alarm annunciation system. The remote test shall simulate the movement of the actuating magnet relative to the switch subassembly.

2.14 DURESS ALARMS

****
NOTE: Determine the type, number, and locations of duress alarms and show them on the drawings. Edit out the appropriate subparagraphs below for the types not required.
****

Duress alarm switches shall provide the means for an individual to covertly notify the alarm annunciation system that a duress situation exists. Provide the number and type(s) of the following Duress Alarms as required on the drawings:

2.14.1 Foot-rail

Foot-rail duress alarms shall be designed to be foot activated and floor mounted. No visible or audible alarm or noise shall emanate from the switch when activated. The switch housing shall shroud the activating lever to prevent accidental activation. Switches shall be rated for a minimum lifetime of 50,000 operations.

2.14.2 Push-button

Latching push-button duress alarm switches shall be designed to be activated by depressing a push-button located on the duress switch housing. No visible or audible alarm or noise shall emanate from the switch. The switch housing shall shroud the activating button to prevent accidental activation. Switches shall be rated for a minimum lifetime of 50,000 operations.

2.14.3 Wireless

Wireless duress alarm switches shall consist of portable alarm transmitters and permanently installed receivers. The transmitter shall be activated by depressing a push-button located on the housing. An alarm signal shall be transmitted to one or more receivers located within a protected zone. The receivers shall, in-turn, transmit an alarm signal to the alarm annunciation system. No visible or audible alarm or noise shall emanate from the transmitter or receiver when activated. The transmitter housing shall shroud the activating button to prevent accidental activation. The transmitter shall be designed to be unobtrusive and still be activated in a covert manner. Switches shall be rated for a minimum lifetime of 50,000 operations and have a range of at least 45 m 150 feet. Wireless switches shall be fully supervised, such that the transmitter automatically transmits (checks in) to the receiver on a regular basis to test the system for low battery, tamper, and inactive status.

2.15 ACPCS PROCESSORS-CPU OPTION

****

NOTE: The ACPCS consists of two main subsystems, i.e., the AVBCS, which is required to be a Programmable Logic Controller (PLC) meeting the specifications for the Advanced Traffic Controller Standard, and the ESS. The ESS can be a computer (CPU) or one or more PLC's. For large ACPs with many gates, the CPU option may be appropriate. For small and medium sized ACPs, the PLC option is appropriate. The CPU option is described in this main paragraph and subparagraphs; the PLC option is described in paragraph ACCESS CONTROL POINT CONTROL SYSTEM PROCESSORS-PLC OPTION. Coordinate with the Installation, determine which option to use, and delete the inapplicable paragraph below.

****

The ACPCS consists of two main subsystems, i.e., the Active Vehicle Barrier Control System (AVBCS) and Electronic Security System (ESS). The AVBCS shall be a programmable logic controller (PLC) meeting the requirements of the Advanced Traffic Controller Standard. Provide a central processing unit (CPU) for the ESS meeting the following requirements:

2.15.1 Communications

Means and format for the communication between the ESS CPU, AVBCS PLC, and other PLCs used by the Contractor shall be IEEE Std 802.3 based Ethernet communication. Provide media and format converter system as applicable. The CPU and all PLCs for this project shall be purchased close to the time of installation. Coordination with the Government is essential in completing the system integration in a timely manner such that the latest technology is installed.

2.15.2 ACP Processing and Control Software

2.15.2.1 General

The software shall provide the communication, programming and control capabilities necessary to support all specified points and functions, plus a minimum expansion of 50 percent of the current number of points, complete with their point database. The ESS CPU shall be online at all times and shall perform all required functions as specified. The software shall consist of one or more standard software modules. Where multiple modules are used the modules shall be capable of sharing data and operating together seamlessly. Software shall be windowing type using icons and pull down menus. The system shall support multiple user operation with multiple tasks for each user and shall support operation and management of all peripheral devices. All configuration modifications shall be capable of being made on-line, while the system is operating. Data definitions, operator displays, etc. shall be added or deleted without having to interrupt the data acquisition. It shall be possible to upgrade the software to newer versions using an automatic mechanism provided by the software manufacturer. The software shall provide complete user documentation online, including examples of how to operate the various modules within the software. The ACPCS software shall be "off-the-shelf" standard software products of a company (companies) specializing in such products, supplemented by custom-developed software codes for integrating

the different sub systems and implement the required functionalities. Documentation of all implemented software, including the custom-developed software codes shall be supplied to the Government after formal system acceptance, but prior to the endurance tests. The Government shall have the right of use for the provided software for future enhancements and additions to the installed system.

2.15.2.2 Load and Adjust Software

Load software required for an operational control and processing system, including databases, operational parameters, and system, command, and application programs. Adjust, tune, debug, and commission all software and parameters for controlled systems to assure proper operation in accordance with the sequences of operation and database tables.

2.15.2.3 Operator Interface

The ACP Processing and Control shall be an object-oriented, mouse driven or touch screen, graphical user interface (GUI). The graphical user interface shall include a set of desktop utilities including the following: file management, shell tool, calculator, text editor, and icon editor.

2.15.2.4 Display Information

The ACP Processing and Control System shall display information necessary to support all requirements specified, including: operator commands; alarm notification; reports; system graphics as specified and as shown, incorporating dynamic data; and curve plotting.

2.15.2.5 System Graphics Implementation

System graphics displays shall be hierarchical displays which integrate dynamic data into the display. System graphics shall reflect actual system configuration. Each system schematic shall be included as a separate display. Different colors, textures, and use of inverted video shall be used for various components and dynamic data. The displays shall include standard and/or custom symbols. A library of callable display symbols containing symbols for all necessary equipment and control devices shall be furnished. Symbols shall conform to ISA 5.5 where applicable. Data associated with a display shall be updated within 1 seconds of the digital status change. Any dynamic data which is not current, due to PLC communications failure, PLC failure, or point out of service, shall be highlighted or flagged.

2.15.2.6 Display Editor

The display editor shall enable the user to create, modify, save and delete displays and symbols. Within the display shall be dynamic fields. The function of linking the dynamic fields with the database shall be handled by a separate software module which shall be executed automatically as the last step of the database generation and modification procedure.

2.15.2.7 Drawing Tools

At a minimum, the following object drawing tools must be supported: Rectangle/Square; Ellipse/Circle; Line; Polyline; Polygon; Text.

2.15.2.8 Object Tools

Operations which may be performed on an individual or group of objects shall include the following: Select/Select All; Deselect/Deselect All; Change Color; Move; Nudge; Cut; Copy; Paste; Clear; Duplicate; Group; Ungroup; Align; Space; Snap-to-Grip; Reshape.

2.15.2.9 Graphical Object Oriented Programming

The system shall include a graphical object oriented programming function which shall be used to create all control sequences utilized in the control panels. This function shall reside in the CPU to create, modify, and test software for PLC resident programs. The graphical object oriented programming function shall provide programming elements to be connected together to create a logic diagram. The diagram shall be compliable to produce executable code for the PLC(s). The graphical object oriented programming function shall include elements necessary to create logic diagrams that represent sequences of operation. Program elements shall be able to be combined into a custom template which can then be used as a standard function. Program checkout and debug facilities shall include display of dynamic and/or simulated system variables and points on the programming screens. The user shall be able to fix or force values of variables to enable program checkout during debugging. The programming shall allow for the use of a portable tester for loading files directly into the PLC(s) and uploading and downloading control programs and database information.

2.15.2.10 System Menus and Displays

The user shall be able to call up the following displays by dedicated function key, pull down menu or by icon and shall be able to page forward and backward on linked multiple page displays. The system menu and index displays shall also contain icons which can be used to call up subsequent displays.

a. System Menu (list of all graphics and menus).
b. Index (list of all PLCs).
c. Alarm Summary (list of all uncleared alarms).
d. Abnormal Summary (list of all devices not in normal state; keeps track of alarm conditions which have been cleared).
e. Data Communications Summary (listing of availability for each communication channel, by statistically processing the number of transmission errors, outages, and other abnormal conditions for each channel).

2.15.2.11 Hard-Copy Screen Request

The CPU shall be able to obtain a hard copy of the monitor display being viewed. This shall be an exact "snapshot" of the data and device symbols shown on the selected monitor.

2.15.2.12 Command Software

The software shall provide for defining and selecting points, parameters, graphics, report generation, and all other functions associated with operation. The operator commands shall be usable from keyboards with individual operator passwords as specified.

