Instructions

You have opened the master file for the Standard Definitive Design for Access Control Points (ACPs). The ACP Standard Definitive Design consists of an overall write-up and seven (7) Appendices (Appendix A through Appendix G). The write-up and appendices include several Word, Excel, and Adobe Acrobat files, which have all been converted to pdf format and consolidated into this master pdf file for ease of navigation. For the most effective navigation through this file, turn on the "BOOKMARKS" (left hand column of the document). Bookmarks tab to the write-up and to each individual appendix. The write-up and most of the appendices have an index, which is also listed as a Bookmark. Using the Bookmarks, users can quickly click to the Write-up Index or the Index of a particular Appendix. Users can then use links on the Index pages to get to desired paragraphs, sections, or drawings listed in the Index. To return to any of the indices, the user can simply click the appropriate Bookmark.

The Army Facilities Standardization Subcommittee approved the Access Control Point Standard Definitive Design on 14 December 2004. A copy of the signed approval letter follows this page.

DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON, DC 20310-0600

REPLY TO
ATTENTION OF

DAIM-FD

14 DEC 2004

MEMORANDUM FOR RECORD

SUBJECT: The Army Standard Design for Access Control Points (ACPs)

1. The Army Standard Design for Access Control Points in the attached enclosure are approved. The Standard Design for ACPs incorporates mandatory Army Standards to meet access control functions on active Army installations and reserve component prime installations. This committee must approve any planned deviation from the standard design criteria prior to the execution of ACP projects.

2. The Facility Design Team co-chairs are the Department of the Army, Office of the Provost Marshal General, represented by Mr. Richard Miller, (703) 693-2906, richard.miller@hqda-aoc.army.pentagon.mil, and the Office of the Assistant Chief of Staff for Installation Management, represented by Mr. Vince Kam, 703-604-2464, vincent.kam.w@hqda.army.mil. The Installation Management Agency is represented by Mr. Richard Carter, 703-602-1875, richard.carter@hqda.army.mil. The USACE Center of Standardization is the Omaha District, represented by Mr. John Trout, 402-697-2413, john.e.trout@now02.usace.army.mil.

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Encl

ARMY ACCESS CONTROL POINTS STANDARD DEFINITIVE DESIGN

DECEMBER 2004

Prepared By:

U.S. Army Corps of Engineers
Protective Design Center
Omaha District

ARMY ACCESS CONTROL POINTS
STANDARD DEFINITIVE DESIGN

ARMY ACCESS CONTROL POINTS (ACP)

STANDARD DEFINITIVE DESIGN

1 INTRODUCTION

1.1 DEFINITIVE DESIGN

This Standard Definitive Design supersedes all versions for this facility type. It shall be used for construction of all new ACP projects and renovations to existing ACP projects. It is intended for use anywhere in the continental United States or overseas locations. The design procedures and drawings included in this Standard Definitive Design provide flexibility to Army ACP designers in meeting the Army's baseline physical security requirements and the full range of Force Protection Conditions on Army Installations. This Standard Definitive Design meets the Army Standard for Access Control Points approved by the Army Facilities Standardization Committee and the ACP Criteria established by the Office of the Provost Marshal General (OPMG), who is the Army's proponent for Access Control Points. It also meets Architectural and Engineering design criteria established by the Headquarters U.S. Army Corps of Engineers. The Army Facilities Standardization Subcommittee must approve all changes, deviations, or waivers to the Standard Definitive Design.

1.2 ACP DEFINITION

An Access Control Point is a corridor at the Installation entrance through which all vehicles and pedestrians must pass when entering or exiting the Installation. The perimeter of the ACP consists of both passive and active barriers arranged to form a contiguous barrier to pedestrians and vehicles. ACP guards control the active barriers to deny or permit entry into the Installation.

1.3 ACP PERFORMANCE REQUIREMENTS

ACP's shall be designed to prevent an unauthorized vehicle or pedestrian from entering the Installation, to ensure safety of innocent ACP users, and to maximize throughput of vehicular and pedestrian traffic. In order meet these diverse and sometimes conflicting requirements, Army ACP designers must consider local site constraints and then use creativity and innovation to develop design solutions that meet all of the ACP performance requirements. There are no cookie-cutter design solutions. Each design is unique. Designers must carefully consider all of the criteria and then select and design protective measures that will be most effective for the given site.

2 ACP DESIGN CRITERIA

2.1 THE ARMY STANDARD FOR ACPs

The Army Standardization Committee established the Army Standard for Access Control Points on 14 December 2004. The standard lists mandatory requirements for all Army ACPs. The standard is included in Appendix A. The Army Standardization Committee must approve changes, deviations, or waivers from this standard.

2.2 OFFICE OF PROVOST MARSHAL GENERAL (OMPG) DESIGN CRITERIA

OPMG, as the Army's proponent for Access Control Points, provided their criteria for ACP's in a document titled "ACP Criteria from OPMG" dated 19 November 2004. The OPMG Criteria consist of mandatory requirements and non-mandatory recommendations. Mandatory requirements in the criteria are designated by the words "shall", "will", or "must", whereas non-mandatory recommendations are designated by the words "should", "can", or "may". OMPG Criteria have been made a part of this Standard Definitive Design. The OPMG Criteria is included in Appendix B.

2.3 STANDARD DEFINITIVE DESIGN DRAWINGS

The U.S. Army Corps of Engineers (USACE), as the Center of Standardization for Army Access Control Points, developed Standard Definitive Design drawings for ACP's. These drawings incorporate both the Army Standards and the OPMG Criteria. They also provide mandatory requirements and recommendations to Army ACP designers and Installation Security Specialists for designing Army ACPs. The drawings have been

made a part of this Standard Definitive Design and are included in Appendix C.

2.4 OTHER CRITERIA

ACP designers are responsible to identify additional criteria such as applicable design codes, security (anti-terrorism), sustainability, energy conservation, environmental stewardship, and the Installation Design Guide for each ACP project developed from this Definitive Design at the time project design work is authorized.

3 DESIGN PROCEDURE

The Designer must evaluate the criteria in paragraph 2 above and select ACP features that detect possible threats and ACP features that will delay the threats for the delay times required in the criteria. Detection features include vehicle speed detectors, vehicle wrong-way detectors, vehicle presence detectors, and detection by security guards. Delay features for vehicles include straight roadways, curved roadways, and roadways with chicanes or turns. Based on the opportunities and constraints of the site, the designer must determine appropriate detection and delay features and perform calculations to assure that the selected features provide the delays required for each Threat Scenario required in the criteria. The design engineer must prepare a Design Analysis including descriptions of selected ACP features, layouts of detection and delay features, and calculations verifying delay times. A step-by-step procedure along with examples is in Appendix D.

4 CONTROL OF ACTIVE VEHICLE BARRIERS

Active vehicle barriers are an essential element in preventing unauthorized motorists from entering Army Installations. However, an active vehicle barrier capable of stopping large, moving vehicles can cause significant damage to vehicles and can cause injury or even death to vehicle occupants. Through Army policy and design criteria, ACP designs must include adequate safety features to ensure the safety of motorists entering and exiting the ACP. The active vehicle barrier controls are an essential element of the ACP safety features. Active vehicle barrier controls must provide sufficient information to ACP guards to help them decide when to deploy the barriers. Active vehicle barrier controls must also close the active barriers upon command of the guards in order to stop a threat vehicle. Finally, the active vehicle barrier controls must provide sufficient warning to non-threat vehicles to allow them to either clear the barrier or stop safety in front of it before it is closed.

4.1 SENSORS

Barrier controls include sensors to detect a vehicle going the wrong way in the ACP, a vehicle speeding, and vehicle presence. Sensor systems for over-speed, wrong-way, and vehicle presence shall utilize proven sensor technology and equipment.

4.1.1 Wrong Way Detection

Wrong way sensors shall be deployed in all outbound lanes at the ACP entrance and after each Turn-around. Wrong way detectors can utilize induction loops, video motion cameras, microwave, laser, or other appropriate sensor technology.

4.1.2 Point Over-Speed Detection

Point over-speed sensors shall be deployed in all inbound lanes at the ACP entrance. Point over-speed detectors can utilize induction loops, video motion cameras, microwave, laser, or other appropriate sensor technology.

4.1.3 Continuous Over-Speed Detection

Continuous over-speed sensors may be deployed in the Approach and Access Control Zones to defeat Threat Scenario #2 (see description of Threat Scenarios in paragraph I5a of Appendix B, and see paragraph C in the Design Procedure – Appendix D). Continuous over-speed detectors can utilize video motion cameras, forward/backward looking microwave or laser sensors, or other appropriate sensor technology. Induction loops and side fired microwave and laser sensors are not suitable for continuous over-speed detection.

4.1.4 Vehicle Presence Detection

Vehicle presence sensors shall be deployed at all active vehicle barriers to detect a vehicle immediately over the barrier. Detection of a vehicle immediately over the barrier will suppress a barrier “close” command. Vehicle presence sensors shall also be deployed in the “Vehicle Presence Detection” protective system shown on Drawing C3.14 in Appendix C. Vehicle presence detectors can utilize induction loops, video motion cameras, microwave, break beam, or other appropriate sensor technology.

4.2 PROCUREMENT

The supplier of the active vehicle barriers at a given ACP shall also supply all barrier controls. Controls shall include over-speed, wrong-way, and vehicle presence sensors; traffic warning signs and signals; traffic control

signals near the barrier; gate arms at the barrier (when applicable); barrier control panels including switches and indicating lights; Annunciator panels for gate guards; and programmable logic controllers (PLC) to control the barriers and to control warning and traffic signals associated with the barriers.

4.3 INSTALLATION

The active vehicle barrier supplier shall provide on-site direction to the installation contractor (if different than the supplier) during installation of all barrier control elements and connecting wiring.

4.4 TESTING

The barrier supplier shall be required to submit for approval complete schematics and logic diagrams of the barrier control system along with complete test procedures for final acceptance testing. Upon completion of installation of all active vehicle barriers and controls, the barrier supplier shall be required to perform tests per his approved test procedures to verify barrier performance for all modes of operation. The barrier supplier's Final Acceptance Test shall include testing of the full range of operation of all sensors utilized in the barrier control system.

5 COSTS

Because of the wide variety of ACP configurations and features, only costs for two types of ACPs were prepared. However, the costs of the various ACP components can be extracted from these estimates and applied to a wide variety of ACP configurations to obtain programming level costs. Cost estimates for a PASSENGER VEHICLE ONLY ACP (including a Visitors Control Center) and a TRUCK ONLY ACP are included in Appendix E.

6 OTHER DESIGN CONSIDERATIONS

6.1 PASSIVE BARRIERS

The OPMG Criteria in Appendix B require that passive barriers along the ACP corridor be capable of stopping a 6,800kg (15,000 pound) vehicle traveling at the maximum speed and approach angle that it can attain before impacting the barrier. The kinetic energy of this vehicle traveling at 48 km/hr (30 mph) is ½*mass*speed^2 or 612 kilo-Joules (451,000 ft-lbs). The criteria in Appendix B also require that the passive barriers and roadways be

designed to limit vehicle approach angles to less than 25 degrees when possible. For passive barriers where the approach angle from the roadway is limited to 25 degrees or less, the required stopping kinetic energy of the passive barrier can be reduced by multiplying the vehicle kinetic energy by sin (25)=0.423. For this example, the barrier energy-stopping requirement is reduced from 612 kJ (451,000 ft-lbs) to 259 kJ (191,000 ft-lbs). Refer to UFC 4-022-02 "Selection and Application of Vehicle Barriers" for a procedure for determining approach angles and resulting energy stopping requirements for passive barriers.

6.2 ELECTRICAL LOADS

Electrical loads include Utility loads, Emergency Generator loads, and UPS loads. The OPMG Criteria in Appendix B describes requirements for the Emergency Generator and UPS loads. Drawing E1.02 shows an overall summary of all three types of loads. A more detailed listing of the loads is included in Appendix F.

6.3 BARRIER SAFETY REGIMES

As described in the OMPG Criteria in Appendix B, there are three active barrier safety regimes that have been approved by the Surface Development and Distribution Command (SDDC) for use at Army ACPs. One of these safety regimes must be used whenever an active vehicle barrier is installed at an Army ACP. These regimes are:

6.3.1 Signs and Signals

This scheme employs warning signs and signals to alert non-threat vehicles of impending vehicle barrier deployment. Barrier deployment is delayed for four seconds from the time the guard initiates an Emergency Fast Operate command to allow warning signals to sequence. See drawing C9.10.

6.3.2 Vehicle Presence Detection

This scheme requires that all motorist stop in front of the barrier at a traffic lane control signal. The lane control signal will sense the vehicle presence and change the signal from "red" to "green" to allow the motorists to proceed over the barrier. If a guard initiates an Emergency Fast Operate command and there are no vehicles detected in front of the barrier, the four-second delay for safety signal sequence described in the above paragraph is eliminated. This scheme is shown on drawing C3.14. Also, see Appendix G for information on logic control of the sensors, lane control signals, and barriers.

6.3.3 Normally Closed Operation

This safety scheme requires that two sets of barriers be installed to create a "sally port" type barrier system. This scheme can be utilized when real estate for the ACP is limited. The distance between the two sets of barriers can vary from a minimum, which would be only enough to turn around a rejected vehicle, or longer to provide a space for platooning vehicles. Drawing C3.08 shows this scheme with the minimum space between barrier sets, and drawing C3.13 shows this scheme with a platoon system.

APPENDIX A

THE ARMY STANDARD
FOR
ACCESS CONTROL POINTS

APPENDIX A
THE ARMY STANDARD FOR ACPs
INDEX

DEPARTMENT OF THE ARMY
ASSISTANT CHIEF OF STAFF FOR INSTALLATION MANAGEMENT
600 ARMY PENTAGON
WASHINGTON DC 20310-0600

DAIM-ZA

DEC 1 4 2004

MEMORANDUM FOR RECORD

SUBJECT: The Army Standard for Access Control Points

1. The Army Standard for Access Control Points is approved for implementation. This Standard establishes mandatory features for Army Access Control Points (ACPs). It applies to all active Army installations and reserve components prime installations. Only the Army Facilities Standardization Committee has the authority to approve exceptions to this Standard. Waivers from the Army Standard must be approved through the installation management chain of command in accordance with AR 415-15.

2. The Army Standard for Access Control Points is mandatory for operations and maintenance projects starting FY2006 and beyond. For programming purposes requiring the use of Military Construction, Army/Army Reserve/National Guard appropriations, all projects from FY2008 and after must apply the Army Standard.

3. The proponent of this Standard is the Army Facilities Standardization Committee. Supplementation of this Standard is prohibited without prior approval from the Committee. The Army Standard for Access Control Points will be periodically reviewed and as needed, updated. The Army Standard for ACPs will be posted to the Army Installation Design Standards. Recommended changes with supporting rationale should be sent through the chain of command directly to the Assistant Chief of Staff for Installation Management, ATTN: Access Control Points Facilities Design Team (DAIM-MD), 600 Army Pentagon, Washington, DC 20310-0600.

JAMES A. CHEATHAM Major General, USA Acting Director for Military Programs Army Facilities Standardization Committee	for RONALD L. JOHNSON Major General, USA Director, Installation Management Agency Army Facilities Standardization Committee	LARRY J. LUST Major General, GS Assistant Chief of Staff for Installation Management Chairman, Army Facilities Standardization Committee
30 Nov 2004 (Date)	12/14/04 (Date)	13/12/04 (Date)

THE ARMY STANDARD

For Access Control Points (ACPs)

December 2004

DISTRIBUTION STATEMENT: Approved for Public Release; Distribution is unlimited

The Army Standard for Access Control Points – December 2004

The Assistant Chief of Staff for Installation Management, HQDA (Preparing Agent)

The United States Army Corps of Engineers

The Installation Management Agency

Record of Changes (changes are indicated by \1\ … /1/)

Change No.	Date	Location

This Army Standard supersedes the HQDA memorandum, 26 February 2004, subject: Interim Army Standards for Canopies at Army Installation Access Control Points

FORWARD

This printing publishes the Army Standard for Access Control Points (ACPs). The Army Facilities Standard process is explained in AR 415-15. This Army Standard establishes mandatory features for Army ACPs. It applies to all active Army installations and reserve components prime installations.

The proponent of this Standard is the Army Facilities Standardization Committee. Supplementation of this Standard is prohibited without prior approval from the Committee. Technical advice concerning the Army Standard is the responsibility of the Center of Standardization – the United States Army Corps of Engineers Omaha District. Users are invited to contact the Center of Standardization for document interpretation.

The Army Standard for Access Control Points is mandatory for operations and maintenance projects starting FY2006 and beyond. For programming purposes requiring the use of Military Construction, Army/Army Reserve/National Guard appropriations, all projects from FY2008 and after must apply the Army Standard.

Only the Army Facilities Standardization Committee has the authority to approve exceptions to this standard. Waivers from the Army Standard must be approved through the installation management chain of command in accordance with AR 415-15.

The Army Standard for Access Control Points will be periodically reviewed and as needed, updated, and made available to users as part of the Army's responsibility for providing technical criteria for military construction. The Army Standard for ACPs will be posted to the Army Installation Design Standards. Recommended changes with supporting rationale should be sent through the chain of command directly to the Assistant Chief of Staff for Installation Management, ATTN: Access Control Points Facilities Design Team (DAIM-MD), 600 Army Pentagon, Washington, DC 20310-0600.

The Army Standard for Access Control Points – December 2004

1 INTRODUCTION

1-1 **PURPOSE AND SCOPE.** This document provides standards for Army access control points (ACPs). The Army Facilities Standardization Committee (AFSC) under the Department of the Army Facilities Standardization Program publishes the Army Standard. The AFSC is composed of the Headquarters, Department of the Army, Assistant Chief of Staff for Installation Management (ACSIM); The Director for Military Programs, Headquarters, US Army Corps of Engineers (USACE); and the Director, Installation Management Agency (IMA). Publication of the Army Standard for Access Control Points is by electronic media on the Internet at the ACSIM Installation Design Standards website.

1-2 **APPLICABILITY.** This Army Standard applies to all Army active installations and reserve components prime installations where government or contractors plan for, construct, and maintain Army access control points.