2.15.2.13 Command Input and Errors

Command menus shall utilize full words and acronyms selected to allow operators to use the system without extensive training or data processing backgrounds. The system shall prompt the operator. The system shall supervise operator inputs to ensure they are correct for proper execution. Operator input assistance shall be provided whenever a command cannot be executed because of operator input errors.

2.15.2.14 Special Functions

The system shall support the following special functions by using a mouse, in addition to all other commands specified:

a. Help shall produce a display of all commands available to the operator. The help command, followed by a specific command, shall produce context sensitive listing with a short explanation of the purpose, use, and system reaction to that command.

b. Start/Enable shall manually start equipment and enable monitoring and control of points.

c. Stop/Disable shall manually stop equipment and disable monitoring and control components.

d. Display diagram shall display diagrams of specific utility systems or other systems.

e. Diagram Development shall facilitate development of diagrams of specific utility systems or other systems.

f. Auto/Override shall override automatic operation of a point or return a point to automatic operation.

g. Print Report shall allow the operator to print reports.

h. Confirm Action shall allow the operator to confirm that the desired command sequence has been correctly entered and is to be executed.

i. Cancel Action shall perform the opposite function of the confirm action, at any time prior to executing confirm action.

j. Memo Pad shall allow the operator to create, store and retrieve pop-up notes.

2.15.2.15 Operator's Commands

The operator's commands shall provide the means for entry of control and monitoring commands, and for retrieval of information. The operator's commands shall perform such tasks as requesting a display of any digital point or any group of related points, startup and shutdown selected systems or devices, modifying, adjusting, enabling or defining a point or point parameters.

2.15.2.16 System Access Control

A minimum of 20 passwords shall be usable with the control system software. The system shall maintain an ASCII disk file logging all operators logged onto the system, alarm acknowledgments, commands issued

and all database modifications for each password. Each password shall be definable as to the functions that the operator can perform.

2.15.2.17 Alarms

The software shall notify an operator of the occurrence of an alarm condition. The control system alarm history shall be stored in an ASCII file and shall be re callable by the operator using the report generator. Alarm messages shall take precedence over other functions. A minimum of the most recent 1000 system alarms shall be directly available at the CPU. Digital alarms shall be subject to immediate reporting, within the alarm response time. A unique message with a field of 60 characters shall be provided for each alarm. Assignment of messages to a point shall be an operator editable function. Secondary messages shall be assignable by the operator for printing to provide further information, such as telephone lists or maintenance functions, and shall be editable by the operator. Classes of alarms, which will be identified for each item, include class 1 and class 2 alarm conditions. Class 1 (Critical) shall include display, print, and audible alarm at occurrence and at return-to-normal. Acknowledgment of class 1 alarms by the operator shall be required at occurrence and at return-to-normal. Class 2 (Informational) shall include display, print, and audible alarm at occurrence and at return-to-normal. No acknowledgment of class 2 alarms is required unless otherwise shown.

2.15.2.18 Pop-up Note Function

A pop-up note function shall be included providing the operator a capability of noting any data which may be associated with alarms or with any other event. A note created by an operator shall be automatically called up when any other workstation calls up the associated point, alarm, or alarm summary. The pop-up note function shall also support free form entry of data which can be used by any workstation operators as general reminders or instructions.

2.15.2.19 Real Time Clock Synchronization

The system shall synchronize the real time clocks of the CPU and PLC(s) within one second at least once per day automatically without operator intervention and without requiring system shutdown. The central station computer shall automatically initiate a call once per day to the NIST clock to obtain the correct time and date and update all time clocks. The central station computer shall generate a report showing differences.

2.15.2.20 Report Generator

Software shall be provided to generate and format standard and custom reports for displaying and storing on disk. Reports shall use database values and parameters, values calculated using the real time static database or historical data base; with the reports subsequently stored on hard disk or zip drive. Dynamic operation of the system shall not be interrupted to generate a report. The report shall contain the time and date when the sample was taken, and the time and date when the report was retrieved.

2.15.2.21 Periodic Automatic Report

The system shall allow for specifying, modifying, or inhibiting the report to be generated, the time the initial report is to be generated, the time interval between reports, end of period, and the output peripheral. The

system (through the Request Report Mode) shall allow for the operator to request, at any time, an immediate display of any report.

2.15.2.22 Processing and Control Supervision

The system shall supervise the CPU, PLC(s), I/O function, and circuit for alarm reporting including: CPU, PLC not responding; CPU, PLC responding (return to normal); CPU to PLC circuit high error rate; real time clock error more than 1 seconds (adjustable); CPU, PLC offline; CPU, PLC online (return to normal); CPU, PLC failure (self-diagnostics); point not responding to command; and point change of state without command.

2.15.2.23 ACP Processing and Control Database

The database shall be stored on disk and in memory. The static database shall be downloadable to backup devices.

2.15.2.24 Database Definition Process

Software shall be provided to define and modify each point in the database using operator commands. The definition shall include all physical parameters and constraints associated with each point. Each database item shall be callable for display or printing, including EEPROM, ROM and RAM resident data. Each point shall be defined and entered into database by the Contractor.

2.15.2.25 Historical Data Storage and Retrieval

A historical data storage and retrieval function shall be provided to collect and store dynamic data. This function shall be in addition to other data storage requirements. The function shall have the capability to collect and store alarm status changes, point values, events and operator commands, and system responses. This function shall have the capability to retain historical data on hard disk for pre-specified time periods, up to forty-five days using last day roll over, for short-term analysis, and then output the data to the zip drive for long-term retention. The operator shall also be able to selectively recall short-term data stored on hard disk. Retrieval of the contents of any selected historical data file shall be available using the data retrieval and report generation program. The output of the report generation program shall be capable of being viewed on the screen, transferred to removable media, or stored.

2.15.2.26 Security Management

This software shall support a user based security system. When enabled, the security system shall allow for the creation of users with certain rights and/or privileges. These rights shall include the ability to run any combination of or all of the applications in the data acquisition system. The security system shall support either centralized or distributed security file management. When user based security is enabled, an audit trail shall be generated in the system which shall tag every operator action with user identification (ID). The system shall support a minimum of 254 separate security areas. Security areas shall be assignable on a per function block basis. Each function block shall be assigned all of the available security areas, none of the available security areas, or up to three individual security areas. The following functions shall be supported within the security management application:

a. Enable/Disable user based security.

b. Define users.
c. Define groups which users may belong to.
d. Define security path(s).
e. Define user and/or group rights/privileges.
f. Define security area names.
g. Define system auto-start user.

2.16 ACPCS PROCESSORS-PLC OPTION

The ACPCS consists of two main subsystems, i.e., the Active Vehicle Barrier Control System (AVBCS) and Electronic Security System (ESS). The AVBCS is required to be a programmable logic controller (PLC) meeting the requirements of the Advanced Traffic Controller Standard. Provide one or more PLCs or equivalent devices for the ESS meeting the following requirements:

2.16.1 Communications

Means and format for the communication between the ESS PLC(s) and AVBCS PLC shall be IEEE Std 802.3 based Ethernet communication. Provide media and format converter system as applicable.

2.16.2 New PLCs

All PLCs for this project shall be purchased close to the time of installation. Coordination with the Government is essential in completing the system integration in a timely manner such that the latest technology is installed.

2.16.3 Graphical Object Oriented Programming

The system shall include a graphical object oriented programming function which shall be used to create all control sequences utilized in the PLC(s). This function shall be capable of creating, modifying, and testing software for PLC resident programs. The graphical object oriented programming function shall provide programming elements to be connected together to create a logic diagram. The diagram shall be compliable to produce executable code for the PLC(s). The graphical object oriented programming function shall include elements necessary to create logic diagrams that represent sequences of operation. Program elements shall be able to be combined into a custom template which can then be used as a standard function. Program checkout and debug facilities shall include display of dynamic and/or simulated system variables and points on the programming screens. The user shall be able to fix or force values of variables to enable program checkout during debugging. The programming shall allow for the use of a portable tester for loading files directly into the PLC(s) and uploading and downloading control programs and database information.

2.16.4 Alarm Messages

A unique message with a field of 60 characters shall be provided for each alarm. Assignment of messages to a point shall be an operator editable function.

2.16.5 NIST Time

The ESS shall automatically initiate a call once per day to the NIST clock to obtain the correct time and date and update the real time clock. The

AVBCS shall generate a report showing the time difference.

2.16.6 Processing and Control Supervision

The system shall supervise the PLC(s), I/O function, and circuit for alarm reporting including: PLC not responding; PLC responding (return to normal); PLC circuit high error rate; real time clock error more than 1 seconds (adjustable); PLC offline; PLC online (return to normal); PLC failure (self-diagnostics); point not responding to command; and point change of state without command.

2.16.7 ACP Processing and Control Database

The database shall be stored on disk and in memory. The static database shall be downloadable to backup devices.

2.16.8 Data Base Definition Process

Provision shall be made to define and modify each point in the database using operator commands. The definition shall include all physical parameters and constraints associated with each point. Each database item shall be callable for display or printing, including EEPROM, ROM and RAM resident data. Each point shall be defined and entered into database by the Contractor.

2.16.9 Security Management

This system shall support a user based security system. When enabled, the security system shall allow for the creation of users with certain rights and/or privileges. These rights shall include the ability to run any combination of or all of the applications in the data acquisition system.

2.17 ACTUATED TRAFFIC ARMS

****

NOTE: Traffic arms are required in each inbound lane at the ID Check Area for all Safety Systems. Traffic arms are also required in front of all active vehicle barriers in the Presence Detection Safety System. Edit the following paragraphs as necessary.

****

Traffic arms [in the ID Check Area shall be controlled by control switches in the Guard Booths.] [at the active vehicle barriers shall be controlled by the Traffic Signal Controller - see drawings for control logic.] The housing for the traffic arm controller shall be weather proof and constructed of stainless steel not less than 14 gauge, carbon steel not less than 3 mm 1/8 inch thick, or cast steel not less than 6 mm 1/4 inch thick. All seams, joints, and supports shall be electric bead welded. Access to the motor compartment shall be provided with a removable cover secured in a weather proof manner with a lock.

2.17.1 Traffic Arm Assembly

The traffic arm drive assembly shall be directly linked to the gear motor by a heavy duty connecting rod. The traffic arm travel shall not exceed 4 seconds for raising or lowering. Override stops shall be provided to limit the gate arm travel in vertical or horizontal position and shall operate

through 90 degrees. The assembly shall be capable of a minimum of 500 duty cycles per hour. A motor of at least 1/3 HP shall be used to power the system. The traffic arm assembly shall consist of a hollow aluminum assembly, wood, steel or fiberglass material with a length of 2.74 m 9 feet. Provide a spare arm for each traffic arm assembly. The traffic arm shall be covered with retroreflective red and white sheeting. See MUTCD for proper orientation of sheeting. Each traffic arm shall be equipped with an obstruction detector that will automatically reverse the traffic arm motor when an obstruction is detected.

2.17.2 Presence Detection Safety System Only

The traffic arm shall have a minimum of three red warning lights a minimum of 100 mm four inch in diameter evenly spaced on the arm. Provide interlocks and appurtenances to illuminate [flash] the lights when the arm is deployed.

2.18 TRAFFIC SIGNALS

Provide traffic signals with light emitting diode (LED) signal modules as shown on the drawings. The term "LED signal module" in this text shall refer to an array of LEDs and lens that are capable of providing a circular signal indication as specified herein and shown on the drawings. All LED signal modules shall conform to the Equipment Standards of the Institute of Transportation Engineers (ITE), chapter 2a. The arrangement and size of signal indications for each LED signal module shall be as shown on the drawings and shall be in conformance with MUTCD.

2.19 WARNING BEACONS

Each signal unit lens shall have a visible diameter of not less than 200 mm eight inch. When illuminated, the beacon shall be clearly visible, to all drivers it faces, for a distance of at least 1.6 km 1 mile under normal atmospheric conditions unless otherwise physically obstructed. The yellow lens colors shall be in accordance with the requirements of MUTCD. All flashing contacts shall be equipped with filters for suppression of radio interference. Beacons shall be flashed at a rate of not less than 50 nor more than 60 times per minute. The illuminated period of each flash shall not be less than 1/2 and not more than 2/3 of the total cycle. Operation should be programmable and permit continuous non-flashing operation through a supervisory signal from the Traffic Signal Controller. Provide day-light sensor and an automatic dimming system to reduce the brilliance of the beacon.

2.20 TRAFFIC SIGNAL SUPPORTS

The design and installation of all traffic control supports shall be in accordance with AASHTO LTS-4 and applicable local and state standard specifications. Traffic signal supports consist of tubular members, mast arms, pole shaft, base plates, anchor bolts assemblies, foundations as well as associated connections and appurtenances. Loading evaluations shall be consistent with local and state guidelines. Ice and wind loads shall be determined based on the geographic location of the installation in accordance with AASHTO guidelines. Group loading analysis shall be consistent with local and state guidelines and section 1.2.6 of AASHTO LTS-4. Allowable stress shall be consistent with local and state guideline and section 1.4 of AASHTO LTS-4. Fatigue calculations shall be consistent with local and state guideline and section 1.9.6 of AASHTO LTS-4. It is the Contractor's responsibility to conduct soil borings for foundation design;

otherwise, conservative soils assumptions shall be used in calculating foundation requirements. If local and state guidelines provide foundations designs for design conditions, these guidelines may be used provided all loading and design conditions fall within guideline parameters. Before forming and placing concrete, each foundation excavation shall be inspected and evaluated for the actual soil conditions encountered. Do not proceed with the work until the excavation is inspected and evaluated. If necessary, revise the foundation design based on the soil conditions encountered. Before submitting the revised design for approval, obtain the signature and seal of a Professional Engineer registered in the State. Foundation locations may be changed to avoid underground obstructions (see Group II Technical Data Package). All design calculations as well as shop drawings shall be submitted to the government for review and acceptance prior to installation (see Group I Technical Data Package).

2.21 ACTIVE VEHICLE BARRIERS

****
NOTE: Edit Section 34 71 13.19 and include it in the procurement documents for the ACPCS.
****

Furnish and install [number] [type-wedge, net, bollard, etc.] active vehicle barriers rated [4,8,or 12K] with maximum mfeet of run-out in accordance with Section 34 71 13.19 ACTIVE VEHICLE BARRIERS.

2.22 SIGNS AND PAVEMENT MARKINGS

All signs and pavement markings shall be installed in accordance with MUTCD per Joint Regulation (DA AR 55-80/OPNAVINST 11210.2, AFMAN 32-1017/MCO 11210.2D/DLAR 4500.19) of the Department of Defense (DoD) Transportation Engineering Program. In states with supplements to the Manual on Uniform Traffic Control Devices (MUTCD), signs and pavement markings shall also be in accordance with those supplements. Signs and pavement markings shall meet retroreflectivity requirements as defined by FHWA and/or as contained in the MUTCD section 2A.8 and 2A.9. State and local retroreflectivity requirements shall also be satisfied. A minimum sign sheeting of MUTCD (Section 6F.63) Type III sign sheeting shall be used for regulatory and warning signs. All sign posts shall be of breakaway design as set forth in AASHTO RSDG-3 or as required by the local/State DOT. A signing and pavement marking plan shall be submitted to the government for review and comment and is subject to review and comment by SDDCTEA (see Group I Technical Data Package).

2.23 WIRE AND CABLE

Provide all wire, cable, and conduit connecting all Contractor furnished and, where indicated on the drawings, Government furnished equipment. Wiring shall be in accordance with NFPA 70. The wiring shall be [fiber optic] [or] [copper] cable in accordance with the manufacturers' requirements. Copper signaling line circuits and initiating device circuit field wiring shall be No. [18][20][_____] AWG size conductors at a minimum. Wire size shall be sufficient to prevent voltage drop problems. Circuits operating at 24 VDC shall not operate at less than 21.6 volts. Circuits operating at any other voltage shall not have a voltage drop exceeding 10 percent of nominal voltage.

2.23.1 Above Ground Sensor Wiring

Sensor wiring shall be 20 AWG minimum, twisted and shielded, 2, 3, 4, or 6 pairs to match hardware. Multi-conductor wire shall have an outer jacket of PVC.

2.23.2 Direct Burial Sensor Wiring

Sensor wiring shall be 20 AWG minimum, twisted and shielded, 2, 3, 4, or 6 pairs to match hardware. The construction of the direct burial cable shall be as specified in Section 27 15 19.00 10 WIRE LINE DATA TRANSMISSION SYSTEM.