1-3 **REFERENCES.** Appendix A.

2 REQUIREMENTS

2-1 **ACP FUNCTION CLASSIFICATION.** Army physical security policy requires all Army installations to restrict access. Access Control Points are the physical assets along with manpower and operational procedures that commanders employ to control access to Army installations. Army ACPs shall be categorized as follows:

Table 2-1 ACP Use Classifications

Use Classification	Operational Hours	Preferred Operation
Primary	24/7 Open continuously	Vehicle registration/visitor pass capacity. Could also be designated as truck and delivery gate.
Secondary	Less than 24/7 with regular operating hours	Regular operations, visitors with authorization. Could also be designated as truck and delivery gate.
Limited Use	Only opened for special purposes or special events	Tactical vehicles, HAZMAT, special events.
Pedestrian	Varies	Personnel only. Could be located near installation housing areas, near schools, or as part of a Primary or Secondary ACP.

2-2 **PRIMARY AND SECONDARY ACP REQUIREMENTS.** The following requirements apply to all Primary and Secondary ACPs except as noted:

2-2.1 **Performance Standard.** ACPs must be designed to defeat the vehicle and pedestrian threats prescribed in the ACP Criteria from the Office of the Provost Marshal General (Appendix B in the Standard Designs for ACPs), and to ensure safety of motorists, pedestrians, and guards.

2-2.2 **ACP Corridor.** ACPs must have both passive and active vehicle barriers forming a contiguous perimeter around the ACP.

2-2.2.1 **Passive Barriers.** Passive barriers must be capable of preventing penetration of a threat vehicle.

2-2.2.2 **Active Vehicle Barriers.** Active vehicle barriers, controlled by ACP guards, must be utilized in each inbound and outbound lane to permit or deny vehicle access.

2-2.2.3 **Active Vehicle Barrier Safety.** An active vehicle barrier safety regime must be utilized that conforms to one of the Surface Deployment and Distribution Command – Transportation and Engineering Agency (SDDC-TEA) approved safety protocols.

2-2.3 **Control.** ACPs must have zones established to control the flow of vehicular and pedestrian traffic in order to detect, assess, and respond to prescribed threats.

2-2.4 **Entry Gate.** ACPs must have an entry gate capable of securing the ACP. The entry gate must provide the same level of protection as the adjoining perimeter, and should appear to resemble the adjoining perimeter fence and / or barriers

2-2.5 **Identity Check Area.** ACPs must have an identity check area within the access control zone where guards or automated equipment verify pedestrians, vehicles, and vehicular occupants identifications; perform limited searches; and validate authorizations to enter the installation. The identity check area must include:

2-2.5.1 **Identity Check Area Canopy.** Identity check area must be covered with a canopy over all inbound lanes.

2-2.5.2 **Entry Lanes.** ACPs must have at least two lanes in the identity check area.

2-2.5.3 **Traffic Islands.** ACPs must have raised, curbed islands to separate all inbound lanes in the identity check area.

2-2.5.4 **Guard Booths.** ACPs must have a guard booth building for each lane of incoming traffic for use by guards performing vehicle/passenger identity checks.

2-2.5.5 **Lighting.** Identity check area must provide adequate lighting for visual inspection of identification cards and documents.

2-2.6 **Turn-around Lanes.** ACPs must have at least two turn-around lanes, one before and one immediately after the identity check or vehicle search area.

2-2.7 **Gatehouse.** ACPs must have a gatehouse with the primary controls for the final active vehicle barriers. The gatehouse must be sized to accommodate ACP guards and their activities.

2-2.8 **Search Area.** ACPs must have a covered area separated from and easily accessible to the identity check area and obscured from casual observation from the identity check area. The size of the search area must be determined from a traffic engineering study. However, for search areas that allow trucks, the area must be sized to accommodate a minimum of one WB-62 tractor-trailer. For areas that do not allow trucks, the search area must be sized to accommodate a minimum of two passenger-sized vehicles.

2-2.8.1 **Search Area Building.** Search areas must have an adjacent or nearby building to shelter vehicle occupants from inclement weather. The building will facilitate guards' observation of vehicle occupants.

2-2.8.2 **Consolidated Search Area Building.** For ACPs with both truck and passenger search areas, one consolidated search area building is sufficient if the search areas are near each other.

2-2.9 **Overwatch Position.** ACPs must have a strategically located area suitable for an overwatch position that includes controls for the final active vehicle barriers.

2-2.10 **Visitors Control Center (VCC).** Installations must have a building for processing visitors. The building must be sized for the effective throughput of the expected number of visitors.

2-3 **LIMITED USE ACPs.** The following requirement applies to all Limited Use ACPs:

2-3.1 **Performance Standard.** Limited Use ACPs shall provide means to defeat the vehicle and pedestrian threats prescribed in the ACP Criteria from the Office of the Provost Marshal General (Appendix B in the Standard Designs for ACPs), and to ensure safety of motorists, pedestrians, and guards. Portable facilities including passive and active barriers, guard booths, and lights shall be used and configured to meet the requirements of limited use.

2-3.2 **Control.** Limited Use ACPs must have zones established to control the flow of vehicular and pedestrian traffic in order to detect, assess, and respond to prescribed threats.

2-3.3 **Entry Gate.** Limited Use ACPs must have an entry gate capable of securing the ACP. The entry gate must provide the same level of protection as the adjoining perimeter, and should appear to resemble the adjoining perimeter fence and / or barriers.

2-3.4 **Identity Check Area.** Limited Use ACPs must have an identity check area where guards can verify pedestrians, vehicles, and vehicular occupants identifications; perform limited searches; and validate authorizations to enter the installation. The identity check area shall be configured to accept portable facilities to include passive and active barriers, guard booths, and lights.

2-3.5 **Turn-around Lanes.** Limited Use ACPs shall provide means for turn-around of vehicles. Where operational procedures are not adequate for control, a turn-around lane is required and shall be located before the identity check area.

2-4 **PEDESTRIAN ACPs.** The following requirements apply to all Pedestrian ACPs.

2-4.1 **Performance Standard.** Pedestrian ACP's must be designed to defeat the pedestrian threats prescribed in the ACP Criteria from the Office of the Provost Marshal General (Appendix B in the Standard Design for ACPs), and to ensure the safety of pedestrians and guards.

2-4.2 **Pedestrian Corridor.** Pedestrian ACPs must have both passive and active barriers forming a contiguous perimeter around the ACP.

2-4.2.1 **Passive Barriers.** Passive barriers must be capable of preventing easy circumvention or penetration by a pedestrian.

2-4.2.2 **Active Pedestrian Barriers.** Pedestrian ACPs must include active pedestrian barriers controlled by the ACP guards to permit or deny pedestrian access.

2-4.3 **Control.** ACP must have zones established to control the flow of pedestrian traffic in order to detect, assess, and respond to prescribed threats.

2-4.4 **Entry Gate.** Pedestrian ACPs must have an entry gate at the ACP entrance capable of closing off the ACP. The entry gate must provide equivalent security and equivalent appearance as the adjoining perimeter fence/barrier. If the active pedestrian barrier is located at the installation perimeter, a separate entry gate is not required.

2-4.5 **Identity Check Area.** Pedestrian ACPs must have an identity check area within the access control zone where guards or automated equipment verify pedestrians' identifications, perform limited searches, and validate authorizations to enter the installation. The identity check area must include:

2-4.5.1 **Guard Booths.** Pedestrian ACPs must have a guard booth for use by guards performing pedestrian identity checks.

2-4.5.2 **Lighting.** Identity check area must provide adequate lighting for visual inspection of identification documents.

APPENDIX A

REFERENCES

GOVERNMENT PUBLICATIONS:

1. Department of Defense

Defense*Link* Publications Internet site http://www.defenselink.mil/pubs/	DoD Directive 5200.8, Security of DoD Installations and Resources
	DoD 5200.8-R, DoD Physical Security Program
	DoD Instruction 2000.16, DoD Antiterrorism Standards
Unified Facilities Criteria (UFC) Index http://65.204.17.188//report/doc_ufc.html	Unified Facilities Criteria (UFC) 4-012-01, Security Engineering: Entry Control Facilities / Access Control Points.

2. Department of the Army

Army Electronic Publications Internet site http://www.army.mil/usapa/	AR 190-13, The Army Physical Security Program
	AR 415-15, Army Military construction Program Development and Execution
Army IDS web site http://www.mantech-mec.com/army_ids	Army Installation Design Standards
	Army Standard Design for ACPs
	HQDA memorandum, Interim Army Standards for Canopies at Army Installation Access Control Points
SDDC-TEA web site http://www.tea.army.mil/cdrom/readmes/allsections.htm#gates	Surface Deployment and distribution Command-Transportation and Engineering Agency publication, Traffic Engineering for Better Gates

3. Department of Transportation

Federal Highway Administration web site http://mutcd.fhwa.dot.gov	Manual on Uniform Traffic Control Devices and Standard Highway Signs

APPENDIX B

ACP CRITERIA FROM OPMG

APPENDIX B
ACP CRITERIA FROM OPMG
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APPENDIX B
ACP CRITERIA FROM OPMG
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CONTINUED

DEPARTMENT OF THE ARMY
OFFICE OF THE PROVOST MARSHAL GENERAL
2800 ARMY PENTAGON
WASHINGTON, DC 20310-2800

DAPM-MPD-PS

04 JAN 2005

MEMORANDUM THRU THE ARMY CHIEF OF STAFF FOR INSTALLATION MANAGEMENT (ACSIM), 600 ARMY PENTAGON, WASHINGTON, DC 20310

FOR U.S. ARMY CORPS OF ENGINEERS, PROTECTIVE DESIGN CENTER (CENWOED-S), 12526 WEST CENTER ROAD, OMAHA, NE 68144-3869

SUBJECT: Office of the Provost Marshal (OPMG) Access Control Point (ACP) Criteria, 19 Nov 04

1. References:

a. Army Regulation 415-15, Military Construction, Army (MCA) Program Development.

b. United States Army Corps of Engineers, Omaha District, Standard Design, Access Control Points for U.S. Army Installations, 23 Aug 04.

c. ACP Criteria from OPMG, 27 Sep 04.

d. ACP Criteria from OPMG, 19 Nov 04.

2. On 19 Nov 04, OPMG and ACSIM Army Facilities Standardization Committee agreed to refine the original "ACP Criteria from the OPMG dated 27 Sep 04" to the current physical security requirements reflected in "ACP Criteria from the OPMG dated 19 Nov 04."

3. Request that the Standard Design for ACPs reflect the updated OPMG requirements listed in the enclosed document.

4. Point of contact for this action is Mr. Richard Miller, COMM (703) 695-4210 or Mr. Bret Vincent, COMM (703) 692-5541.

Encl

DONALD J. RYDER
Major General, USA
Provost Marshal General

A. The following four types of ACP shall be considered when designing an ACP:
   1. Primary - operates 24 hours per day 7 days a week – 24/7.
   2. Secondary - operates during regular hours but less than 24/7.
   3. Limited Use - open only for special purposes or special events.
   4. Pedestrian - is designated for pedestrians and bicyclers only.

B. ACP Functions. ACPs shall be designed for the following functions:
   1. Vehicle Screening. All vehicles shall be screened for authorization to enter the installation.
   2. Personnel Identification Validation. The identification of all personnel entering the installation shall be verified along with their authorization to enter the installation.
   3. Personnel and vehicles shall be checked and/or searched per prevailing Force Protection Conditions and local procedures.

C. Traffic Engineering Study. Prior to the design of a new or modification of an existing ACP, a Traffic Engineering Study shall be conducted to ensure data required to properly design the ACP is collected. The Traffic Engineering Study shall be used to determine the optimal ACP location and size and to determine requirements to minimize impacts on local traffic patterns.

D. Siting. The ACP should be sited at a distance inside the installation to facilitate the queuing of vehicles without creating an off-post traffic problem, but spatially separated from inhabited buildings.

E. Traffic Types. ACPs shall be capable of handling one or more of the following traffic types: trucks up to WB62, visitor POVs, DOD personnel POVs, official Army vehicles, pedestrians, and bicycles.

F. Operation.
   1. To minimize problems associated with mixing of traffic types, a separate ACP should be identified as a Commercial Vehicle Only ACP.
   2. ACPs that must handle both commercial and passenger vehicles should provide separate commercial vehicle and passenger vehicle ID Check areas and separate search areas.
   3. ACPs that handle pedestrian traffic and vehicular traffic shall keep these traffic types physically separate.

G. Future Enhancements. Designers shall consider future technology enhancements and possible expansion of the ACP. Automated systems to validate the identity of incoming personnel and vehicles are anticipated for use at Primary, Secondary, and Pedestrian ACPs. Designers shall provide spare conduits for communications, power, and computer upgrades.

H. Coordination.
   1. Before designing an ACP, the designer shall coordinate with state and local authorities concerning impacts to public roadways, signage, and other requirements.
   2. Designers should coordinate with the Surface Deployment and Distribution Command (SDDC) for assistance on issues involving public highways.

3. For OCONUS Installations, the designer should coordinate with the host nation government agencies or their appropriate Status of Forces Agreement (SOFA) subcommittee.

I. The following requirements apply to Primary and Secondary ACPs except as noted: (Note, additional requirements for pedestrian access at Primary and Secondary ACPs are listed below in paragraph K below.)

1. Performance Requirement. ACP's shall be designed to defeat all threats described below, to ensure safety of innocent users, and to maximize throughput.
2. ACP Layout.
   a. Corridor. The Access Control Point shall consist of a corridor at the installation boundary through which all vehicles and pedestrians must pass when entering or exiting the installation.
   b. The perimeter of the ACP, except at its entrance, shall include both passive and active vehicle barriers arranged to form a contiguous barrier to vehicles. Active vehicle barriers, that can be opened and closed, shall be deployed at the end of the ACP (i.e., at the entrance to the Installation).
   c. ACP guards will control the active vehicle barriers to deny or permit entry into the Installation.
   d. Zones. The ACP corridor shall be divided into an Approach Zone, an Access Control Zone, and a Response Zone.
      1) The Approach Zone shall run from the ACP entrance to the beginning of the Access Control Zone. It shall provide an area for incoming vehicles to be sorted and queued for ID authentication.
      2) The Access Control Zone shall run between the Approach and Response Zones. Vehicle and occupant ID checks shall be performed within this zone at a covered ID Check Area or a covered Search Area.
      3) The Response Zone shall run from the end of the Access Control Zone to the entrance to the Installation/Cantonment Area and includes the final active vehicle barriers.

3. Design Objective. The primary objective of the ACP design shall be to prevent an unauthorized vehicle or pedestrian from entering the installation. The ACP design shall include construction features supporting the effective and efficient use of equipment, manpower, and procedures to accomplish this primary objective.

4. Design Strategy. The overall design strategy to meet the objective above for vehicle threats shall be to detect the threat vehicle as early in its attack as possible and to delay it a sufficient amount of time to allow ACP guards time to deploy the active vehicle barriers before the threat vehicle can enter the Installation.

5. Design Criteria.
   a. Vehicle Threat Scenarios. ACPs shall be designed to defeat the following four minimum vehicle threat scenarios. Additional vehicle threat scenarios may be considered if supported by a local threat assessment.
      1) Vehicle Threat Scenario #1. Threat vehicle enters the ACP in the inbound or outbound lane(s) at the maximum speed attainable at the ACP entrance and then immediately accelerates at its maximum acceleration rate through the ACP. Army policy sets the maximum acceleration rate of a threat vehicle at 11.3 f/s/s.

2) Vehicle Threat Scenario #2. Threat vehicle enters the ACP in the inbound or outbound lane(s) at or under the posted ACP Speed Limit and then, later at some point further in the Approach Zone, accelerates at its maximum acceleration rate through the rest of the ACP.
3) Vehicle Threat Scenario #3. Threat vehicle attempts to covertly enter the ACP, but is detected and denied entry by guards at the ID Check Area. Vehicle driver then defies guards and accelerates through the rest of the ACP at the vehicle's maximum acceleration rate.
4) Vehicle Threat Scenario #4. Similar to Threat Scenario 3 above, except the driver of the denied vehicle drives toward the Turn-around or Search Area at the ACP Speed Limit (25mph) as if complying with guard instructions, but then fails to turn and instead accelerates at its maximum acceleration rate through the rest of the ACP.

b. Delay Time. Once a threat vehicle is detected, the ACP design shall delay it a sufficient time to allow ACP security guards time to deploy the active barriers before the threat vehicle reaches the entrance to the Installation. Delay time begins at the instant the attack is detected either by sensors or by security guards. The delay shall include the following:
1) Guard reaction time shall be no less than 3 seconds for Threat Scenarios #1 through #3 and 1 second for Threat Scenario #4,
2) Barrier traffic signal sequence time shall be no less than 4 seconds (unless other ACP features provide an equivalent amount of safety for innocent vehicles).
3) Barrier operating time should not be more than 2 seconds.
4) The ACP design, therefore, shall provide a minimum of 9 seconds delay for Threat Scenarios #1 through #3 and 7 seconds delay for Threat Scenario #4.

6. Entry Gate. The ACP entrance shall include a entry gate to close off the ACP at the installation perimeter. The entry gate shall provide the same level of security and same aesthetics as the adjoining perimeter barrier/fence.

7. ID Check Area. ACPs shall have an ID Check Area within the Access Control Zone where guards or automated means perform vehicle and passenger ID checks, grant vehicles authorization to enter the installation, or direct vehicles to other areas of the ACP.

8. ID Check Area Canopy. The ID Check Area shall be covered with a canopy over all inbound lanes to provide some protection from the weather for ID Check Area guards. The canopy shall meet the following requirements:
a. The canopy shall consist of a roof structure supported by columns.
b. Architectural treatment must reflect the architectural themes on the Installation and must also be consistent with architectural treatment of other facilities in the ACP, especially the gatehouse.
c. Canopy columns shall be sized to preclude the requirement for cross bracing below the roofline.
d. Columns shall be sized and located so as not to obstruct guard lines of site.
e. Roof underside shall be capable of supporting lighting fixtures and security equipment (e.g., CCTV cameras) anywhere on the underside of the roof and shall be treated with a reflective surface to help achieve required lighting levels and CCTV camera coverage.
f. Vertical clearance must be a minimum of 14.5 feet unless a large number of over height vehicles is expected, then 17 feet. Canopies at

Truck/Commercial Vehicle only ACPs must have a minimum clearance of 17 feet.

g. Width shall be sufficient to cover all inbound lanes and all current and known future requirements for guard booths and the ID Check Area footprint.
h. Length shall be sufficient to accommodate tandem vehicle processing.