2.23.3 Cable Construction

All cable components shall withstand the environment in which the cable is installed for a minimum of 20 years.

2.23.4 Power Line Surge Protection

Equipment connected to alternating current circuits shall be protected from power line surges. Equipment protection shall withstand surge test waveforms described in IEEE C62.41.1 and IEEE C62.41.2. Fuses shall not be used for surge protection.

2.23.5 Sensor Device Wiring and Communication Circuit Surge Protection

Inputs shall be protected against surges induced on device wiring. Outputs shall be protected against surges induced on control and device wiring installed outdoors and as shown. Communications equipment shall be protected against surges induced on any communications circuit. Cables and conductors, except fiber optics, which serve as communications circuits between systems shall have surge protection circuits installed at each end. Protection shall be furnished at equipment, and additional triple electrode gas surge protectors rated for the application on each wireline circuit shall be installed within 1 meter 3 feet of the building cable entrance. Fuses shall not be used for surge protection. The inputs and outputs shall be tested in both normal mode and common mode using the following two waveforms:

a. A 10 microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 Volts and a peak current of 60 amperes.

b. An 8 microsecond rise time by 20 microsecond pulse width waveform with a peak voltage of 1000 Volts and a peak current of 500 amperes.

2.23.6 Power Line Conditioners

A power line conditioner shall be furnished for equipment in each subsystem. The power line conditioners shall be of the Ferro-resonant design, with no moving parts and no tap switching, while electrically isolating the secondary from the power line side. The power line conditioners shall be sized for 125 percent of the actual connected kVA load. Characteristics of the power line conditioners shall be as follows:

a. At 85 percent load, the output voltage shall not deviate by more than plus or minus 1 percent of nominal when the input voltage fluctuates between minus 20 percent to plus 10 percent of nominal.

b. During load changes of zero to full load, the output voltage shall not deviate by more than plus or minus 3 percent of nominal. Full correction of load switching disturbances shall be accomplished within 5 cycles, and 95 percent correction shall be accomplished within 2 cycles of the onset of the disturbance.

c. Total harmonic distortion shall not exceed 3.5 percent at full load.

2.24 FACTORY ACCEPTANCE TEST

2.24.1 General

Provide personnel, equipment, instrumentation, and supplies necessary to perform a Factory Acceptance Test of the complete Active Vehicle Barrier Control System. The Factory Acceptance Test shall demonstrate the required barrier, traffic signal, and warning beacons controls. The test set-up must include the actual PLC, control panels, and control switches to be used in the AVBCS. The barrier open, close, and emergency close actuating devices and open and close position switches; the VPDs; the traffic signals; and the warning beacons may be simulated.

2.24.2 Test Plan

In accordance with the Group III Technical Data Package, submit a Test Plan including a schedule, test procedures, equipment catalog cuts, one line diagrams showing interconnections of all subsystem components, and ladder diagrams showing control logic for the barriers, traffic signals, warning beacons, and alarm and status points to the Contracting Officer 30 days prior to the proposed test start date of the Factory Acceptance Test.

2.24.3 Test

Upon Test Plan approval by the Contracting Officer, assemble the test system and perform the Factory Acceptance Test. The Factory Acceptance Test shall demonstrate that the system complies with the requirement specified herein. The Factory Acceptance Test shall be conducted during regular daytime working hours on weekdays. The Contracting Officer reserves the right to witness all or a portion of the Factory Acceptance Test.

2.24.4 Test Report

Within seven (7) days of successful completion of the Factory Acceptance Test, submit a Test Report to the Contracting Officer documenting the results of the test. The Test Report shall include the results of all test procedures showing all commands, stimuli, and responses to demonstrate compliance with the contract requirements. The Test Report shall also include a certification from each Technical Specialist of the Traffic Signal Controller, CCTV, and Security Monitoring subsystems that their subsystem meets the contract requirements. The Contracting Officer will notify the Contractor within 7 days of receipt of the Test Report whether the Test Report is approved. If disapproved, the Contracting Officer will note the specific procedures that are disapproved, and the Contractor shall retest those procedures. No equipment shall be shipped to the field until the Test Report is approved by the Contracting Officer.

PART 3 EXECUTION

3.1 EXAMINATION

Verify that site conditions are in agreement with the contract drawings. In accordance with Group II Technical Data Package, prepare a report describing any differences in site conditions or conditions that will affect performance of the system to the Contracting Officer. Do not take any corrective action without written permission from the Contracting Officer.

3.2 INSTALLATION

3.2.1 Oversight

The Contractor designated Technical Specialists from the AVBCS and ESS shall oversee installation.

3.2.2 Installation Schedule

Before beginning any site work, provide a schedule of all installation and testing activities. The project activities in the proposed schedule shall be arranged in chronological order. All installation and testing activities, specifically those requiring ACP outages, shall be coordinated with the Contracting Officer. No site work shall be done without an approved schedule by the Contracting Officer.

3.2.3 Wiring

Furnish and install all cables and conduits for all wiring interconnecting contractor furnished, and where indicated on the drawings, Government furnished equipment. Install all wiring per Section 26 20 00 INTERIOR DISTRIBUTION SYSTEM and Section 33 70 02.00 10 ELECTRICAL DISTRIBUTION SYSTEM, UNDERGROUNG.

3.2.4 Grounding

Provide ground rods and grounding system for the following: Traffic Signal supports, Warning Signal supports, AVBCS enclosure, Active Vehicle Barrier frames, Active Vehicle Barrier control enclosure, and supports for over speed and wrong-way detectors. Ground rods installed by the Contractor shall be tested as specified in IEEE Std 142. Provide a ground wire from Active Vehicle Barrier frame to the Active Vehicle Barrier control enclosure.

3.2.5 Enclosure Penetrations

Enclosure penetrations shall be from the bottom unless the system design requires penetrations from other directions. Penetrations of interior enclosures involving transitions of conduit from interior to exterior, and penetrations on exterior enclosures shall be sealed with rubber silicone sealant to preclude the entry of water. The conduit riser shall terminate in a hot-dipped galvanized metal cable terminator. The terminator shall be filled with an approved sealant as recommended by the cable manufacturer and in a manner that does not damage the cable.

3.2.6 Cold Galvanizing

Field welds and/or brazing on factory galvanized boxes, enclosures,

conduits, etc., shall be coated with a cold galvanized paint containing at least 95 percent zinc by weight.

3.2.7 Other Requirements

Install the system in accordance with the standards for safety included in NFPA 70 and the appropriate installation instructions from the manufacturers of the equipment. Components within the system shall be configured with appropriate service points to pinpoint system trouble in less than 20 minutes.

3.2.8 Incidental Infrastruture

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NOTE: Provide drawing showing all contract requirements for incidental infrastructure, e.g., shoulders, curbing, shoulder to curb transitions, guardrail, and other passive barriers. Passive barriers must transition towards active barriers in accordance with Standard Drawing C9.02. Gaps and offsets between active and passive barriers must prevent a threat vehicle from traveling between barriers. Active vehicle barriers must be installed in a curbed section. If no curbing exists, a shoulder to curb transition of 10:1 must be introduced prior to and after the active vehicle barrier. All appurtenances must have lateral offset no less than 600 mm (2 feet) as noted on Standard Drawing C9.02 except in the absence of curbing or where speeds exceed 64 km/h (40 mph), in which case offsets and clearances must be compliant with AASHTO RSDG-3. All passive barriers not identified as crashworthy per NCHRP 350 and AASHTO RSDG-3 must be located outside of the clear zone as defined by AASHTO RSDG-3.

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Provide all incidental construction as shown on the Drawings. Incidental construction shall be designed and constructed in accordance with local/state DOT requirements, AASHTO GDHS-5 (, the AASHTO RSDG-3, NCHRP 350, and the MUTCD.

3.3 CONTRACTOR FIELD TEST

Calibrate and test all equipment, verify communications links between all subsystem components and between subsystems, place the integrated system in service, and test the integrated system using the approved test procedures for the Performance Verification Test. Deliver a report certifying that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include certifications from the Technical Specialists of the Active Vehicle Barrier, Traffic Signal Controller, CCTV, and Security Monitoring equipment/subsystems that the equipment/subsystems have been installed and tested and that they meet the requirements of the specifications.

3.4 COMMISSIONING

3.4.1 General

Commissioning shall consist of successfully completing a Performance Verification Test, the training of Installation security and maintenance personnel, and successfully completing an Endurance Test as described below. Commissioning shall begin only after the Contracting Officer approves the Test Report from the Contractor Field Test and all materials in the Group IV Technical Data Package.

3.4.2 Commissioning Team Leader

Designate a Commissioning Team Leader to be responsible for scheduling all tests, coordinating attendance of all required Commissioning Team members, conducting the tests, and preparing appropriate Test Reports, and the final Commissioning Report.

3.4.3 Commissioning Team

The Commissioning Team shall consists of the Commissioning Team Leader; the Technical Specialists from the AVBCS and ESS; a representative of the design agent; a Contracting Officer's representative; a representative from the Installation; [a representative of the Electronic Security Systems Center]; and a representative of the USACE Protective Design Center.

3.4.4 Training

3.4.4.1 General Requirements

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NOTE: Coordinate the training requirements with the Installation and designate the number of persons to be trained.

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Conduct training courses for designated personnel in the operation and maintenance of the ACPCS. The training shall be oriented to the specific system being installed. Training manuals shall be delivered for each trainee with 2 additional copies delivered for archiving at the project site. The manuals shall include an agenda, defined objectives for each lesson, and a detailed description of the subject matter for each lesson. Furnish audio-visual equipment and other training materials and supplies. Where the Contractor presents portions of the course by audio-visual material, copies of the audio-visual material shall be delivered to the Government either as a part of the printed training manuals or on the same media as that used during the training sessions. A training day is defined as 8 hours of classroom instruction, including two 15-minute breaks and excluding lunchtime, Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the operator training for the guards, the Contractor shall assume that guards will have a high school education or equivalent and are familiar with Access Control Points operations. For maintenance training, the Contractor shall assume mechanical and electrical maintenance personnel typically employed at military installations. Approval of the planned training schedule shall be obtained from the Government at least 30 days prior to the training.

3.4.4.2 Guard's Training

The Guard Training Course shall be taught at the project site for a period of up to eight hours during or after the Contractor's field testing, but before commencing the performance verification test. A maximum of [12] [_____] personnel shall attend the course. No part of the training given during this course will be counted toward completion of the performance verification test. The course shall include instruction on the specific hardware configuration of the installed system and specific instructions for operating the installed system. Upon completion of this course, each student shall be able to operate the ACPCS including the following:

a. Operate the active vehicle barriers in both the Manual and Auto modes.

b. Understand the differences between the normal and EFO operation of the barriers.

c Understand when to use Manual, Maintenance, and Auto modes for each barrier.

d. Understand all requirements for putting a barrier in either the Manual or Maintenance modes including required actions in the roadway ahead of the barrier and actions at the barrier.

e. Understand the active vehicle barrier safety scheme including operation of all Vehicle Presence Detectors, Traffic Signals, signs, and warning signals.

f. Understand operation of the Traffic Signal including all signal indications for various operational modes and barrier positions.

g. Reconfigure barriers after an EFO activation.

h. Understand the operation and coverage of all over speed and wrong-way sensors.

i. Monitor, acknowledge, and reset alarms.

j. Monitor and control CCTV system

3.4.4.3 Maintenance Personnel Training

The Maintenance Personnel Training Course shall be taught at the project site for a period of up to eight hours during or after the Contractor's field testing, but before commencing the performance verification test. A maximum of [12] [_____] personnel shall attend the course. The course shall include the following:

a. Instruction on each equipment and its configuration in the installed system.

b. Trouble shooting and diagnostic procedures.

c. Component repair and replacement procedures.

d. Emphasis on the importance of periodic testing and preventative maintenance. Provide a list of periodic preventative maintenance tasks for the active vehicle barriers and other critical equipment.

e. Calibration procedures.

f. Review of system drawings to identify device locations, communications, topology, and flow.

3.4.4.4 System Manager Training

[_____] System managers shall be trained for a minimum of 8 hours in addition to the Guard and Maintenance Personnel described above. System Manager Training shall provide training for trainers, such that, system managers will be able to train new guards and maintenance personnel in the future. System Manager Training shall also include the following:

a. Enrollment/deactivation process including the assignment of operator passwords.

b. Change database configuration.

c. Modify graphics, if provided.

d. Print reports, e.g., Sequence of Events reports.

e. Any other functions necessary to manage the system.

3.4.5 Performance Verification Test (PVT)

3.4.5.1 Test Plan

In accordance with the Group IV Technical Data Package, the Contractor's Commissioning Team Leader shall submit a Test Plan including a schedule, test procedures, equipment catalog cuts, one line diagrams showing interconnections of all subsystem components, and ladder diagrams showing control logic for the barriers, traffic signals, warning beacons, and alarm and status points to the Contracting Officer 30 days prior to the proposed start date of the Performance Verification Test. For each test in the PVT, the test procedures shall clearly indicate which Commissioning Team members must witness and certify the test.

3.4.5.2 Test

Per approved test procedures and under the direction of the Contractor's Commissioning Team Leader, the Commissioning Team shall perform a Performance Verification Test of the installed Access Control Point Control System. The PVT shall demonstrate that the system complies with the requirements specified herein. Where possible, the PVT shall be conducted during regular daytime working hours on weekdays. At the successful completion of each test in the PVT, appropriate Commissioning Team Members shall sign the completed test procedure to certify that the test was successful.

3.4.5.3 Test Report

Within seven (7) days of successful completion of the PVT, the Contractor's Commissioning Team Leader shall submit a Test Report to the Contracting Officer documenting the results of the test. The Test Report shall include the results of all test procedures showing all commands, stimuli, and responses to demonstrate compliance with the contract requirements. The Test Report shall also include a certification from each Commissioning Team

member that the tests were successful. The Contracting Officer will notify the Contractor, within 7 days of receipt of the Test Report, whether the Test Report is approved. If disapproved, the Contracting Officer will note the specific procedures that are disapproved, and the Contractor shall retest those procedures. The Endurance Test shall not begin until the PVT Test Report is approved by the Contracting Officer.

3.4.6 Endurance Test

3.4.6.1 General

In accordance with the Group IV Technical Data Package, the Contractor's Commissioning Team Leader shall submit a Test Plan including a schedule, test description, list of personnel required to conduct the test, and a list of all data to collect and observances to be made in order to demonstrate system reliability and operability of the completed Access Control Point Control System. The Endurance Test shall be conducted in phases as specified. The Endurance Test shall not be started until the Contractor notifies the Contracting Officer, in writing, that training as specified has been completed and that the correction of all outstanding deficiencies has been satisfactorily completed. The Contracting Officer may terminate the testing at any time the system fails to perform as specified. Upon termination of testing by the Contracting Officer or by the Contractor, the Contractor shall commence an assessment period as described for Phase II below.

3.4.6.2 Phase I Testing

The test shall be conducted 24 hours per day for 15 consecutive calendar days, including holidays, and the system shall operate as specified. Make no repairs during this phase of testing unless authorized by the Contracting Officer in writing. If the system experiences no failures during Phase I testing, the Contractor may proceed directly to Phase III testing after receipt of written permission from the Contracting Officer.

3.4.6.3 Phase II Assessment

After the conclusion of Phase I, identify all failures, determine causes of all failures, repair all failures, and deliver a written report to the Contracting Officer. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed, and shall recommend the point at which testing should be resumed. After delivering the written report, convene a test review meeting at the jobsite to present the results and recommendations to the Contracting Officer. The meeting shall not be scheduled earlier than 5 business days after receipt of the report by the Contracting Officer. As a part of this test review meeting, demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Contractor's report and the test review meeting, the Contracting Officer will determine the restart date, or may require that Phase I be repeated. If the retest is completed without any failures, proceed directly to Phase III testing after receipt of written permission from the Contracting Officer.

3.4.6.4 Phase III Testing

The test shall be conducted 24 hours per day for 15 consecutive calendar days, including holidays, and the system shall operate as specified. Make no repairs during this phase of testing unless authorized by the Contracting Officer in writing.