9. Entry Lanes.
   a. The number of inbound and outbound lanes shall be determined from the Traffic Engineering Study.
   b. ACPs shall have a minimum of 2 lanes in the ID Check Area.

10. Primary Traffic Islands. ACPs shall have raised, curbed islands to separate all inbound lanes in the ID Check Area.

11. Secondary Traffic Islands.
   a. ACPs should also have raised, curbed islands at the end of the Approach Zone for installing possible future automated access control equipment.
   b. When used, secondary islands should be the same width as primary islands.

12. Turn-around Lanes.
   a. ACPs shall have at least two Turn-around Lanes, one before and one immediately after the ID Check Area.
   b. If secondary islands are used, a Turn-around should be included between the secondary and primary islands.

13. Gatehouse. ACPs shall have a Gatehouse sized to accommodate ID Check Area guards and their activities. For new construction, the Gatehouse building shall be located on a raised island immediately after the last Turn-around to give the Gatehouse guard clear views of operations in the ID Check Area, of vehicles directed to the last Turn-around, and of vehicles entering and exiting the Search Area. At ACPs with existing Gatehouses, the Gatehouse building may be located within the ID Check Area. All Gatehouses shall have the following:
   a. Construction to provide a minimum ballistics protection of UL 752 (latest edition) Level 3 with a higher level of protection authorized if warranted by a local threat assessment.
   b. Heating and/or Air Conditioning appropriate for the geographic location,
   c. Water Cooler.
   d. Unisex Latrine with sink.
   e. Interior storage for cleaning materials and special equipment.
   f. Exterior storage for traffic cones, signs, etc.
   g. Heavy-duty exterior power outlets sufficient to run temporary floodlights, etc.
   h. Interior power outlets sufficient for radio chargers, computers, etc.
   i. Active vehicle barrier control console with enunciator, computer workstation, and communications equipment including LAN, telephone, and Internet connections.
   j. Sufficient counter space for report writing and storage of reference material.
   k. Sufficient parking to facilitate security vehicle stationing and shift changes.
   l. Passive barriers to provide crash protection from inbound and (if located on center island) outbound vehicles.
   m. Windows to provide 180 degree field of view toward incoming traffic and mirrors or other visual aids to complete the field of view.

14. Guard Booths. ACPs shall have a Guard Booth building for each lane of incoming traffic (except for the lane with a Gatehouse) for use by guards

performing vehicle/passenger ID checks. Guard Booths shall be located on the primary, raised islands in the ID Check Area. Guard Booths shall also have:

a. Construction that provides a minimum ballistics protection of UL 752 (latest edition) Level 3 with a higher level of protection authorized if warranted by a local threat assessment.
b. Heating and/or Air Conditioning appropriate for the geographic location.
c. Exterior power outlet sufficient to power hand-held searchlights, bug zappers etc.
d. Interior power outlet sufficient for radio chargers, computers, etc.Active vehicle barrier control console with enunciator, computer workstation, and communications equipment including Local Area Network (LAN), telephone, and Internet connections.
e. Anti-fatigue floor mat.
f. Sufficient counter space for report writing and storage of reference material.
g. Passive barriers to provide crash protection from vehicles.
h. Windows to provide 360-degree field of view.

15. Passenger Vehicle Search Area. ACPs will have a Passenger Vehicle Search Area:
    a. Covered with a canopy.
    b. Easily assessable from the ID Check Area.
    c. Shielded from casual observation from the ID Check Area.
    d. Sized to accommodate the search of a minimum of 2 passenger vehicles.

16. Truck Search Area. ACPs that allow truck traffic will have a Truck Search Area:
    a. Separate from the Passenger Vehicle Search Area.
    b. Covered with a canopy (unless prohibited by the cargo search equipment system in use).
    c. Obscured from casual observation.
    d. Sized to accommodate the search of one WB-62 tractor-trailer and the search equipment to be used, e.g., Mobil Vehicle Inspection System (MVIS).
    e. If there is only one Search Area for both trucks and passenger vehicles, the Search Area shall be easily assessable from the ID Check Area.

17. Search Offices. The ACP shall include a Search Office building located adjacent to both the Passenger Vehicle and Truck Search Areas to support Search Area guards and their activities. If Truck and Passenger Vehicle Search Areas are far apart, provide a Search Office for each. The size of the Search Office building shall be based on the volume of traffic expected through the ACP. As a minimum, the Search Office shall provide shelter for vehicle occupants during searches and storage of Search Area equipment. For ACPs with significant traffic volumes, each Search Area building will have:
    a. Heating and Air Conditioning appropriate for the geographic location.
    b. Water cooler.
    c. Unisex Latrine with sink.
    d. Internal storage for security equipment, supplies, and spare parts.
    e. External storage for traffic control devices, vehicle inspection equipment, etc.
    f. Locker storage for weapons, personal gear, and pre-positioning of protective equipment.
    g. Break room for 4 security personnel with refrigerator, microwave, water cooler, and sink.
    h. Space and power for Computer servers for future automated systems.
    i. Interior power outlets sufficient for radio chargers, computers, etc.

j. Control console with enunciator controls for gate arms, aides to search guards, and communications equipment including LAN and Internet connections.
k. Secure and Non-secure areas for vehicle drivers and passengers separated by a space suitable for a walk-through metal detector and x-ray package scanner if used.
l. Computer Kiosk for self-registration of drivers/passengers located in the non-secure area (required when necessary to process truck drivers/passengers).
m. One or two (depending on anticipated requirement) truck driver/passenger processing stations each with sufficient workspace for a computer, ID Badge making machine, and camera for taking ID Photos.
n. Requirements for support of Rapiscan and magnetometer, if used.

18. Overwatch Position. ACPs shall have a strategically placed Overwatch Position located near the final active vehicle barriers but within sight of the ID Check Area. The Overwatch Position shall include a permanent facility or a paved pad to accommodate a security force vehicle or temporary facility during increased FPCONS. The position shall be equipped with controls for the active vehicle barriers.
    a. Permanent Building. If a permanent building is provided, it shall provide a fighting position for one guard and shall include the following:
        1) Construction to provide a minimum ballistics protection of UL 752 (latest edition) Level 3 with a higher level of protection authorized if warranted by a local threat assessment.
        2) Heating and/or Air Conditioning appropriate for the geographic location.
        3) Interior power outlet sufficient for radio chargers, computers, etc.
        4) Active vehicle barrier control console with enunciator, computer workstation, and communications equipment including Local Area Network (LAN), telephone, and Internet connections.
        5) Windows to provide 360-degree field of view.
    b. Paved Pad. If the Overwatch position is established as a paved pad for a temporary facility, a lockable junction box shall be imbedded in the pad with quick connections to communications, power, and barrier controls.

19. Passive Barriers. Passive vehicle barriers shall be capable of stopping a 15,000-pound vehicle traveling at the maximum speed and approach angle it can attain immediately prior to impacting the barrier. Where possible, the roadway shall be designed to limit the maximum approach angle to no more than 25 degrees. However, for other points on the perimeter, e.g., opposite to a Turn-around, the maximum approach angle could be as high as 90 degrees. Barriers at these points shall be sized accordingly.

20. Active Barriers.
    a. Number. Active barriers shall be installed in all inbound and outbound lanes at the end of the Response Zone.
    b. Certification/Approval. Active vehicle barriers shall be certified/approved by one of the following:
        1) Certified to meet U.S. Department of State vehicle barrier crash standards (SD-STD-02.01, Specification for Vehicle Crash Testing of Perimeter Barriers and Gates: April 1985).
        2) Certified by American Society of Testing and Materials (ASTM).
        3) Approved by Protective Design Center.

c. Rating. Active vehicle barriers shall be capable of stopping a 15,000-pound vehicle traveling at the maximum speed it can attain before impacting the barrier, but in no case shall the speed be less than 30 mph. The maximum vehicle speed must be determined by an evaluation of the threat vehicle speed and acceleration characteristics and the design of the roadway approaching the barrier. The length of vehicle penetration beyond the barrier shall be determined by a local vulnerability assessment of buildings and facilities adjacent to the barrier that would be subjected to the detonation of the threat vehicle explosive charge. As a minimum, active barriers shall be rated K4 (15,000-pound vehicle at 30 miles per hour) with an "L" rating (vehicle load penetration distance) as determined above. A larger vehicle weight may be used if warranted by a local threat/vulnerability assessment.

d. Operating Modes: Active vehicle barriers shall be capable of either or both of the following modes of operation:
   1) Normally Open Mode. In the Normally Open mode, the barrier is open to normal traffic flow. Security guards will close the barriers only when they detect a threat vehicle. The design of the ACP for this mode of operation shall provide a sufficient delay after the threat vehicle is detected to allow the guards to close the barrier before the threat vehicle reaches it.
   2) Normally Closed Mode. In the Normally Closed mode, the barrier is closed to normal traffic flow. Security guards will open it for each authorized vehicle and then immediately close it once that vehicle has passed over the barrier. This mode of operation adds time to process vehicles and creates additional wear and tear on the barriers. However, it significantly reduces the real estate required for the ACP.

e. Barrier Safety. Active vehicle barrier safety features shall ensure safety of innocent (non-threat) vehicles using the ACP in the event that the barrier is activated. One of the following safety regimes shall be implemented:
   1) Option 1. Active barriers shall be deployed in the Normally Open mode. ACP guards activate all barriers simultaneous when a threat vehicle is detected. A traffic signal(s) shall be installed at the active vehicle barriers. During normal operation, the light will flash yellow. When the guards initiate the barrier "Emergency Fast Operate" command, the traffic light will change to solid yellow for a minimum of 3 seconds and then change to red. After a minimum of another 1 second, the barrier "close" circuit will then be energized. The total delay of 4 seconds will give vehicles approaching the barrier time to either clear the barrier or stop safely in front of it.
   2) Option 2. Active barriers shall be deployed in the Normally Open mode. ACP guards activate all barriers simultaneous when a threat vehicle is detected. A traffic signal/stop sign and vehicle presence detection system shall be deployed in front of each active barrier. If the barrier "Emergency Fast Operate" command is activated while a vehicle is in the zone of one of the presence detectors, the barrier "close" circuit for that barrier will be suppressed until the vehicle clears the zone. The other barriers will not be affected and will close instantaneously, unless a vehicle is also in their presence detector's zone. This scheme will allow the elimination of the 4-second safety time delay described in Option 1 above. This safety regime also requires channeling islands between all lanes, (both inbound and outbound), in front of each barrier.
   3) Option 3. Active barriers shall be deployed in the Normally Closed mode. Barriers are opened only for each authorized vehicle and then closed behind that vehicle after its entry. Barriers in outbound lanes must also be opened for each exiting vehicle and then closed behind them. Once a

barrier is opened, vehicle presence detectors shall suppress any “close” command until the vehicle clears the barrier.

4) Other schemes approved by SDDC-TEA that provide an equivalent level of safety.

f. Barrier Controls.

1) Only guards in the Gatehouse, Guard Booths, and Overwatch Position shall have emergency close control of the active barriers. A master “Emergency Fast Operate” (EFO) button shall be provided on a Barrier Master Control Panel located in the Gatehouse. Slave EFO buttons shall be located in each Guard Booth and the Overwatch Position. The “Emergency Fast Operate” buttons will close all active barriers in all inbound and outbound lanes.

2) Barrier controls at all locations shall include the EFO button, open/close status of each barrier, and an enunciator providing audible and visual indication of alarms including over speed and wrong way alarms.

3) Switches and indicating lights shall be provided on the Barrier Master Control Panel to allow the Gatehouse guard to enable or disable the slave EFO buttons.

4) A separate Maintenance Control Panel with Automatic-Manual controls and status indication for individual barriers shall be provided and located in the Gatehouse.

21. Visitors Control Center (VCC). For ACPs that handle visitors, the ACP shall have a Visitors Control Center building for processing visitors wishing to enter the installation. The VCC should be sized for effective through put of the number of expected visitors considering that a single processor can process 12-20 visitors per hour. The Visitors Control function for ACPs with minimal visitors, can be performed from a Guard Booth; a separate VCC building is not required. The VCC should include the following:
    a. Waiting Area.
    b. Parking.
    c. Service Counter.
    d. Self-registering kiosks.
    e. Administration Office.
    f. Break Room.
    g. Water cooler.
    h. Restrooms.

22. Lighting. ACP lighting will meet the following criteria:
    a. Approach and Response Zones and Search Area Parking and Roadways – 3 Foot Candles (FC) average with average to minimum ratio not to exceed 4:1.
    b. Access Control Zone and Search Areas – 5 FC average with average to minimum ratio not to exceed 3:1. In the location where ID checks or searches are made, illumination shall be 10 FC or twice the illumination in the immediate surrounding area (whichever is greater) The vertical illumination shall be at least 25% of the horizontal illumination.
    c. Lighting at the ID Check and Search Areas shall have a color rendition index (CRI) of not less than 65. All other light sources shall have a CRI of not less than 50.

23. Surveillance. ACPs will have a CCTV system with the following:
    a. Overwatch Cameras. CCTV cameras shall over watch the Approach Zone, ID Check Area, Search Area, and Active Vehicle Barrier areas.

b. ID Check Area. CCTV cameras shall be positioned to view drivers, ID Check guards, and the vehicle being searched.
c. Search Areas. CCTV cameras shall be positioned to view drivers, Search guards, and the vehicle being searched.
d. Rear License Plates. Conduit shall be installed in the islands at the ID Check Area and Search Areas to accommodate future cameras to view rear license plates.
e. Monitors. Monitors for CCTV shall be at the Gatehouse and the Central Security Monitoring Station.
f. Digital Video Recording. The CCTV system shall include digital video recording for 24 hours per day and 7 days a week operation.

24. Communications. Guards at the Gatehouse, Guard Booths, Search Areas, Overwatch Position, and Visitors Control Center shall have a minimum of 2 means of communications with each other and with the Central Security Monitoring Station.

25. Information Access. ACPs shall have computers capable of accessing and displaying pertinent law enforcement information and Installation access data.

26. Electronic Security.
    a. Duress Alarms. Guards at the ID Check Area, Search Areas, Overwatch Position, and VCC will have duress alarm capability that will annunciate at both the Gatehouse and the Central Security Monitoring Station.
    b. Intrusion Detection. The entry doors to the Gatehouse, Guard Booths, Overwatch Building, Search Office, and Visitors Control Center shall be equipped with Balanced Magnetic Switches (BMS) for intrusion detection.

    c. Tamper Switches.
        1) Electronic control cabinets for communications, security, and barrier controls shall be equipped with tamper switches.
        2) The junction box at the Overwatch Position pad (if provided) shall be equipped with a tamper switch.

27. Back-up Power. The ACP will have a back-up emergency generator or equivalent with the following:
    a. Automatic start-up within 10 seconds after the normal source of electrical power fails.
    b. Sufficient on-site fuel to maintain full-load operation for a minimum of 12 hours.
    c. Status monitored at Gatehouse including alarms for loss of normal power, emergency generator malfunction, and low fuel.
    d. The following loads shall be on Back-up Power:
        1) Interior lighting for the Gatehouse, Guard Booths, Overwatch position, and Inspection Offices.
        2) Canopy lighting in the ID Check Area and the Search Areas.
        3) External lighting in the Access Control Area.
        4) External lighting in the Search Areas.
        5) Approach Zone and Response Zone lighting within 100 feet of the Access Control Zone.
        6) External lighting 150 feet on both sides of the final vehicle barriers.
        7) Uninterruptible Power Supplies (UPS).

28. Uninterruptible Power Supply (UPS). The ACP shall have one or more Uninterruptible Power Supplies to power critical security and safety loads when the normal source of electrical power fails. The following loads shall be on UPS:
    a. Primary communications system
    b. Duress alarm system.
    c. Computers.
    d. CCTV systems.
    e. Intrusion Detection Systems (IDS).
    f. Access Control Equipment including:
        1) Active vehicle barrier controls,
        2) Active barrier activation system for one complete operation cycle (open to close and close to open).
        3) Traffic arms.
        4) Traffic sensors (wrong way, over speed, and presence detectors).
        5) Traffic signals and warning lights.

29. Traffic Control Devices.
    a. ACPs shall utilize traffic control devices including signs, markings, signals, and traffic arms to direct traffic, to provide information, and to safeguard both drivers and guards.
    b. Traffic control devices shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), the National Standard IAW Title 23 U.S. Code, and applicable State and Host-Nation laws.
    c. The Surface Deployment and Distribution Command, Transportation Engineering Agency (SDDCTEA) is available to assist in defining traffic control requirements when standards are not available.
    d. An Overheight Vehicle Detection and Warning System should be deployed ahead of the ID Check Area to detect and warn drivers of Overheight vehicles before proceeding to the canopy.

30. Automation: Personnel identification systems for automated access control shall be compatible with the Common Access Card (CAC).

J. The following requirements apply to Limited Use ACPs:
    1. Entry Gate. The ACP entrance shall include an entry gate to close off the ACP at the Installation perimeter.
    2. The entry gate shall provide the same level of security and same aesthetics as the adjoining perimeter barrier/fence.

K. The following requirements apply to Pedestrian ACPs. These requirements apply to Pedestrian ACPs that stand-alone or Pedestrian ACP facilities that are a part of a Primary or Secondary ACP. The term pedestrian used here includes both pedestrian and bicycle traffic.

    1. Performance Standard. Pedestrian ACPs shall be designed to prevent unauthorized entry, to ensure safety, and to maximize throughput of pedestrians.
    2. Design Criteria. Pedestrian Threat Scenarios. ACPs shall be designed to defeat the following two minimum pedestrian threat scenarios. Additional threat scenarios may be considered if supported by a local threat assessment:
        a. Pedestrian Threat Scenario #1. Pedestrian attempts to forcibly enter the Installation by breaching or circumventing ACP barriers using limited hand tools.
        b. Pedestrian Threat Scenario #2. Pedestrian attempts to covertly enter the Installation by using false credentials.

3. Entry Gate. Pedestrian ACPs will have an Entry Gate at the ACP entrance capable of closing off the ACP. The Entry Gate shall provide equivalent security and equivalent aesthetics as the adjoining perimeter fence/barrier.

4. Guard Booths. Pedestrian ACPs will have one or more Guard Booth buildings for use by guards performing pedestrian ID checks. Guard Booths will have the following:
   a. Construction that provides a minimum ballistics protection of UL 752 (latest edition) Level 3 with a higher level of protection authorized if warranted by a local threat assessment.
   b. Heating and/or Air Conditioning appropriate for the geographic location.
   c. Exterior power outlet sufficient to power hand-held searchlights, bug zappers, etc.
   d. Interior power outlets sufficient for radio chargers, computers, etc.,
   e. Anti-fatigue floor mat.
   f. Sufficient counter space for report writing and storage of reference material.
   g. Windows to provide a 360-degree field of view.

5. Perimeter Barriers. Pedestrian ACPs shall have passive barriers along each side of the ACP corridor capable of preventing easy penetration by a pedestrian. These barriers must tie into the Entry Gate at the ACP entrance as well as the Active Pedestrian Barrier(s) to form a contiguous personnel barrier from the ACP entrance through the Active Pedestrian Barrier(s).

6. Active Pedestrian Barriers. Pedestrian ACPs shall include active pedestrian barriers (e.g., turnstiles, portals, etc.) controlled by the ACP guards to regulate pedestrian traffic.

7. Communications.
   a. ACP guards shall have a minimum of two means to communicate with each other and with guards at the Gatehouse (if the pedestrian access is part of a Primary or Secondary ACP) or guards at the Central Security Monitoring Station (if the Pedestrian ACP is Stand-alone).
   b. ACP guards will have wireless duress alarms that annunciate at the Gatehouse (if the pedestrian access is part of a Primary or Secondary ACP) or the Central Security Monitoring Station if the Pedestrian ACP is Stand-alone).

8. Lighting. Lighting in the Pedestrian ACP shall maintain a minimum of 2-foot candles illumination.

9. Surveillance Equipment. Pedestrian ACPs shall be equipped with a Closed Circuit Television (CCTV) system with the following requirements:
   a. Overwatch Cameras. CCTV cameras shall over watch the approach to the Guard Booth from the Entry Gate to the area around the active pedestrian barrier including the Guard Booth.
   b. Monitors. Monitors for CCTV shall be at the Pedestrian Guard Booth. Monitors shall also be at the Gatehouse if the Pedestrian ACP is part of a Primary or Secondary ACP or at the Central Security Monitoring Station if the Pedestrian ACP is stand-alone.
   c. Digital Video Recording. The CCTV system shall include digital video recording for 24 hours per day and 7 days a week operation.

10. Information Access. Pedestrian ACPs shall have a computer capable of accessing and displaying pertinent law enforcement information and Installation access data.

11. Signs. Pedestrian ACPs shall include signs to direct pedestrians, provide security information, and provide adequate safeguards to both guards and pedestrians.

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U.S ARMY ENGINEER DISTRICT, OMAHA

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM

STANDARD DEFINITIVE DESIGN
APPENDIX C

ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

DECEMBER 17, 2004

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
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SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING | DATE:
DWN BY: JAC | CKD BY: RJT | DESIGN FILE NO. 0001G101
REVIEWED BY: USACE-OD | PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD | DRAWING CODE: DEF072-50-01
CHIEF:

REV. --
SPEC. NO.
CONTRACT NO.

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
COVER SHEET

SHEET REFERENCE NUMBER
G1.01
SHEET 1 OF 40

SHEET INDEX

APPENDICES

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DESIGNED BY: GANNETT FLEMING	DATE: X	REV. --	
DWN BY: JAC	CKD BY: RJT	DESIGN FILE NO. 00016201	SPEC. NO.
REVIEWED BY: USACE-OD		PLOT SCALE RATIO: NO SCALE	CONTRACT NO.
SUBMITTED BY: USACE-OD CHIEF:		DRAWING CODE: DEF872-50-01	

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

GENERAL NOTES
ACCESS CONTROL POINTS

SHEET REFERENCE NUMBER
G2.01
SHEET 2 OF 40

INTRODUCTION

THE DEPARTMENT OF THE ARMY (DA) INSTALLATION ACCESS CONTROL PROGRAM FOR ACCESS CONTROL POINTS (ACP) STANDARD DESIGN, REPRESENTED BY THE FOLLOWING DRAWINGS AND DESIGN NARRATIVES, WAS DEVELOPED TO MEET THE REQUIREMENTS OF THE DEPARTMENT OF THE ARMY FACILITIES STANDARDIZATION PROGRAM (REFERENCE CRITERIA 1). THIS STANDARD HAS BEEN DEVELOPED TO MEET PHYSICAL SECURITY POLICY ESTABLISHED BY HEADQUARTERS (HQ), DA.

REFERENCE CRITERIA

1. DEPARTMENT OF ARMY FACILITIES STANDARDIZATION PROGRAM, ARCHITECTURAL AND ENGINEERING DESIGN CRITERIA, ENGINEERING REGULATION ER 1110-1-113 (LATEST EDITION)
2. FEDERAL HIGHWAY ADMINISTRATION (FHWA), MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), 2003
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6. TRANSPORTATION RESEARCH BOARD (TRB), HIGHWAY CAPACITY MANUAL, 2000
7. DEPARTMENT OF DEFENSE, UNIFIED FACILITIES CRITERIA (UFC) ON ENTRY CONTROL FACILITIES/ACCESS CONTROL POINTS; UFC 4-022-01
8. INSTITUTE OF TRANSPORTATION ENGINEERS (ITE), TRAFFIC ENGINEERING HANDBOOK, 1999
9. NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM (NCHRP) REPORT 350, RECOMMENDED PROCEDURES FOR THE SAFETY PERFORMANCE EVALUATION OF HIGHWAY FEATURES

STANDARDS

ARMY INSTALLATION DESIGN STANDARDS (IDS) MAY 2004 - THE PURPOSE OF THESE STANDARDS, AND THIS STANDARD DESIGN PACKAGE, IS TO PROVIDE COMMON FACILITY AND INFRASTRUCTURE STANDARDS FOR ALL ARMY INSTALLATIONS. THE ARMY IDS PROVIDE COMPREHENSIVE STANDARDS IN THE FOLLOWING AREAS THAT THIS STANDARD DESIGN, WHEN IMPLEMENTED, SHALL COMPLY WITH THE FOLLOWING CHAPTERS IN THE IDS:

SITE PLANNING DESIGN STANDARDS
BUILDING DESIGN STANDARDS
CIRCULATION DESIGN STANDARDS
LANDSCAPE DESIGN STANDARDS
SITE ELEMENTS DESIGN STANDARDS
FORCE PROTECTION DESIGN STANDARDS

ELECTRONIC SECURITY

1. TM5-853-4, "SECURITY ENGINEERING-ELECTRONIC SECURITY SYSTEMS"

ARCHITECTURAL & STRUCTURAL

1. FOR A STRUCTURAL REFERENCE, AND AS A GENERAL REFERENCE USE UFC 1-200-02 "DESIGN: GENERAL BUILDING REQUIREMENTS"
2. TI 809-04, TECHNICAL INSTRUCTIONS - SEISMIC DESIGN FOR BUILDINGS, 13 DECEMBER 1998
3. TI 809-04, TECHNICAL INSTRUCTIONS - STRUCTURAL DESIGN CRITERIA FOR BUILDINGS, 01 SEPTEMBER 1999

ELECTRICAL DESIGN REQUIREMENTS

1. ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA (IESNA), GUIDELINE FOR SECURITY LIGHTING FOR PEOPLE PROPERTY AND PUBLIC SPACES, 2003
2. TECHNICAL MANUAL (TM) 5-811-1/AIR FORCE AFJMAN32-1080, ELECTRICAL POWER SUPPLY AND DISTRIBUTION
3. TECHNICAL INSTRUCTIONS (TI) 811-16, LIGHTING DESIGN
4. NFPA 70, 72, 101, AND 780
5. ANSIC2 NATIONAL ELECTRIC SAFETY CODE, LATEST EDITION
6. UNIFIED FACILITIES CRITERIA (UFC) 3-501-03N, ELECTRICAL ENGINEERING PRELIMINARY DESIGN CONSIDERATIONS

MECHANICAL DESIGN REQUIREMENTS

1. TI 800-01, TECHNICAL INSTRUCTIONS, DESIGN CRITERIA, 20 JULY 1998 (CHG. 28-30 JULY 2004)
2. AMERICAN SOCIETY OF HEATING, REFRIGERATION, AND AIR CONDITIONING ENGINEERS (ASHRAE) MANUALS
3. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA), NATIONAL FIRE CODES (NFC)
4. ETL 1110-3-491 - SUSTAINABLE DESIGN AND DEVELOPMENT FOR MILITARY FACILITIES
5. UFC 3-410-01FA DATED 15 MAY 2003, DESIGN: HEATING, VENTILATING AND AIR CONDITIONING
6. UFC 3-410-02A DATED 15 MAY 2003, DESIGN: HEATING, VENTILATING AND AIR CONDITIONING (HVAC) CONTROL SYSTEMS

PLUMBING DESIGN REQUIREMENTS

1. NATIONAL STANDARD PLUMBING CODE (NAPHCC) AND ASHRAE TECHNICAL MANUALS

CIVIL ENGINEERING

1. UNIFIED FACILITIES CRITERIA (UFC) 4-010-01, MINIMUM ANTITERRORISM STANDARDS FOR BUILDINGS
2. UNIFIED FACILITIES CRITERIA (UFC) 3-210-06A, SITE PLANNING AND DESIGN, 16 JANUARY 2004
3. UNIFIED FACILITIES CRITERIA (UFC) 3-230-17FA, DRAINAGE FOR AREAS OTHER THAN AIRFIELDS, 16 JANUARY 2004
4. UNIFIED FACILITIES CRITERIA (UFC) 3-230-18FA, GENERAL PROVISIONS AND GEOMETRIC DESIGN FOR ROADS, STREETS, WALKS, AND OPEN STORAGE AREAS, 16 JANUARY 2004
5. UNIFIED FACILITIES CRITERIA (UFC) 3-250-01FA, PAVEMENT DESIGN FOR ROADS, STREETS, WALKS, AND OPEN STORAGE AREAS, 16 JANUARY 2004

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
207 SENATE AVENUE
CAMP HILL, PA 17011-2316
(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

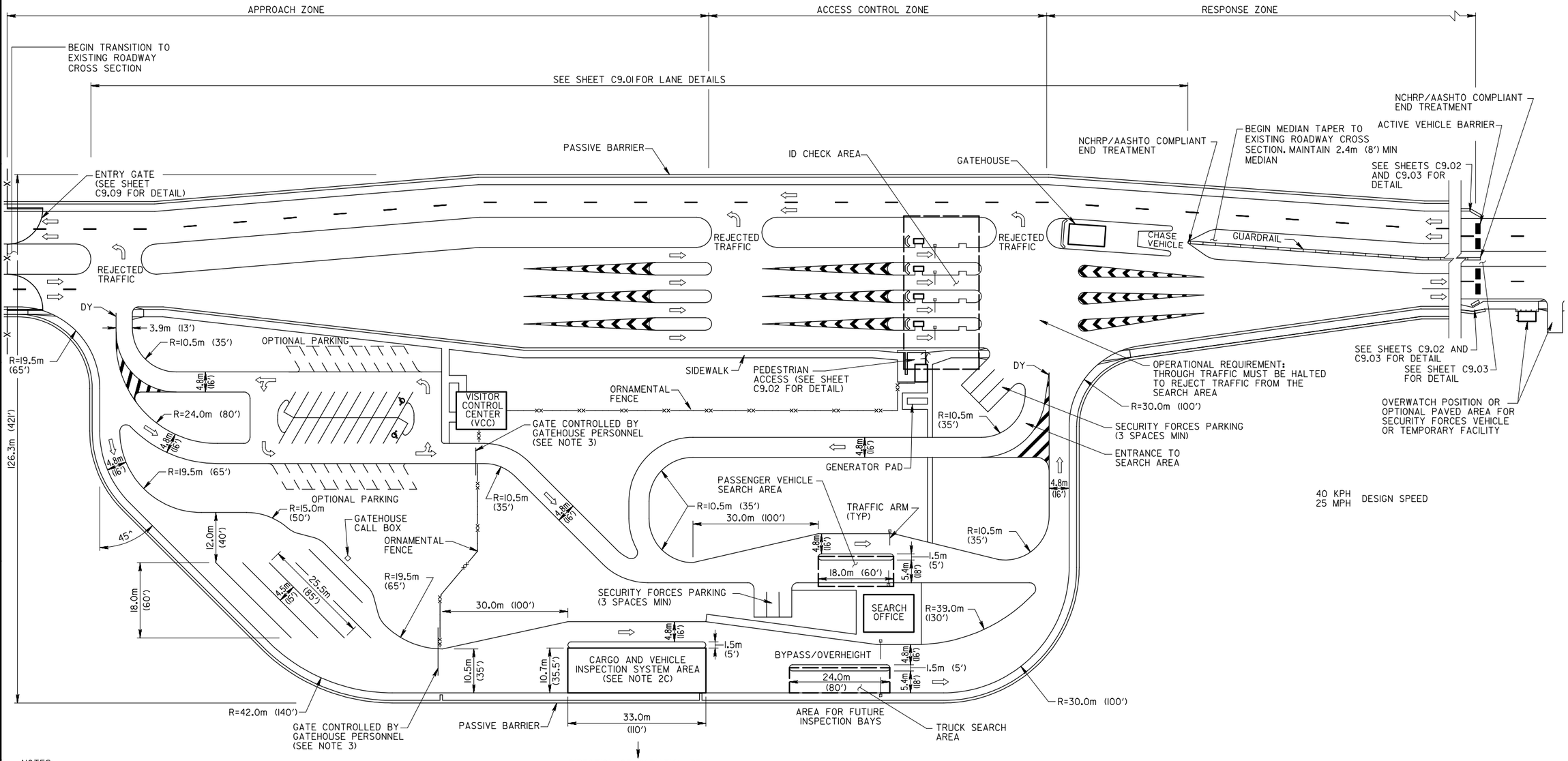
REV.	SPEC. NO.	CONTRACT NO.
--		X

DESIGNED BY: GANNETT FLEMING	DATE: X		
DWN BY: JAC	CKD BY: RJT	DESIGN FILE NO. 0801C001	PLOT SCALE RATIO: NO SCALE
REVIEWED BY: USACE-OD		SUBMITTED BY: USACE-OD	DRAWING CODE: DEF872-50-01
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

GENERAL NOTES

SHEET REFERENCE NUMBER
C0.01
SHEET 3 OF 40



PRIMARY ACP
WITH VCC AND COMMERCIAL VEHICLE

NOTES:

1. SEE SHEETS C3.09 TO C3.14 FOR SPEED DETECTION REQUIREMENTS IN THE APPROACH ZONE AND SPEED MANAGEMENT OPTIONS IN THE APPROACH AND RESPONSE ZONES.

2. PROVIDE A 10.7m (35') WIDE X 33.5m (110') LONG PAVED INSPECTION AREA FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM. THIS PROVIDES ENOUGH WIDTH FOR THE INSPECTION SYSTEM AND THE LANE OF TRAVEL FOR THE VEHICLES TO BE INSPECTED. THE LENGTH IS SUFFICIENT TO ALLOW THE INSPECTION SYSTEM TO SCAN A LARGE STATIONARY VEHICLE AND MANEUVER.

   A. TO INCREASE THROUGHPUT A LONGER INSPECTION LANE CAN BE PROVIDED FOR OPERATION OF THE CARGO AND VEHICLE INSPECTION SYSTEM THAT SCANS STATIONARY VEHICLES. THIS WILL ALLOW THE SYSTEM TO SCAN SEVERAL VEHICLES AT ONE TIME.

   B. PROVIDE NO CANOPY OVER THE INSPECTION AREA PLANNED OR DEDICATED FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM UNLESS THE CLEAR HEIGHT IS A MINIMUM OF 6.7m (22').

   C. SITE ALL PERMANENT FACILITIES SUCH THAT THEY ARE NOT IN THE DIRECTION OF TRAVEL OF THE RADIATION BEAM UNLESS THE DISTANCE BETWEEN THE INSPECTION VEHICLE AND THE FACILITY IS AT LEAST 90.0m (300'). THE INTENT IS TO INSURE THAT THE 100mR/YEAR RADIATION DOSE LIMIT IS NOT EXCEEDED FOR PERSONNEL WHO MAY BE IN THE DIRECTION OF TRAVEL OF THE RADIATION. THIS DISTANCE CAN BE REDUCED TO 23.0m (75.5') IF A 305mm (12") WIDE X 2.4m (8') HIGH (MIN) CONCRETE SHIELDING WALL IS PROVIDED BETWEEN THE RADIATION SOURCE AND ANY FACILITY OF CONCERN. THE DETERMINATION OF EXCLUSION ZONES SHOULD ALSO CONSIDER OBLIQUE SCAN ANGLES, WHICH SOME INSPECTION SYSTEMS CAN EMPLOY. REFER TO ACTUAL EQUIPMENT TO BE USED FOR SPECIFIC EXCLUSION ZONE REQUIREMENTS.

   D. ADD CONDUIT FOR ELECTRICAL POWER AND PROVIDE SUFFICIENT ELECTRICAL POWER CAPACITY FOR POSSIBLE ADDITION OF A FIXED VEHICLE INSPECTION SYSTEM.