3.4.6.5 Phase IV Assessment

After the conclusion of Phase III, identify all failures, determine causes of failures, repair failures, and deliver a written report to the Contracting Officer. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed, and shall recommend the point at which testing should be resumed. After delivering the written report, convene a test review meeting at the jobsite to present the results and recommendations to the Contracting Officer. The meeting shall not be scheduled earlier than 5 business days after receipt of the report by the Contracting Officer. As a part of this test review meeting, demonstrate that all failures have been corrected by repeating appropriate portions of the performance verification test. Based on the Contractor's report and the test review meeting, the Contracting Officer will determine the restart date, and may require that Phase III be repeated. Do not commence any required retesting until after receipt of written notification by Contracting Officer. After the conclusion of any retesting which the Contracting Officer may require, the Phase IV assessment shall be repeated as if Phase III had just been completed.

3.4.7 Commissioning Report

Upon successful completion of the Endurance Test, the Contractor's Commissioning Team Leader shall prepare a Commissioning Report documenting that the Contractor has successfully completed the PVT and Endurance Test and recommending that the completed system be accepted. The Commissioning Report shall include signatures of the Commissioning Team.

3.5 APPENDICES

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NOTE: There are 3 possible Appendix A, of which the Designer must choose one.
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APPENDIX A
Normally Deployed Active Barrier Safety System

1 FEATURES. Provide the following features for the Barrier Normally Closed Safety Scheme:

1.1 A three light Traffic Signal adjacent to each barrier. The three lights in each Traffic Signal shall be Red-Yellow-Green top to bottom. The Traffic Signal shall be located no more than 3 m (10 feet) behind the active barrier as a driver normally approaches the barrier.

1.2 A 600 mm (2 foot) wide stop line placed 13 m (40 feet) in front of the traffic signal as a driver normally approaches the barriers.

1.3 Double solid white lines between lanes approaching the barriers to prohibit lane changes in front of the barriers.

1.4 Vehicle presence detectors located immediately before and immediately after each barrier. Presence detectors can be induction loops, video motion sensors, or other suitable technologies capable of sensing vehicle presence.

1.5 One Master Control Panel and one Guard Booth Control panel for each Guard Booth along with all control switches and indicating lights as shown on the Drawings. The Master Control Panel will normally be located in the Gatehouse for use by the lead ACP guard.

[NOTE TO DESIGNER. Include a drawing showing the control switches and control logic for this scheme. Use Drawing E1.03 in the Standard Design or provide a new drawing if the control switches and controls on Drawing E1.03 are modified. If the controls are modified from Drawing E1.03, the following control sequences will also need to be modified.]

1.6 An Actuated Traffic Arm for each inbound lane in the ID Check Area. ATAs shall be installed near the Guard Booths as shown on the Drawings. An ATA Control Panel with Open and Close control switches for the ATA shall be provided and mounted on the back wall of the Guard Booth below the back window.

2 BARRIER CONTROL SWITCHES.
2.1.1 Per the Drawings, the active vehicle barrier control system shall have one 2 position Auto-Manual mode selector switch for the Inbound Barriers, one 2 position Auto-Manual mode selector switch for the Outbound Barriers, one Inbound Fill switch, one Inbound Release switch, one Outbound Fill switch, one Outbound Release switch, one Normal-Maintenance key operated selector switch for each barrier (unique key for each barrier removable in the Maintenance position only), and one set of Open and Close switches for each barrier. Also per the Drawings, the Guard Booth Control Panels shall have one Inbound Fill switch, one Inbound Release switch, one Outbound Fill switch, and one Outbound Release switch. In the Barrier Normally Closed Safety Scheme, at least one barrier is closed in both the inbound and outbound lanes, therefore, the EFO function (and associated controls) is not required.

2.1.2 In the Manual mode of the Inbound Barriers mode selector switches, the Close and Open switches on the Master Control Panel shall be activated for the inbound barriers, but the Fill and Release switches on the Master and Guard Booth Control Panels shall be deactivated for inbound barriers. In the

Auto mode of the Inbound Barriers mode selector switch, the Close and Open switches on the Master Control Panel shall be deactivated for the inbound barriers, and the Fill and Release switches on the Master and Guard Booth Panels shall be activated for inbound barriers. The above requirements also apply to the control switches and control logic for the outbound barriers. In the Maintenance position of a barrier's Normal-Maintenance selector switch, the Close and Open switches on the Master Control Panel shall be deactivated and the Fill and Release switches on the Master and Guard Booth Control Panels shall also be deactivated for that barrier.

2.1.3 Under normal operations, the Inbound Barriers and Outbound Barriers Auto-Manual mode selector switches on the Master Control Panel will be in the Auto positions. Barriers in the inbound or outbound lane(s) can be test operated by installing the proper lane markings and passive barriers ahead of the active barrier to be tested and then placing the appropriate mode switch to the Manual mode. Once in the Manual mode with the lane properly blocked and marked, the barrier can be opened and closed from the Open and Close switches on the Master Control Panel. The Maintenance position of each barrier's Auto-Maintenance selector switch can be used when maintenance needs to be performed on the barrier. Maintenance personnel would place the barrier's Auto-Maintenance switch in the Maintenance position and then remove and retain the key, thus locking out all control of that barrier from the Control Panels. Maintenance personnel would also have to block and mark the lane ahead of the barrier and also lock and tag out certain equipment at the barrier per the barrier manufacturer's recommendations for the type of maintenance to be performed.

3 TRAFFIC SIGNAL AND BARRIER CONTROLS.

3.1 BARRIER LAYOUT AND DESIGNATIONS. Each inbound and outbound lane shall have 2 barriers per lane arranged in a sally port to entrap a vehicle or vehicles between them. The space between barriers shall be long enough for the longest vehicle anticipated for the ACP. The space may be made longer to accommodate multiple vehicles in a platooning type arrangement. Per the Drawings, the initial barrier from the perspective of innocent motorists is designated A, and the final barrier is designated B for inbound lanes. The initial barrier, again from the perspective of the innocent motorists, is designated C, and the final barrier is designated D for outbound lanes.

3.2 AUTO MODE OF OPERATION. Initially with no vehicles present in the inbound lanes and the Inbound Barriers Auto-Manual selector switch in the Auto mode, Barrier A is open and Barrier B is closed. Incoming vehicles are checked at the ID Check point and if cleared are allowed to pass over Barrier A and proceed to the Stop Line for Barrier B. The guard at either the Gatehouse or the Guard Booth will then activate the Inbound Release switch. Upon activation of the Inbound Release switch, the Traffic Signal for Barrier A shall go from Green to Yellow for three seconds and then to Red. After an additional second of Red, Barrier A's close circuit shall be energized to close the barrier. After Barrier A is fully closed, Barrier B's open circuit shall be energized to open Barrier B. When Barrier B is fully open, its Traffic Signal shall change from Red to Green to allow the vehicle or vehicles to proceed onto the Installation. When the vehicle or vehicles between Barriers A and B have passed over Barrier B, the guard will activate the Inbound Fill switch. Upon activation of the Inbound Fill switch, the Traffic Signal for Barrier B shall change from Green to Yellow for 3 seconds and then to Red. After an additional 1 second at Red, Barrier B's close circuit will be energized to close Barrier B. After Barrier B is fully closed, the open circuit for Barrier A shall be energized to open Barrier A. After Barrier A is fully open, its Traffic Signal shall change from Red to

Green. The same controls apply to Barriers C and D in the outbound lanes and control switches Outbound Release and Outbound Fill. The close circuit for all barriers shall be supervised by the Vehicle Presence Detectors (VPD's) in front of and behind the barrier, such that if either VPD detects a vehicle, the barrier close circuit shall be suppressed.

3.3 MANUAL MODE OF OPERATION. When the Inbound Barriers Auto-Manual mode switch is placed in the Manual mode, the inbound barriers shall be controlled from the individual barrier Open and Close switches on the Master Control Panel. Initiation of a Close command to an open barrier shall cause that barrier's Traffic Signal to change from Green to Yellow for 3 seconds and then to Red. After an additional one second of Red, the barrier's close circuit shall be energized through the VPD's immediately in front of and behind the barrier. If the VPD's are clear, the barrier shall close. Initiation of an Open commend to a closed barrier shall energize the open circuit for the barrier and open the barrier. After the barrier is fully open, the Traffic Signal shall change from Red to Green.

3.4 NORMAL-MAINTENANCE OPERATION. When the barrier's Normal-Maintenance switch is placed in the Maintenance position and the barrier is open, the Traffic Signal for that barrier shall change from Green to Yellow for 3 seconds and then to Red. If the barrier is closed when its Normal-Maintenance switch is placed in the Maintenance position, the Traffic Signal will already be Red and shall stay Red as long as the selector switch is in the Maintenance position. When the barrier's Normal-Maintenance switch is returned to the Normal position, the Traffic signal shall stay Red if the barrier is closed or shall change to Green if the Barrier is open.