3. SLIDING GATES TO CLOSE SEARCH AREA DURING NON-MANNED HOURS.

LEGEND

⇨	TRAFFIC FLOW PATTERN
Y/100mm (4")	PAINT STRIPE STYLE/WIDTH
DY	DOUBLE YELLOW LINE
	TRAFFIC ARM
	ACTIVE VEHICLE BARRIER
	PASSIVE VEHICLE BARRIER
	ORNAMENTAL FENCE
	BOLLARDS
	CANOPY
	BARRIER WALL
	DOUBLE FACE GUARD RAIL
	SINGLE FACE GUARD RAIL
	GUARD BOOTH
	GENERATOR PAD W/SIDEWALK
	CURB RAMP

0 5 10 20 m
SCALE: 1:500

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers Omaha District

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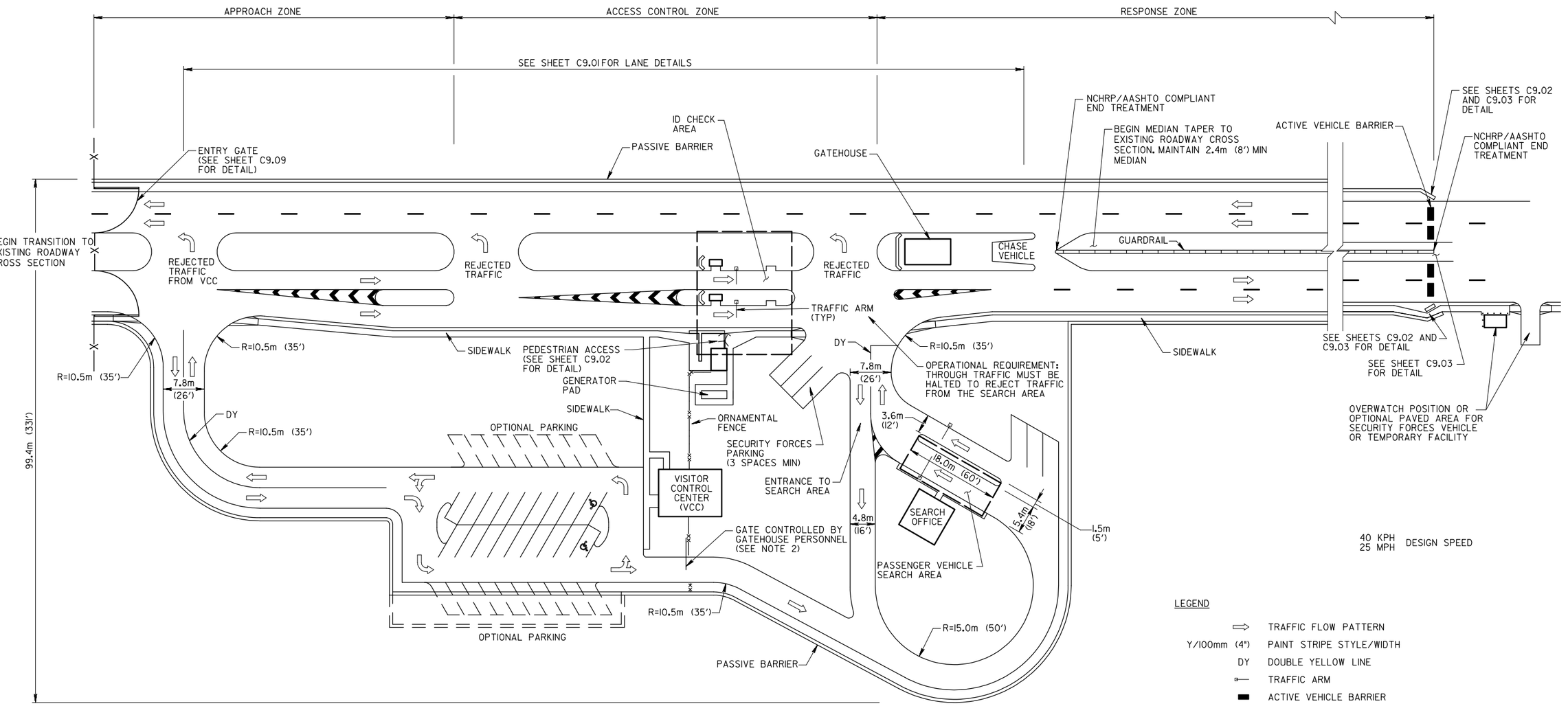
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	DATE: X	REV. —	CONTRACT NO.
DWN BY: JAC	CKD BY: RJT	DESIGN FILE NO. 0001C501	SPEC. NO.
REVIEWED BY: USACE-OD		PLOT SCALE RATIO: 1:500	
SUBMITTED BY: USACE-OD		DRAWING CODE: DEF872-50-01	
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
PRIMARY ACP WITH VCC AND COMMERCIAL VEHICLE ACCESS

SHEET REFERENCE NUMBER
C3.01
SHEET 4 OF 40



40 KPH
25 MPH DESIGN SPEED

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

NOTES:

1. SEE SHEETS C3.09 TO C3.14 FOR SPEED DETECTION REQUIREMENTS IN THE APPROACH ZONE AND SPEED MANAGEMENT OPTIONS IN THE APPROACH AND RESPONSE ZONES.
2. SLIDING GATE TO CLOSE SEARCH AREA DURING NON-MANNED HOURS.

PRIMARY/SECONDARY ACP WITH VCC

(NOT FOR COMMERCIAL VEHICLES)

0 5 10 20 m
SCALE: 1:400

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US Army Corps of Engineers
Omaha District

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SYMBOL	DESCRIPTION	DATE	APPROVED

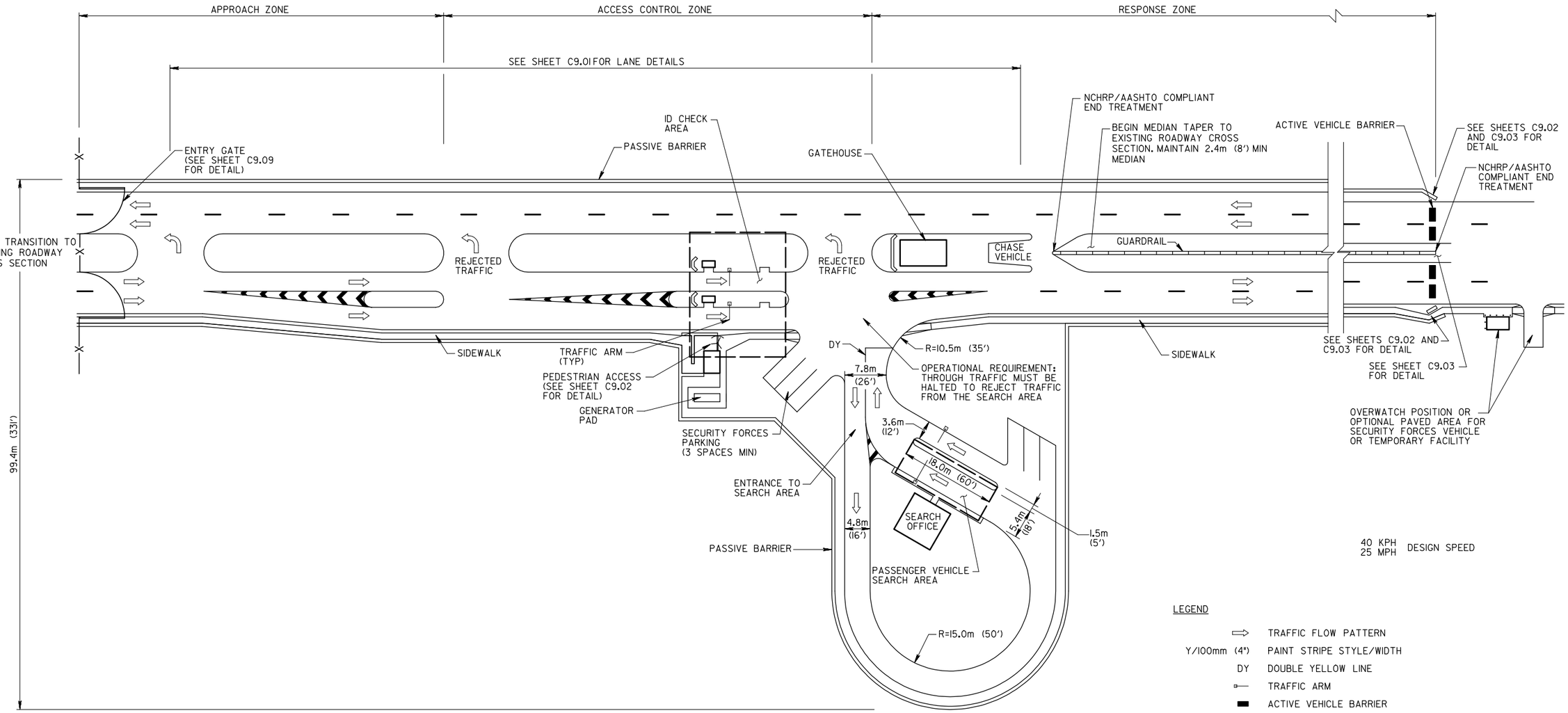
REV. 1 | SPEC. NO. | CONTRACT NO.

DESIGNED BY: GANNETT FLEMING | DATE: X
DWN BY: JAC | CKD BY: RJT | DESIGN FILE NO. 00D1C502 | PLOT SCALE RATIO: 1:400
REVIEWED BY: USACE-OD | SUBMITTED BY: USACE-OD | DRAWING CODE: DEF872-50-01
CHIEF:

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
PRIMARY/SECONDARY ACP WITH VCC

SHEET REFERENCE NUMBER
C3.02
SHEET 5 OF 40



40 KPH
25 MPH DESIGN SPEED

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

NOTES:

1. SEE SHEETS C3.09 TO C3.14 FOR SPEED DETECTION REQUIREMENTS IN THE APPROACH ZONE AND SPEED MANAGEMENT OPTIONS IN THE APPROACH AND RESPONSE ZONES.

PRIMARY/SECONDARY ACP WITHOUT VCC

(NOT FOR COMMERCIAL VEHICLES)

0 5 10 20 m
SCALE: 1:400

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SYMBOL	DESCRIPTION	DATE	APPROVED

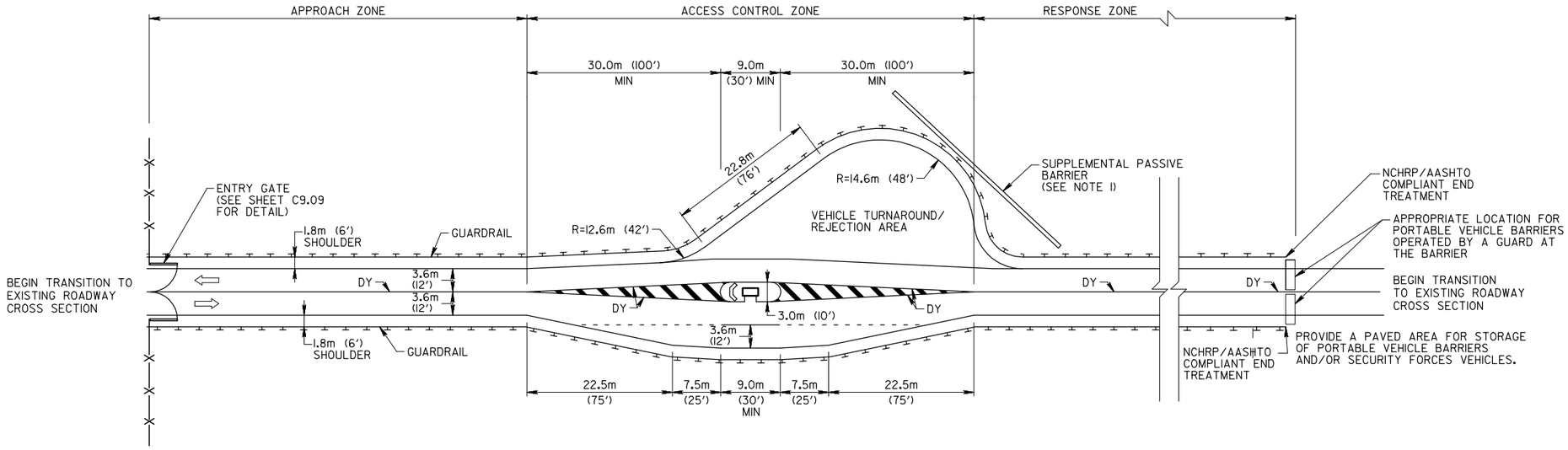
REV.	SPEC. NO.	CONTRACT NO.
1		

DESIGNED BY: GANNETT FLEMING
DRN BY: JAC
CKD BY: RJT
DATE: X
DESIGN FILE NO.: D001C303
PLOT SCALE RATIO: 1:400
REVIEWED BY: USACE-OD
SUBMITTED BY: USACE-OD
CHIEF:
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
PRIMARY/SECONDARY ACP WITHOUT VCC

SHEET REFERENCE NUMBER
C3.03
SHEET 6 OF 40



LIMITED USE ACP

NOTES:

1. SUPPLEMENTAL BARRIERS REQUIRED TO STOP VEHICLES APPROACHING AT GREATER THAN 25 DEGREES.

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

0 5 10 20 m
SCALE: 1:400

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

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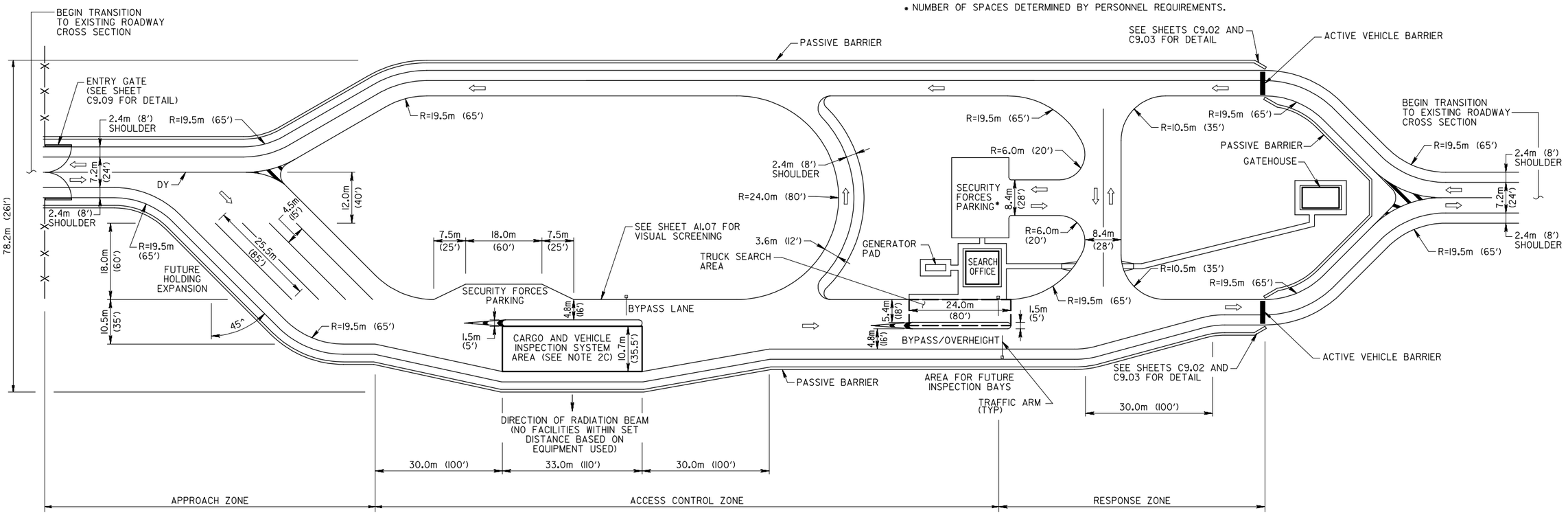
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	DATE: X	REV. --	CONTRACT NO.
DWN BY: JAC / CKD BY: RJT	DESIGN FILE NO. 0D01C304	SPEC. NO.	
REVIEWED BY: USACE-OD	PLOT SCALE RATIO: 1:400		
SUBMITTED BY: USACE-OD / CHIEF:	DRAWING CODE: DEF872-50-01		

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
LIMITED USE ACP

SHEET REFERENCE NUMBER
C3.04
SHEET 7 OF 40



40 KPH
25 MPH DESIGN SPEED

NOTES:

1. SEE SHEETS C3.09 TO C3.14 FOR SPEED DETECTION REQUIREMENTS IN THE APPROACH ZONE AND SPEED MANAGEMENT OPTIONS IN THE APPROACH AND RESPONSE ZONES.
2. PROVIDE A 10.7m (35') WIDE X 33.5m (110') LONG PAVED INSPECTION AREA FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM. THIS PROVIDES ENOUGH WIDTH FOR THE INSPECTION SYSTEM AND THE LANE OF TRAVEL FOR THE VEHICLES TO BE INSPECTED. THE LENGTH IS SUFFICIENT TO ALLOW THE INSPECTION SYSTEM TO SCAN A LARGE STATIONARY VEHICLE AND MANEUVER.
   A. TO INCREASE THROUGHPUT A LONGER INSPECTION LANE CAN BE PROVIDED FOR OPERATION OF THE CARGO AND VEHICLE INSPECTION SYSTEM THAT SCANS STATIONARY VEHICLES. THIS WILL ALLOW THE SYSTEM TO SCAN SEVERAL VEHICLES AT ONE TIME.
   B. PROVIDE NO CANOPY OVER THE INSPECTION AREA PLANNED OR DEDICATED FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM UNLESS THE CLEAR HEIGHT IS A MINIMUM OF 6.7m (22').
   C. SITE ALL PERMANENT FACILITIES SUCH THAT THEY ARE NOT IN THE DIRECTION OF TRAVEL OF THE RADIATION BEAM UNLESS THE DISTANCE BETWEEN THE INSPECTION VEHICLE AND THE FACILITY IS AT LEAST 90.0m (300'). THE INTENT IS TO INSURE THAT THE 100mR/YEAR RADIATION DOSE LIMIT IS NOT EXCEEDED FOR PERSONNEL WHO MAY BE IN THE DIRECTION OF TRAVEL OF THE RADIATION. THIS DISTANCE CAN BE REDUCED TO 23.0m (75.5') IF A 305mm (12") WIDE X 2.4m (8') HIGH (MIN) CONCRETE SHIELDING WALL IS PROVIDED BETWEEN THE RADIATION SOURCE AND ANY FACILITY OF CONCERN. THE DETERMINATION OF EXCLUSION ZONES SHOULD ALSO CONSIDER OBLIQUE SCAN ANGLES, WHICH SOME INSPECTION SYSTEMS CAN EMPLOY. REFER TO ACTUAL EQUIPMENT TO BE USED FOR SPECIFIC EXCLUSION ZONE REQUIREMENTS.
   D. ADD CONDUIT FOR ELECTRICAL POWER AND PROVIDE SUFFICIENT ELECTRICAL POWER CAPACITY FOR POSSIBLE ADDITION OF A FIXED VEHICLE INSPECTION SYSTEM.
3. MAXIMUM THREAT SPEED OBTAINABLE IN THE CURVE BY A POV IS 80 KPH (50 MPH), WITH 2.4m (8') SHOULDER, 3.6m (12') LANE AND 19.8m (65') RADIUS, BASED ON STRAIGHTEST PATH.
4. GATEHOUSE DOUBLES AS OVERWATCH.

COMMERCIAL VEHICLE ACP

BARRIER NORMALLY CLOSED OPERATION

0 5 10 20 m
SCALE: 1:500

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

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US Army Corps of Engineers Omaha District

Gannett Fleming
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CAMP HILL, PA 17011-2316
(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

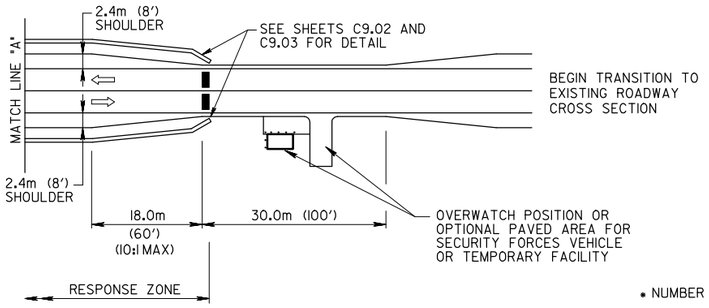
REV. —
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DRN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0001C505
PLOT SCALE RATIO: 1:500
SUBMITTED BY: USACE-OD
DRAWING CODE: DEF872-50-01
CHIEF:

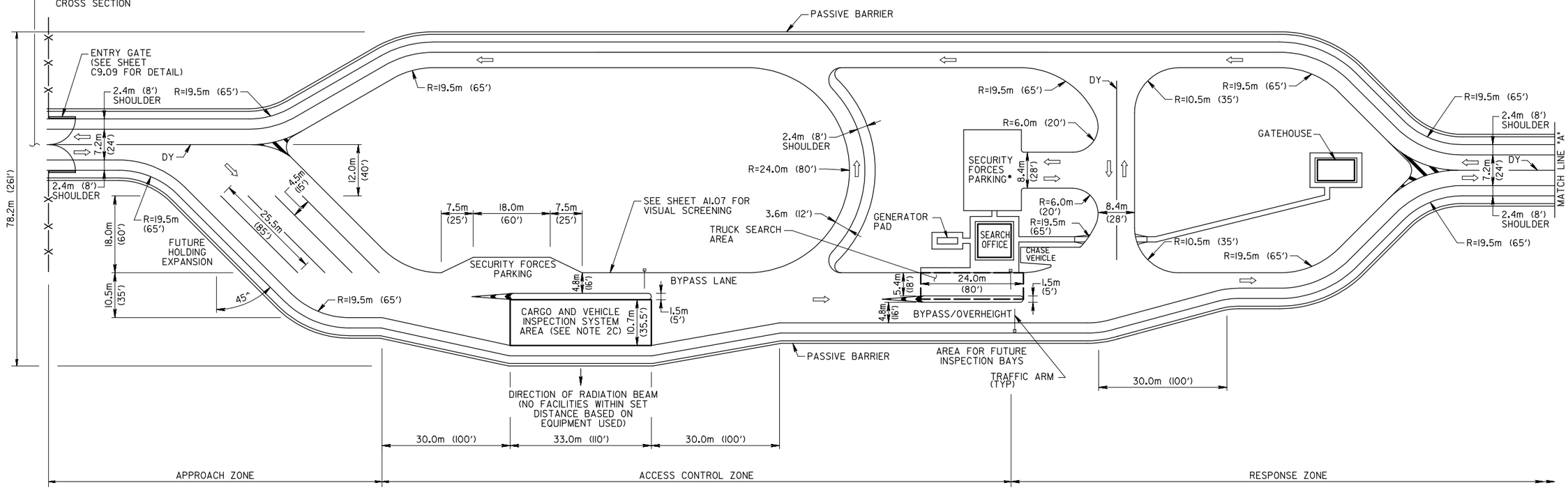
DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
COMMERCIAL VEHICLE ACP
BARRIER NORMALLY CLOSED OPERATION

SHEET REFERENCE NUMBER
C3.05
SHEET 8 OF 40



• NUMBER OF SPACES DETERMINED BY PERSONNEL REQUIREMENTS.



40 KPH
25 MPH DESIGN SPEED

NOTES:

1. SEE SHEETS C3.09 TO C3.14 FOR SPEED DETECTION REQUIREMENTS IN THE APPROACH ZONE AND SPEED MANAGEMENT OPTIONS IN THE APPROACH AND RESPONSE ZONES.
2. PROVIDE A 10.7m (35′) WIDE X 33.5m (110′) LONG PAVED INSPECTION AREA FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM. THIS PROVIDES ENOUGH WIDTH FOR THE INSPECTION SYSTEM AND THE LANE OF TRAVEL FOR THE VEHICLES TO BE INSPECTED. THE LENGTH IS SUFFICIENT TO ALLOW THE INSPECTION SYSTEM TO SCAN A LARGE STATIONARY VEHICLE AND MANEUVER.
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   B. PROVIDE NO CANOPY OVER THE INSPECTION AREA PLANNED OR DEDICATED FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM UNLESS THE CLEAR HEIGHT IS A MINIMUM OF 6.7m (22′).
   C. SITE ALL PERMANENT FACILITIES SUCH THAT THEY ARE NOT IN THE DIRECTION OF TRAVEL OF THE RADIATION BEAM UNLESS THE DISTANCE BETWEEN THE INSPECTION VEHICLE AND THE FACILITY IS AT LEAST 90.0m (300′). THE INTENT IS TO INSURE THAT THE 100mR/YEAR RADIATION DOSE LIMIT IS NOT EXCEEDED FOR PERSONNEL WHO MAY BE IN THE DIRECTION OF TRAVEL OF THE RADIATION. THIS DISTANCE CAN BE REDUCED TO 23.0m (75.5′) IF A 305mm (12") WIDE X 2.4m (8′) HIGH (MIN) CONCRETE SHIELDING WALL IS PROVIDED BETWEEN THE RADIATION SOURCE AND ANY FACILITY OF CONCERN. THE DETERMINATION OF EXCLUSION ZONES SHOULD ALSO CONSIDER OBLIQUE SCAN ANGLES, WHICH SOME INSPECTION SYSTEMS CAN EMPLOY. REFER TO ACTUAL EQUIPMENT TO BE USED FOR SPECIFIC EXCLUSION ZONE REQUIREMENTS.
   D. ADD CONDUIT FOR ELECTRICAL POWER AND PROVIDE SUFFICIENT ELECTRICAL POWER CAPACITY FOR POSSIBLE ADDITION OF A FIXED VEHICLE INSPECTION SYSTEM.
3. MAXIMUM THREAT SPEED OBTAINABLE IN THE CURVE BY A POV IS 80 KPH (50 MPH), WITH 2.4m (8′) SHOULDER, 3.6m (12′) LANE AND 19.8m (65′) RADIUS, BASED ON STRAIGHTEST PATH.

COMMERCIAL VEHICLE ACP

BARRIER NORMALLY OPEN OPERATION

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

0 5 10 20 m
SCALE: 1:500

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers Omaha District

Gannett Fleming
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CAMP HILL, PA 17011-2316
(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

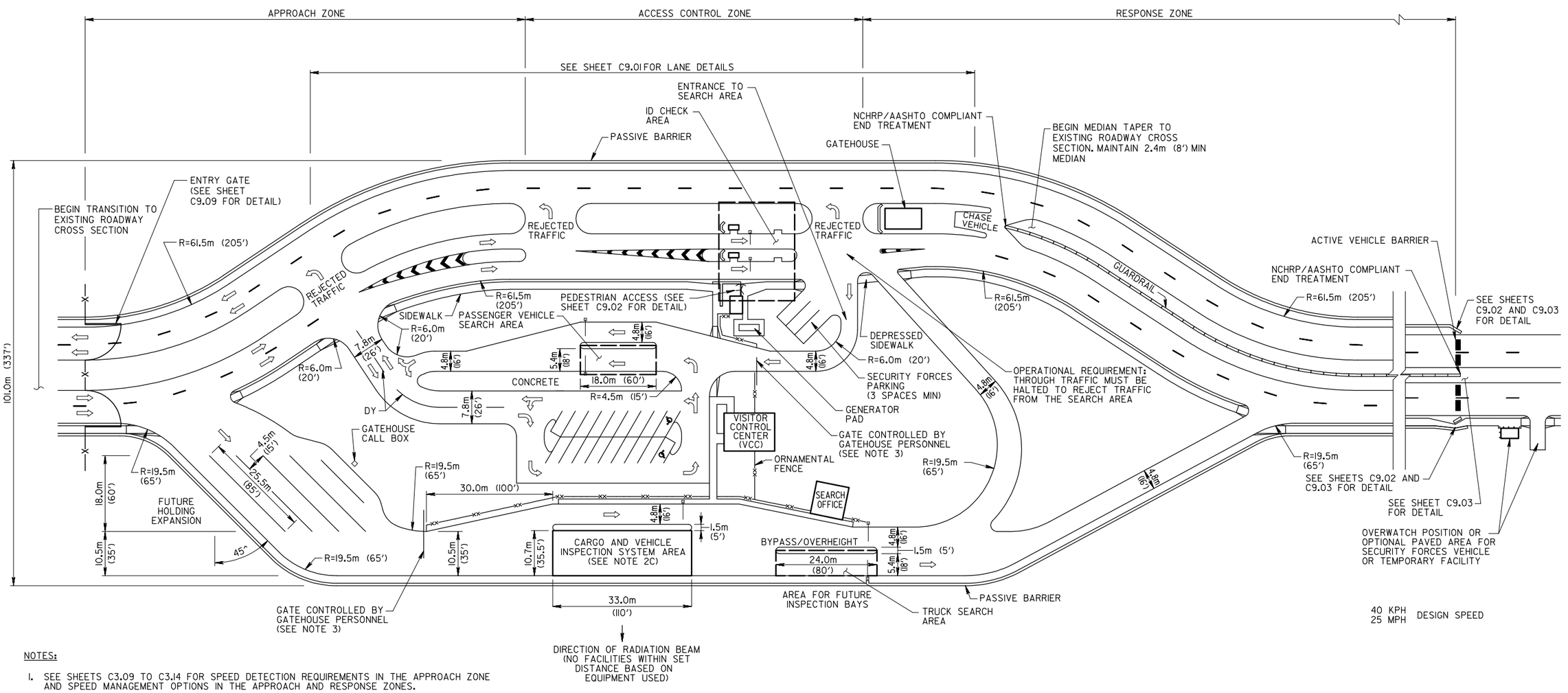
REV. --
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DRN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
SUBMITTED BY: USACE-OD
CHIEF:
DATE: X
DESIGN FILE NO. 0001C506
PLOT SCALE RATIO: 1:500
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
COMMERCIAL VEHICLE ACP
BARRIER NORMALLY OPEN OPERATION

SHEET REFERENCE NUMBER
C3.06
SHEET 9 OF 40



NOTES:

1. SEE SHEETS C3.09 TO C3.14 FOR SPEED DETECTION REQUIREMENTS IN THE APPROACH ZONE AND SPEED MANAGEMENT OPTIONS IN THE APPROACH AND RESPONSE ZONES.
2. PROVIDE A 10.7m (35') WIDE X 33.5m (110') LONG PAVED INSPECTION AREA FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM. THIS PROVIDES ENOUGH WIDTH FOR THE INSPECTION SYSTEM AND THE LANE OF TRAVEL FOR THE VEHICLES TO BE INSPECTED. THE LENGTH IS SUFFICIENT TO ALLOW THE INSPECTION SYSTEM TO SCAN A LARGE STATIONARY VEHICLE AND MANEUVER.
   - A. TO INCREASE THROUGHPUT A LONGER INSPECTION LANE CAN BE PROVIDED FOR OPERATION OF THE CARGO AND VEHICLE INSPECTION SYSTEM THAT SCANS STATIONARY VEHICLES. THIS WILL ALLOW THE SYSTEM TO SCAN SEVERAL VEHICLES AT ONE TIME.
   - B. PROVIDE NO CANOPY OVER THE INSPECTION AREA PLANNED OR DEDICATED FOR USE BY THE CARGO AND VEHICLE INSPECTION SYSTEM UNLESS THE CLEAR HEIGHT IS A MINIMUM OF 6.7m (22').
   - C. SITE ALL PERMANENT FACILITIES SUCH THAT THEY ARE NOT IN THE DIRECTION OF TRAVEL OF THE RADIATION BEAM UNLESS THE DISTANCE BETWEEN THE INSPECTION VEHICLE AND THE FACILITY IS AT LEAST 90.0m (300'). THE INTENT IS TO INSURE THAT THE 100mR/YEAR RADIATION DOSE LIMIT IS NOT EXCEEDED FOR PERSONNEL WHO MAY BE IN THE DIRECTION OF TRAVEL OF THE RADIATION. THIS DISTANCE CAN BE REDUCED TO 23.0m (75.5') IF A 305mm (12") WIDE X 2.4m (8') HIGH (MIN) CONCRETE SHIELDING WALL IS PROVIDED BETWEEN THE RADIATION SOURCE AND ANY FACILITY OF CONCERN. THE DETERMINATION OF EXCLUSION ZONES SHOULD ALSO CONSIDER OBLIQUE SCAN ANGLES, WHICH SOME INSPECTION SYSTEMS CAN EMPLOY. REFER TO ACTUAL EQUIPMENT TO BE USED FOR SPECIFIC EXCLUSION ZONE REQUIREMENTS.
   - D. ADD CONDUIT FOR ELECTRICAL POWER AND PROVIDE SUFFICIENT ELECTRICAL POWER CAPACITY FOR POSSIBLE ADDITION OF A FIXED VEHICLE INSPECTION SYSTEM.
3. SLIDING GATES TO CLOSE SEARCH AREA DURING NON-MANNED HOURS.
4. MAXIMUM THREAT SPEED OBTAINABLE BY A POV IS 90 KPH (56 MPH), WITH 2 3.6m (12') LANES AND 61.5m (205') RADIUS.

RESTRICTED REAL ESTATE ACP WITH VCC AND COMMERCIAL VEHICLE BARRIER NORMALLY OPEN OPERATION

NO DENIAL BETWEEN TRUCK HOLDING & TRUCK INSPECTION

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

0 5 10 20 m
SCALE: 1:500

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers Omaha District

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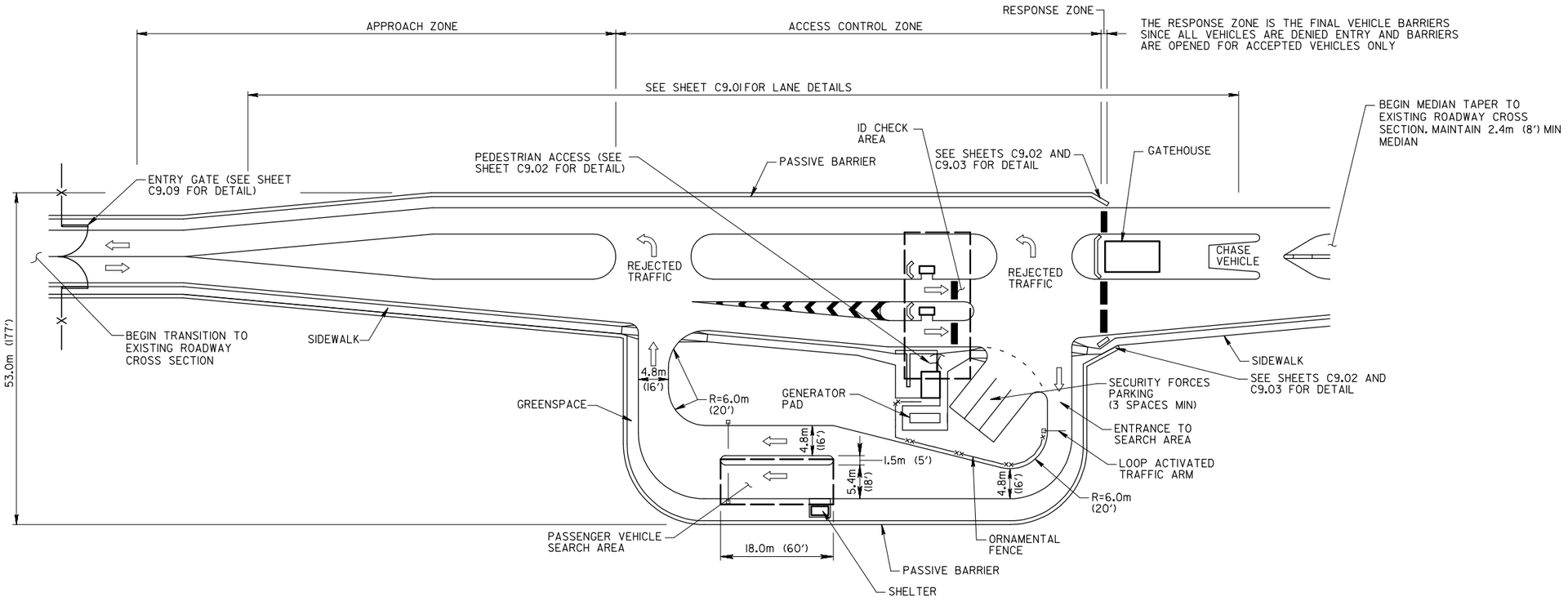
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING
DWN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
SUBMITTED BY: USACE-OD
CHIEF:
DATE: X
DESIGN FILE NO. 0001C307
PLOT SCALE RATIO: 1:500
DRAWING CODE: DEF872-50-01
REV. --
SPEC. NO.
CONTRACT NO.