APPENDIX A
Presence Detection Active Barrier Safety System

1 FEATURES. Provide the following features for the Presence Detection Safety Scheme:

1.1 A three light Traffic Signal at each inbound and outbound lane. The three lights in each Traffic Signal shall be Red-Yellow-Green top to bottom. The Traffic Signal shall be located up to 3 m (10 feet) behind the Stop Line as a driver normally approaches the barriers.

1.2 A 600 mm (2 foot) wide Stop Line placed 8 m (25 feet) in front of the active vehicle barrier as a driver normally approaches the barrier.

1.3 Actuated Traffic Arm 1 m (3 feet) beyond the back edge of the Stop Line as shown on the Drawings. Provide an Auto-Manual selector switch and Open and Close switches for the ATA in the Barrier Control Cabinet. In the Auto mode of the selector switch, the ATA control shall mimic the adjacent active vehicle barrier. In the Manual mode of the selector switch, the ATA shall be controlled by the Open and Close switches.

1.4 Raised, curbed islands between lanes approaching the barriers to prevent lane changes in front of the barriers.

1.5 Dual phenomenology vehicle presence detectors (VPD) located in front of the Stop Line (detectors 1a and 1b), between the Stop Line and the barrier (detectors 2a and 2b), and immediately after the barrier (detectors 3a and 3b). Presence detectors can be induction loops, IR Break Beams, video motion sensors, or other suitable technologies capable of sensing vehicle presence.

1.6 One queue detection vehicle presence detector(s) a minimum of 39 m (117 feet) in front of the Stop Line and covering an area the width of the lane by 17 m (50 feet) long.

1.7 One Master Control Panel, one Maintenance Control Panel, one Guard Booth Control panel for each Guard Booth, and one Overwatch Position Control Panel (if applicable) along with all control switches and indicating lights as shown on the Drawings. The Master Control Panel will normally be located in the Gatehouse for use by the lead ACP guard. The Maintenance Panel will also normally be in the Gatehouse, but located where access by guards is controlled.

[NOTE TO DESIGNER. Include a drawing showing the control switches and control logic for this scheme. Use Drawing E1.03 in the Standard Design or provide a new drawing if the control switches and controls on Drawing E1.03 are modified. If the controls are modified from Drawing E1.03, the following control sequences will also need to be modified.]

1.8 Actuated Traffic Arm for each inbound lane in the ID Check Area. ATAs shall be installed near the Guard Booths as shown on the Drawings. An ATA Control Panel with Open and Close control switches for the ATA shall be provided and mounted on the back wall of the Guard Booth below the back window.

2 BARRIER CONTROL SWITCHES.

2.1.1 Per the Drawings, each barrier shall have a 3 position mode selector switch and Open and Close switches on the Maintenance Control Panel. Also per the Drawings, the Master Control Panel and the Guard Booth and Overwatch

Position Control Panels shall have EFO switches.

2.1.2 The modes on each barrier's mode selector shall be Manual - Maintenance - Auto. Each switch shall be operable by a unique key which shall be removable in the Maintenance mode only. In the Manual mode, the Close and Open switches on the Maintenance Control Panel shall be activated, but the EFO switches on the other panels shall be deactivated for that barrier only. In the Auto mode, the Close and Open switches on the Maintenance Control Panel shall be deactivated, and the EFO switches on the other panels shall be activated for the barrier. In the Maintenance mode, the Close and Open switches on the Maintenance Control Panel shall be deactivated, and the EFO switches on the other panels shall also be deactivated for the barrier.

2.1.3 Under normal operations, all barriers' mode selector switches will be in the Auto position. An individual barrier can be test operated by installing the proper lane markings and passive barriers ahead of the active barrier and then placing its mode switch in the Manual mode. Once in the Manual mode with the lane properly blocked and marked, the barrier can be opened and closed from the Open and Close switches on the Maintenance Control Panel. The Maintenance mode can be used when maintenance personnel need to perform maintenance on the barrier. Maintenance personnel would place the barrier's mode switch in the Maintenance position and then remove and retain the key, thus locking out all control of that barrier from the Maintenance Control Panel and EFO activation. Maintenance personnel would also have to block and mark the lane ahead of the barrier and also lock and tag out certain equipment at the barrier per the barrier manufacturer's recommendations for the type of maintenance to be performed.

3 TRAFFIC SIGNAL AND BARRIER CONTROLS.

3.1 AUTO MODE OF OPERATION. In the Auto mode of operation with the barrier open and no vehicles on VPD 1a or 1b, the Traffic Signal shall be Red. After a one second delay when a vehicle is detected by either VPD 1a or 1b, the Traffic Signal shall change from Red to Green to allow the vehicle to pass over the barrier. Once the vehicle is detected by either VPD 2a or 2b, the Traffic Signal shall change from Green back to Red. This operation is similar to Lane Metering on freeway entrances. If a vehicle is detected by VPD 2a, 2b, 3a, or 3b at the instant a guard activates the barrier Emergency Fast Operate (EFO) command, the barrier "Close" circuit shall be suppressed until VPD 2a, 2b, 3a, and 3b are clear. Also, if a guard activates the Emergency Fast Operate (EFO) command and the Traffic Signal is Green, the Traffic Signal shall change from Green to Red and the barrier "Close" circuit shall be suppressed until the vehicle is detected by either VPD 2a or 2b. If the vehicle is detected by VPD 2a or 2b, the suppression will continue until VPD's 2a, 2b, 3a, and 3b are clear. If neither of these conditions exist at the time that a barrier Emergency Fast Operate (EFO) command is activated, the barrier "Close" Circuit shall not be suppressed and the barrier shall immediately close in its emergency fast mode. See typical control schematics on the Drawings.

[NOTE TO DESIGNER: Delete paragraphs 3.2 and 3.3 if Queue Operation is not required.]

3.2 QUEUE OPERATION. If vehicles back up behind the Stop Line during periods of heavy traffic such that the queue VPD detects a vehicle continuously for 30 seconds, the Traffic Signal shall go from Lane Metering operation to Queue operation. In the Queue operation, the Traffic Signal shall change to Flashing Yellow and vehicles will be allowed to pass over the

barrier without stopping at the Stop Line. The Queue operation shall end immediately when the Queue VPD does not detect a vehicle. When the Queue operation ends, the Traffic signal shall change from Flashing Yellow to Solid Yellow and then to Red and resume Lane Metering operation. The distance between the Queue VPD and the Stop Line is such that the last vehicle leaving the Queue VPD will see the Traffic Signal change to Solid Yellow and Red in time to have to stop at the Stop Line. Since this operation relies on the vehicles in the queue to stop a threat vehicle, the last vehicle in the queue must stop at the Stop Line.

3.3 EFO DURING QUEUE OPERATION. If an EFO command is activated from any of the Control Panels during Queue operation, the Traffic Signal shall go from Flashing Yellow to Solid Yellow for 4 seconds and then to Solid Red. After an additional 1 second of Solid Red, the barrier close circuit shall be energized, provided that there are no vehicles detected on VPD 2a, 2b, 3a, or 3b. If a vehicle is detected on any of these VPD's, the barrier close circuit will be suppressed until all VPD's are clear.

3.4 EFO RESET. After an EFO activation, guards will close all inbound and outbound lanes. Guards will then activate the EFO Reset switch on the Maintenance Panel to reset EFO, place each barrier's mode switch to the Manual position, open each barrier using the Open switches on the Maintenance Panel, and then place each barrier's mode switch to the Auto position. Guards could then reopen the ACP.

3.5 MANUAL AND MAINTENANCE MODES OF OPERATION. When a barrier's mode switch is placed in either the Maintenance or Manual modes, the traffic signal for that barrier shall go from Green to Yellow for 3 seconds and then to Red. As noted above, before a barrier's mode switch is placed in either the Maintenance or Manual positions, the operator must ensure that the lane that the barrier is in is properly blocked and marked.

3.6 RETURN TO AUTO MODE. When the barrier's mode switch is placed in the Auto mode and the barrier is open, the barrier's Traffic Signal shall revert back to the RED/GREEN lane metering operation. If a barrier's mode switch is placed in the Auto mode and the barrier is closed, the barrier's Traffic Signal will stay Red and an alarm shall be generated.