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
SITE PLAN
RESTRICTED REAL ESTATE ACP WITH VCC AND COMMERCIAL VEHICLE ACCESS BARRIER NORMALLY OPEN OPERATION

SHEET REFERENCE NUMBER
C3.07
SHEET 10 OF 40



NOTES:

1. BARRIERS ARE NORMALLY CLOSED. ID CHECK AREA OR GATEHOUSE GUARD OPENS BARRIER FOR EACH INBOUND OR OUTBOUND VEHICLE AND THEN IMMEDIATELY CLOSES IT BEHIND THEM.

RESTRICTED REAL ESTATE ACP
WITH BARRIER NORMALLY CLOSED OPERATION

NO COMMERCIAL VEHICLES ALLOWED
LOW VOLUME APPLICATIONS ONLY (NOT SUITABLE FOR > 400 VEHICLES PER HOUR)

LEGEND

⇨	TRAFFIC FLOW PATTERN
Y/100mm (4")	PAINT STRIPE STYLE/WIDTH
DY	DOUBLE YELLOW LINE
	TRAFFIC ARM
	ACTIVE VEHICLE BARRIER
	PASSIVE VEHICLE BARRIER
	ORNAMENTAL FENCE
	BOLLARDS
	CANOPY
	BARRIER WALL
	DOUBLE FACE GUARD RAIL
	SINGLE FACE GUARD RAIL
	GUARD BOOTH
	GENERATOR PAD W/SIDEWALK
	CURB RAMP

0 5 10 20 m
SCALE: 1:400

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SYMBOL	DESCRIPTION	DATE	APPROVED

REV. --
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DRWN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0D01C308
PLOT SCALE RATIO: 1:400
SUBMITTED BY: USACE-OD
CHIEF:
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
RESTRICTED REAL ESTATE ACP
WITH BARRIER NORMALLY CLOSED OPERATION

SHEET REFERENCE NUMBER
C3.08
SHEET 11 OF 40

ACCESS CONTROL POINT

Dacp = MINIMUM DISTANCE REQUIRED TO DEFEAT THREAT SCENARIO #1. DEPENDS ON THREAT VEHICLE ENTRY SPEED (Vo) - SEE APPENDIX D "DESIGN PROCEDURE"

Vo (MPH)	35	40	45	50	55	60	65	70
Vo (KPH)	56	64	72	80	89	97	105	113
Dacp (FT)	920	986	1,052	1,118	1,184	1,250	1,316	1,382
Dacp (M)	280	300	321	341	361	381	401	421

APPROACH ZONE

Daz = LENGTH REQUIRED FOR TRAFFIC SORTING AND QUEUING PER TRAFFIC ENGINEERING STUDY. ASSUME Daz = 163.0m (535') FOR THIS EXAMPLE.

ACCESS CONTROL ZONE

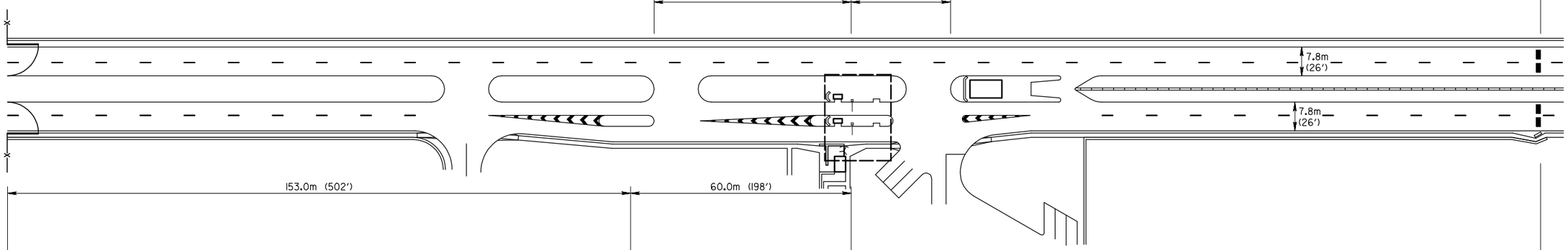
Dacz = 78.0m (255')

Dai = 50.0m (165')

Dir = 27.0m (90')

RESPONSE ZONE

Drz = 485.0m (1590') W/O CONTINUOUS OVER-SPEED DETECTION
Drz = 253.0m (830') WITH ONE SPEED ZONE
Drz = 193.0m (632') WITH TWO SPEED ZONES



ZONE 1	ZONE 2	SPEED DETECTION ZONE
40 (25)	24 (15)	SPEED LIMIT - KPH (MPH)
56 (35)	32 (20)	SPEED DETECTOR SETTING - KPH (MPH)

ACP ENTRANCE

ID CHECK AREA

ACTIVE VEHICLE BARRIERS (SEE SHEETS C9.02 AND C9.03 FOR DETAILS)

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

CONVENTIONAL ACP

NOT TO SCALE

NOTES:

1. THE CONVENTIONAL ACP PROTECTIVE SYSTEM HAS NO SPEED MANAGEMENT FEATURES. IT RELIES ON OVER-SPEED DETECTORS TO DETECT THE THREAT VEHICLE AS EARLY IN ITS ATTACK AS POSSIBLE. IT ALSO RELIES ON ROADWAY LENGTHS IN THE APPROACH AND RESPONSE ZONES TO DELAY THE THREAT VEHICLE. SEE APPENDIX D "DESIGN PROCEDURE" FOR SAMPLE CALCULATIONS OF REQUIRED SPEED ZONE DISTANCES AND OF REQUIRED LENGTHS OF THE APPROACH AND RESPONSE ZONES.

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SYMBOL	DESCRIPTION	DATE	APPROVED

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DWN BY: JAC			CHIEF:

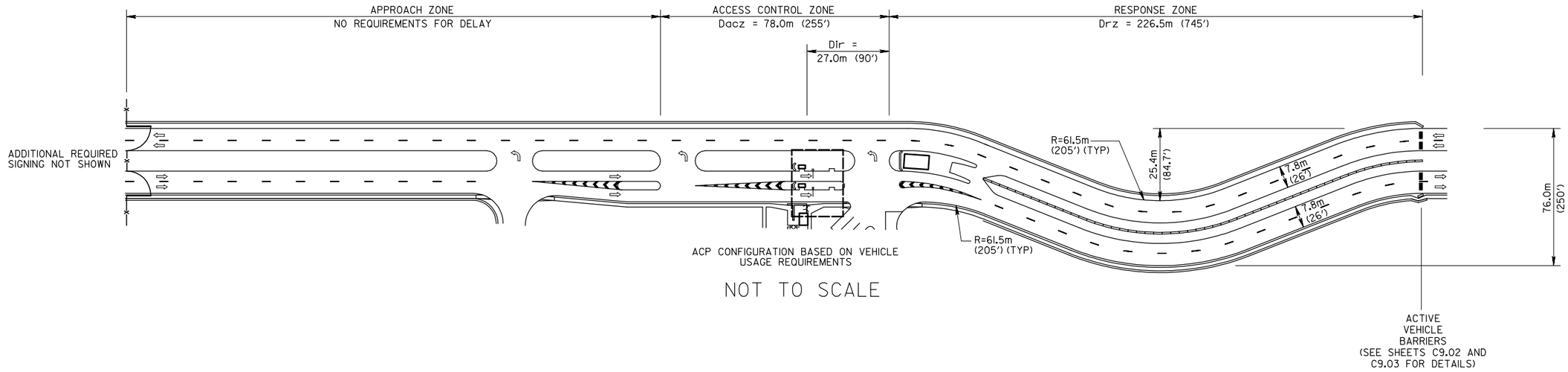
REV.	SPEC. NO.	CONTRACT NO.
--		

DATE:	DESIGN FILE NO.	PLOT SCALE RATIO:	DRAWING CODE:
X	0001C309	NO SCALE	DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

PROTECTIVE SYSTEMS
CONVENTIONAL ACP

SHEET REFERENCE NUMBER
C3.09
SHEET 12 OF 40



NOT TO SCALE

DESIGN PARAMETERS	MAX THREAT SPEED	PROS	CONS	APPLICABILITY/ CONSIDERATIONS
NORMAL CONDITIONS DESIGN SPEED = 40 KPH (25 MPH) Emax = 4% R = 61.5m (205') ANGLE OF DEFLECTION = 50°	SEE PARAGRAPH E.1 AND TABLE D-9 OF APPENDIX D FOR METHODOLOGY	PHYSICALLY LIMITS NORMAL AND THREAT SPEEDS	MAY CAUSE MINOR REDUCTIONS IN ROADWAY CAPACITY DUE TO CONTROLLED SPEEDS TRUCKS NEED TO USE BOTH LANES MINOR CRASHES MAY INCREASE	CURVATURE CAN ENCOMPASS ID AND/OR BARRIER AREA

CHICANE 80KPH (50 MPH) MAXIMUM SPEED

NOT TO SCALE
40 KPH (25 MPH) DESIGN SPEED

NOTES:

1. THE 80 KPH (50 MPH) CHICANE ACP PROTECTIVE SYSTEM HAS A CHICANE IN THE RESPONSE ZONE THAT LIMITS THE MAXIMUM SPEED OF A THREAT VEHICLE TO 80 KPH (50 MPH). SEE APPENDIX D "DESIGN PROCEDURE" FOR SAMPLE CALCULATIONS OF REQUIRED CHICANE PARAMETERS.

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") — PAINT STRIPE STYLE/WIDTH
- DY — DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

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SYMBOL	DESCRIPTION	DATE	APPROVED

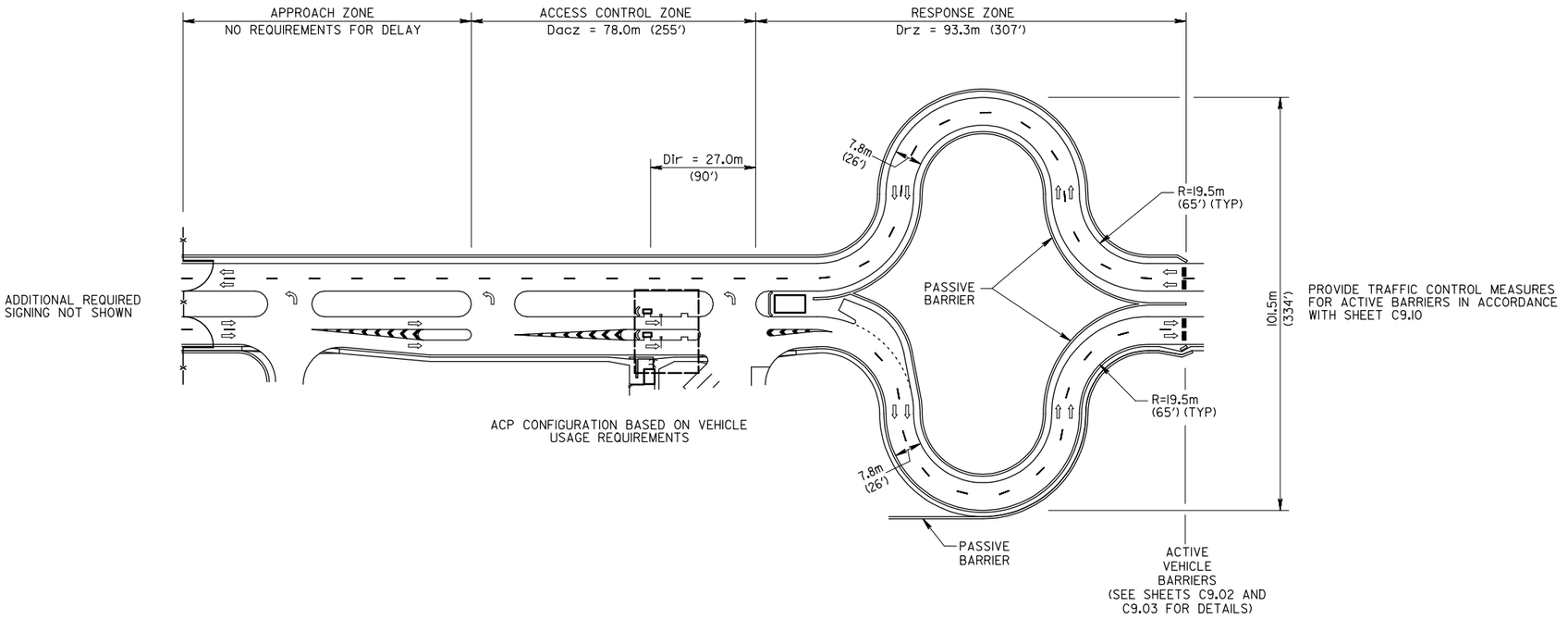
REV.	SPEC. NO.	CONTRACT NO.
--		

DESIGNED BY: GANNETT FLEMING
DRN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0001C310
PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD
CHIEF:
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

PROTECTIVE SYSTEMS
CHICANE 80 KPH (50 MPH) MAXIMUM SPEED

SHEET REFERENCE NUMBER
C3.10
SHEET 13 OF 40



NOT TO SCALE

DESIGN PARAMETERS	MAX THREAT SPEED	PROS	CONS	APPLICABILITY/ CONSIDERATIONS
NORMAL CONDITIONS DESIGN SPEED = 21KPH (13 MPH) Emax = 2% R = 19.5m (65') ANGLE OF DEFLECTION = 80°	SEE PARAGRAPH E.2 AND TABLE D-12 OF APPENDIX D FOR METHODOLOGY	CAN HELP ACHIEVE NEEDED APPROACH AND RESPONSE DISTANCE PHYSICALLY LIMITS NORMAL AND THREAT SPEEDS	REQUIRES ADDITIONAL R/W AND ROADWAY CONSTRUCTION MAY CAUSE SOME MINOR REDUCTION IN CAPACITY CONSISTS OF 4 TURNS AS DEFINED BY MUTCD MINOR CRASHES MAY INCREASE W/O LANE SEPARATION TRUCKS MAY REQUIRE BOTH LANES TO NAVIGATE	REQUIRES MUTCD SIGNING AS TURNS

CURVE - 52 KPH (32 MPH) MAXIMUM SPEED

NOT TO SCALE
24 KPH (15 MPH) DESIGN SPEED
NOT FOR COMMERCIAL USE

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

NOTES:

1. THE 52 KPH (32 MPH) TURN ACP PROTECTIVE SYSTEM HAS A SERIES OF TURNS IN THE RESPONSE ZONE THAT LIMITS THE MAXIMUM SPEED OF A THREAT VEHICLE TO 52 KPH (32 MPH). SEE APPENDIX D 'DESIGN PROCEDURE' FOR SAMPLE CALCULATIONS OF THE REQUIRED TURN PARAMETERS.

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SYMBOL	DESCRIPTION	DATE	APPROVED

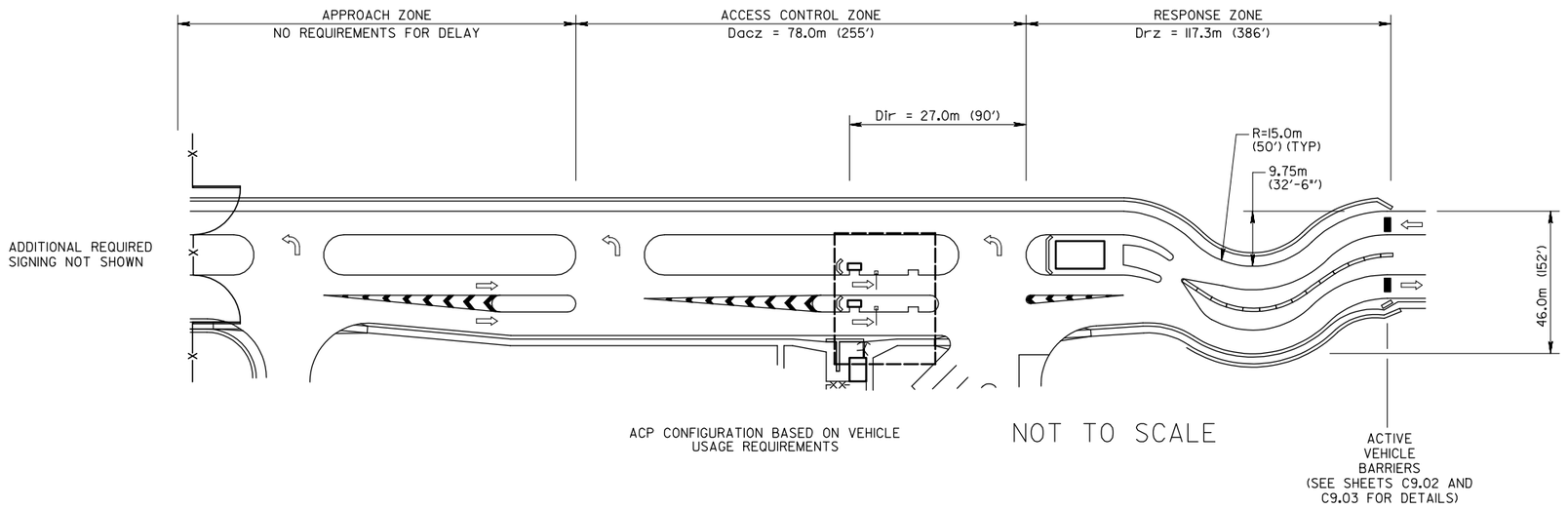
REV. --
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DWN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0001C311
PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD CHIEF:
DRAWING CODE: DEF072-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

PROTECTIVE SYSTEMS
TURN - 52 KPH (32 MPH) MAXIMUM SPEED

SHEET REFERENCE NUMBER
C3.11
SHEET 14 OF 40



DESIGN PARAMETERS	MAX THREAT SPEED	PROS	CONS	APPLICABILITY/ CONSIDERATIONS
NORMAL CONDITIONS DESIGN SPEED < 24 KPH (15 MPH) Emax = 2% R = 15.0m (50') ANGLE OF DEFLECTION = 70°	SEE PARAGRAPH E.3 AND TABLE D-1 OF APPENDIX D FOR METHODOLOGY	PHYSICALLY LIMITS NORMAL AND THREAT SPEEDS	MAY CAUSE MINOR REDUCTIONS IN ROADWAY CAPACITY DUE TO CONTROLLED SPEEDS DIFFICULT FOR LARGER VEHICLES TO MANEUVER MINOR CRASHES MAY INCREASE NOT SUITABLE FOR MORE THAN 175 VEHICLES PER HOUR PER LANE NOT APPROPRIATE FOR TRUCKS	CURVATURE CAN ENCOMPASS ID AND/OR BARRIER AREA MORE SUITABLE FOR LOW-VOLUME AND/OR RESIDENTIAL USE

CHICANE - 45 KPH (24 MPH) MAXIMUM SPEED

NOT TO SCALE
24 KPH (15 MPH) DESIGN SPEED
NOT FOR COMMERCIAL USE

NOTES:

1. THE 45 KPH (28 MPH) CHICANE ACP PROTECTIVE SYSTEM HAS A CHICANE IN THE RESPONSE ZONE THAT LIMITS THE MAXIMUM SPEED OF A THREAT VEHICLE TO 45 KPH (28 MPH). SEE APPENDIX D "DESIGN PROCEDURE" FOR SAMPLE CALCULATIONS OF THE REQUIRED CHICANE PARAMETERS.