APPENDIX A
Signs and Signals Active Barrier Safety System

1 FEATURES. Provide the following features for the Signs and Signals Safety System:

1.1 A three light Traffic Signal over each inbound and outbound active barrier. The three lights in each Traffic Signal shall be Red-Yellow-Green top to bottom. The Traffic Signal shall be located up to 3 m (10 feet) behind the active barriers as a driver normally approaches the barriers.

1.2 A 600 mm (2 foot) wide stop line placed 13 m (40 feet) in front of the traffic signal as a driver normally approaches the barriers.

1.3 Double solid white lines between lanes approaching the barriers to prohibit lane changes in front of the barriers.

1.4 Vehicle Presence Detectors (VPDs) located immediately before and immediately after each barrier. VPDs can be induction loops, video motion sensors, or other suitable technologies capable of sensing vehicle presence.

1.5 Warning Sign and Beacon with alternating yellow flashing lights located 50 m (150 feet) in front of the barriers.

1.6 One Master Control Panel, one Maintenance Control Panel, one Guard Booth Control panel for each Guard Booth, and one Overwatch Position Control Panel (if applicable) along with all control switches and indicating lights as shown on the Drawings. The Master Control Panel will normally be located in the Gatehouse for use by the lead ACP guard. The Maintenance Panel will also normally be in the Gatehouse, but located where access by guards is controlled.

[NOTE TO DESIGNER. Include a drawing showing the control switches and control logic for this safety scheme. Use Drawing E1.03 in the Standard Design or provide a new drawing if the control switches and controls on Drawing E1.03 are modified. If the controls are modified from Drawing E1.03, care must be taken to ensure compliance with the security and safety criteria in the Army Standard Design. The control sequences described below will also need to be modified.]

1.7 Actuated Traffic Arm for each inbound lane in the ID Check Area. ATAs shall be installed near the Guard Booths as shown on the Drawings. An ATA Control Panel with Open and Close control switches for the ATA shall be provided and mounted on the back wall of the Guard Booth below the back window.

2 BARRIER CONTROL SWITCHES.

2.1.1 Per the Drawings, each barrier shall have a 3 position mode selector switch and Open and Close switches on the Maintenance Control Panel. Also per the Drawings, the Master Control Panel and the Guard Booth and Overwatch Position Control Panels shall have EFO switches.

2.1.2 The modes on each barrier's mode selector shall be Manual - Maintenance - Auto. Each switch shall be operable by a unique key, which shall be removable in the Maintenance mode only. In the Manual mode, the Close and Open switches on the Maintenance Control Panel shall be activated, but the EFO switches on the other panels shall be deactivated for that barrier only. In the Auto mode, the Close and Open switches on the

Maintenance Control Panel shall be deactivated, and the EFO switches on the other panels shall be activated for the barrier. In the Maintenance mode, the Close and Open switches on the Maintenance Control Panel shall be deactivated, and the EFO switches on the other panels shall also be deactivated for the barrier.

2.1.3 Under normal operations, all barriers' mode selector switches will be in the Auto position. An individual barrier can be test operated by installing the proper lane markings and passive barriers ahead of the active barrier and then placing its mode switch in the Manual mode. Once in the Manual mode with the lane properly blocked and marked, the barrier can be opened and closed from the Open and Close switches on the Maintenance Control Panel. The Maintenance mode can be used when maintenance personnel need to perform maintenance on the barrier. Maintenance personnel would place the barrier's mode switch in the Maintenance position and then remove and retain the key, thus locking out all control of that barrier from the Control Panels. Maintenance personnel would also have to block and mark the lane ahead of the barrier and also lock and tag out certain equipment at the barrier per the barrier manufacturer's recommendations for the type of maintenance to be performed.

3 TRAFFIC SIGNAL AND BARRIER CONTROLS.

3.1 AUTO MODE OF OPERATION. In the Auto mode of operation with the barrier open, the Traffic Signal shall be Green. Upon activation of an EFO command at any of the Control Panels, barrier emergency closure shall be delayed 4 seconds. During this 4 seconds, the Traffic Signal shall change from Green to Yellow for 3 seconds and then to Red. After an additional one second at Red, the barrier's emergency close circuit shall be energized to close the barrier in its emergency fast mode provided that the VPDs immediately in front of and behind the barrier are clear. If either VPD detects a vehicle, the barrier shall not close.

3.2 EFO RESET. After an EFO activation, guards will close all inbound and outbound lanes. Guards will then activate the EFO Reset switch on the Maintenance Panel to reset EFO, place each barrier's mode switch to the Manual position, open each barrier using the Open switches on the Maintenance Panel, and then place each barrier's mode switch to the Auto position. Guards could then reopen the ACP. Note, when a barrier's mode switch is placed in the Auto position and the barrier is open, the barrier's Traffic Signal shall go to Green.

3.3 MANUAL AND MAINTENANCE MODES OF OPERATION. When a barrier's mode switch is placed in either the Maintenance or Manual modes, the traffic signal for that barrier shall go from Green to Yellow for 3 seconds and then to Red. As noted above, before a barrier's mode switch is placed in either the Maintenance or Manual positions, the operator must ensure that the lane that the barrier is in is properly blocked and marked.

3.4 RETURN TO AUTO MODE. When the barrier's mode switch is placed in the Auto mode and the barrier is open, the barrier's Traffic Signal shall change from Red to Green. If a barrier's mode switch is placed in the Auto mode and the barrier is closed, the barrier's Traffic Signal will stay Red and an alarm shall be generated.

APPENDIX B
Events and Alarms at ACP

	Sequence of Events Recorder	Alarm at Gatehouse	Alarm at CSMS-1
	Overspeed	Yes	Yes
	Wrong-Way	Yes	Yes
	Guard Booth #n - EFO Enable	No	No
	Guard Booth #n - EFO Disable	No	No
	Guard Booth #n - EFO	Yes	Yes
	Guard Booth #n - Duress	Yes	Yes
	Guard Booth #n - IDS	Yes	Yes
	Overwatch Position - EFO Enable	No	No
	Overwatch Position - EFO Disable	No	No
	Overwatch Position - EFO	Yes	Yes
	Overwatch Position - Duress	Yes	Yes
	Overwatch Position - IDS	Yes	Yes
	Gatehouse - EFO	Yes	Yes
	Gatehouse - IDS	No	Yes
	EFO Reset	No	No
	EFO Safety Preemption Start	No	No
	EFO Safety Preemption End	No	No
	Barrier Controls Tamper	Yes	Yes
	Search Area Duress	Yes	Yes
	Search Area IDS	Yes	Yes
	Visitors Control Center Duress	Yes	Yes
	Visitors Control Center IDS	Yes	Yes
	Emergency Gen Malfunction	Yes	Yes
	Emergency Gen Switch Over	Yes	Yes
	Emergency Gen Switch Back	Yes	Yes
	Emergency Gen Low Fuel	Yes	Yes
	Barrier #n - Auto Mode	No	No
	Barrier #n - Manual Mode	No	No
	Barrier #n - Maintenance Mode	No	No
*	Barrier #n - Close Ckt Energized	No	No
	Barrier #n - Close Command	No	No
	Barrier #n - Open Command	No	No
	Barrier #n - Closed	No	No
	Barrier #n - Open	No	No
	Que Start		
	Que End		
	Loop #1 Barrier n Malfunction	Yes	Yes
	Loop #2 Barrier n Malfunction	Yes	Yes
	Loop #3 Barrier n Malfunction	Yes	Yes
	IR #6 Barrier n Malfunction	Yes	Yes
	IR #7 Barrier n Malfunction	Yes	Yes
	IR #8 Barrier n Malfunction	Yes	Yes

*Don't need if EFO Preemption points are provided

Notes:
1 Central Security Monitoring Station - CSMS

Number of Events = 23+5*No of Gd Booths + 14*No of Barriers
Number of Alarms @ GH = 11+3*No of Gd Booths+6*No of Barriers
Number of Alarms @ CSMS=12+3*No of Gd Booths+6*No of Barriers

APPENDIX B

No of GB =	2	8
No of Barriers =	4	5
No of Alarms @ GH =	41	65
No of Alarms @ CSMS =	42	66
No of Events =	89	133

-- End of Section --