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

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SYMBOL	DESCRIPTION	DATE	APPROVED

REV. --
SPEC. NO.
CONTRACT NO.

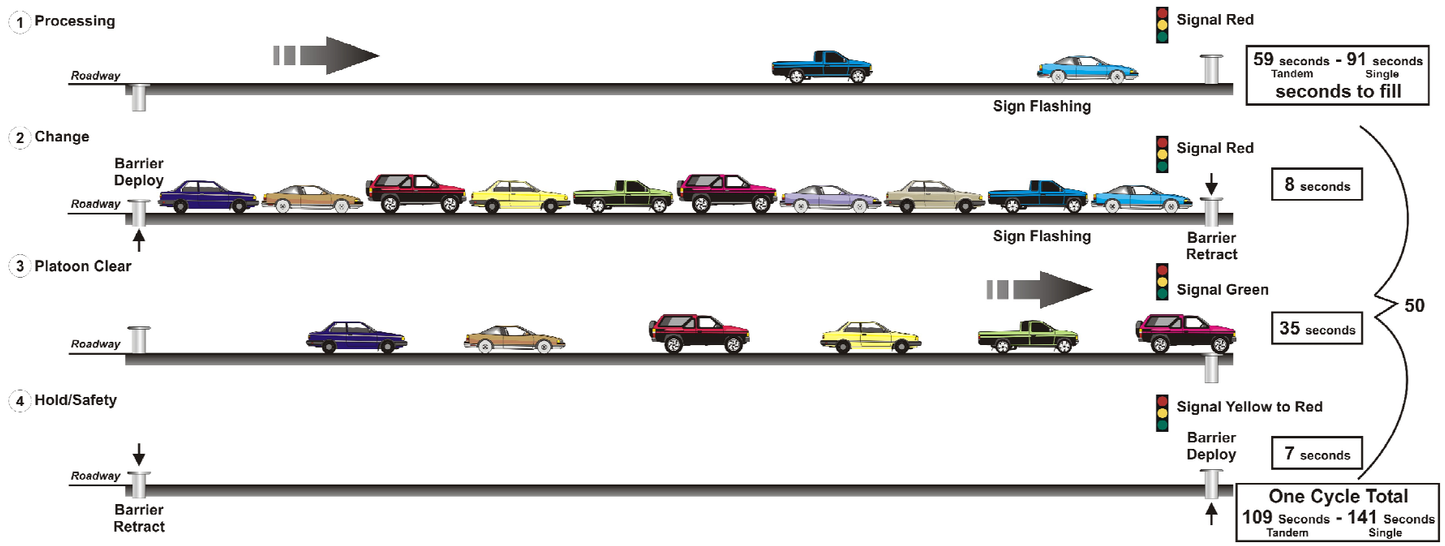
DESIGNED BY: GANNETT FLEMING
DRN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0D01C312
PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD
CHIEF:
DRAWING CODE: DEF872-50-01

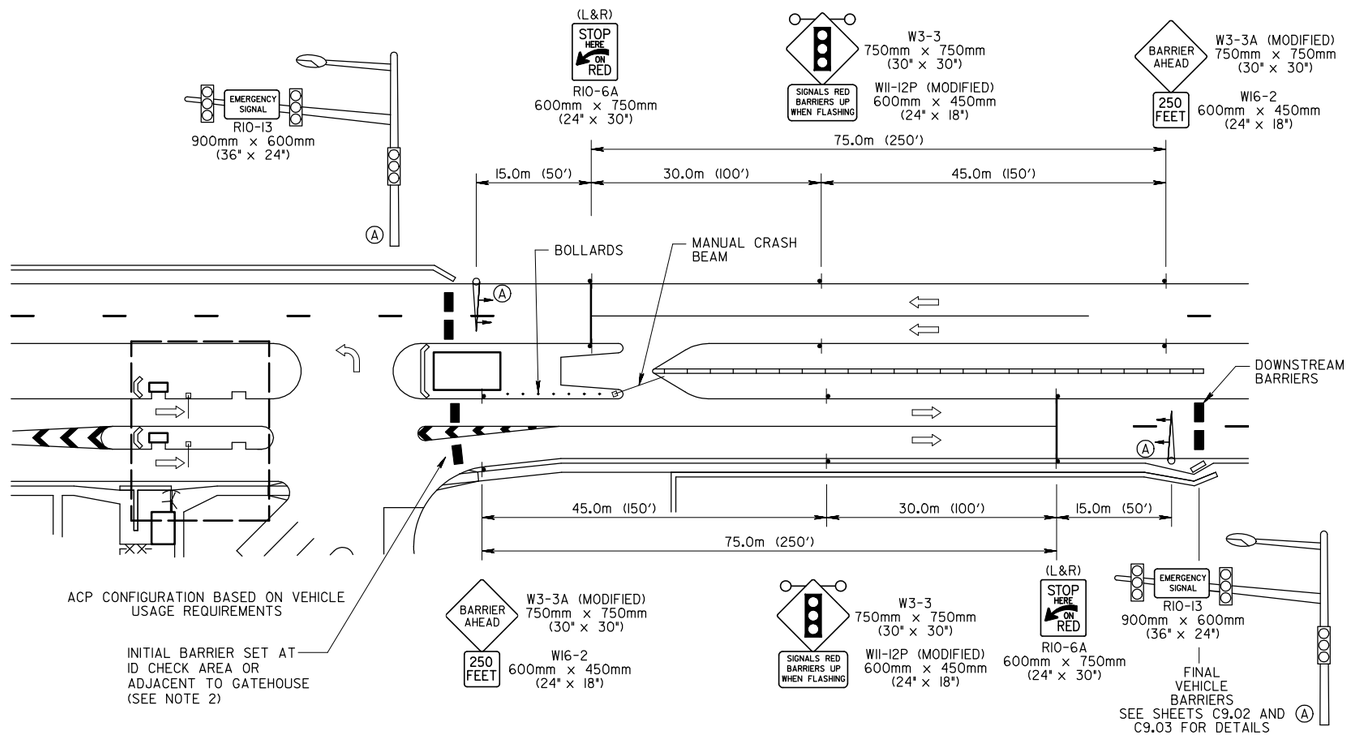
DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

PROTECTIVE SYSTEMS
CHICANE - 45 KPH (28 MPH) MAXIMUM SPEED

SHEET REFERENCE NUMBER
C3.12
SHEET 15 OF 40

Typical Operations





NOTES:

1. RESPONSE ZONE LENGTH VARIES WITH THE NUMBER AND TYPE OF VEHICLES TO BE QUEUED AND AVAILABLE REAL ESTATE. ADJUST SIGNS AND SIGN SPACING AS NECESSARY, BUT IN CONFORMANCE WITH THE MUTCD.
2. IF INITIAL BARRIERS ARE LOCATED AT ID CHECK POSITIONS, ENSURE THAT WRONG WAY DETECTORS ARE INSTALLED AND THAT THE LOCATION OF THE DOWNSTREAM BARRIER SET PROVIDES SUFFICIENT DALAY TO DETECT THE HIGH SPEED THREAT SCENERIOS ENTERING IN THE EXIT LANE.

DESIGN PARAMETERS	RESPONSE ZONE	MAX THREAT SPEED WITH LANE DIVIDERS	PROS	CONS	APPLICABILITY/ CONSIDERATIONS
NORMAL CONDITIONS DESIGN SPEED - N/A Emax = N/A R = N/A	N/A	N/A	MULTIPLE LINES OF SECURITY SINCE BARRIERS ARE UP OR DOWN IN A CONTROLLED SITUATION, MOTORISTS ARE MORE AWARE OF BARRIER DEPLOYMENTS	DECREASES TRAFFIC PROCESSING BY 38% FOR SINGLE PROCESSING AND 46% FOR TANDEM PROCESSING HIGHER COSTS DUE TO MORE BARRIERS AND INCREASED USAGE	AT LOW VOLUMES, AN "UP/DOWN" OPERATION COULD BE RUN AT THE ID CHECK AND THE DOWNSTREAM BARRIER COULD BE DEPLOYED WHEN SOMEONE IS REJECTED COULD BE SIZED AS NEEDED

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

VEHICLE PLATOONING

NOT TO SCALE

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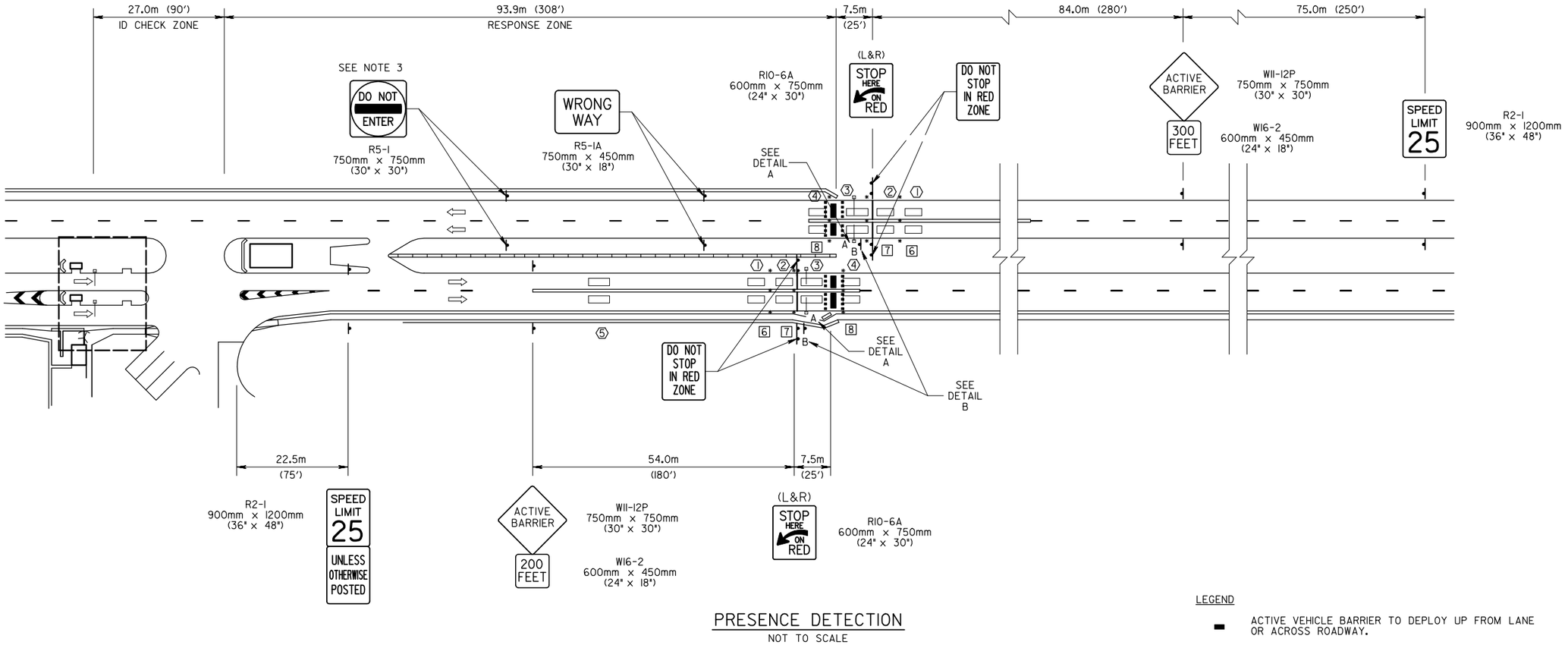
REV.	DESCRIPTION	DATE	APPROVED
--			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

PROTECTIVE SYSTEMS
VEHICLE PLATOONING

DESIGNED BY: GANNETT FLEMING	CKD BY: RJT	DESIGN FILE NO. 0001C313	SPEC. NO.
DWN BY: JAC		PLOT SCALE RATIO: NO SCALE	CONTRACT NO.
REVIEWED BY: USACE-OD		DRAWING CODE: DEF872-50-01	
SUBMITTED BY: USACE-OD		DATE: X	
CHIEF:			

SHEET REFERENCE NUMBER
C3.13
SHEET 16 OF 40

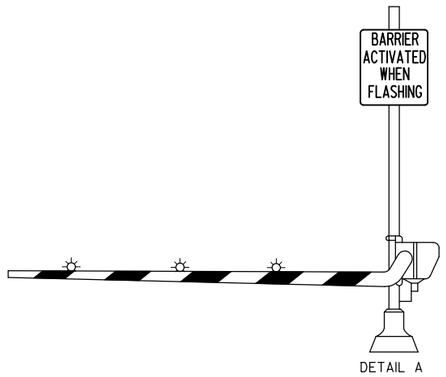


PRESENCE DETECTION

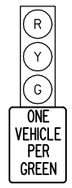
NOT TO SCALE

NOTES:

1. ISLANDS BETWEEN INBOUND AND OUTBOUND LANES ARE REQUIRED TO SEPARATE LANES FOR SECURITY, BARRIER SIGNAL OPERATION, AND PLACEMENT OF SIGNS, SIGNALS, AND BEAM SENSORS. UNDER ROADWAY DRAINAGE SHALL BE DESIGNED ACCORDINGLY.
2. ACTUAL SIGN PLACEMENTS SHALL BE BASED ON MUTCD, LOCAL CONDITIONS, GEOMETRY, ROADWAY ISLANDS, OTHER TRAFFIC CONTROL DEVICES, LANDSCAPE, ROADSIDE FEATURES, ETC.
3. VEHICLE PRESENCE DETECTION LOOPS 1, 2, 3, 4, AND 5 AND ELECTRONIC BEAM LANE SENSORS 6, 7, AND 8 SHALL BE MONITORED BY A MICROPROCESSOR CONTROLLER SIMILAR TO A TRAFFIC CONTROL SIGNAL CONTROLLER. THE MICROPROCESSOR CONTROLLER SHALL BE PROGRAMMED TO CONTROL THE LANE CONTROL SIGNAL, THE GATE ARM, THE ACTIVE VEHICLE BARRIER, AND ACTIVE BARRIER WARNING LIGHTS WITH THE LOGIC SHOWN IN APPENDIX G.
   A. DETECTORS 1 & 2 SHALL BE AHEAD OF STOP LINE.
   B. DETECTOR 3 SHALL BE 1.8m (6') BEYOND STOP LINE AND 1.2m (4') AHEAD OF ACTIVE VEHICLE BARRIERS.
   C. DETECTOR 4 SHALL BE 1.8m (6') BEYOND ACTIVE VEHICLE BARRIERS.
   D. DETECTOR 5 SHALL BE 45.0m (150') AHEAD OF ACTIVE VEHICLE BARRIERS.
4. PAVEMENT DEFINED BY THE "DO NOT STOP IN RED ZONE" SIGN SHALL CONSIST OF RED TEXTURED PAVEMENT BY AGGREGATE OR OTHER MEANS TO INDICATE AREA (ABOUT ONE CAR LENGTH) THAT NEEDS TO BE KEPT FREE OF VEHICLES, VEHICLE BACKUPS, ETC.
5. SEE APPENDIX G FOR ADDITIONAL INFORMATION ON OPERATION AND CONTROLS.
6. SEE EXAMPLES IN APPENDIX C FOR CALCULATIONS OF THE REQUIRED LENGTH OF THE RESPONSE ZONE. PER THESE EXAMPLES, THE LENGTH OF THE RESPONSE ZONE COULD BE REDUCED FURTHER BY UTILIZING A CHICANE OR TURN IN THE RESPONSE ZONE.



DETAIL A



DETAIL B

LEGEND

- ACTIVE VEHICLE BARRIER TO DEPLOY UP FROM LANE OR ACROSS ROADWAY.
- RED IN-ROADWAY LIGHTS THAT FLASH RED WHEN BARRIER IS ACTIVATED. FOR USE WHEN BARRIERS DO NOT CONTAIN LIGHTS AT ACTIVATION.
- QUADRUPOLE INDUCTIVE LOOP DETECTOR
- (4) LOOP DETECTION AREA NUMBER
- [6] BEAM DETECTION AREA NUMBER
- POST MOUNTED SIGN ON SHOULDER, LANE ISLAND, OR IN MEDIAN.
- TRAFFIC GATE ARM IN THE DOWN HORIZONTAL POSITION WITH FLASHING RED LIGHTS WHEN BARRIER DEPLOYMENT COMMAND HAS BEEN INITIATED BY GUARD.
- * ELECTRONIC BEAM LANE SENSORS THAT PROVIDE INPUT TO THE MICROPROCESSOR CONTROLLER FOR LOW METAL-MASS VEHICLES SUCH AS SCOOTERS, MOTORCYCLES, MOPEDS, AND BICYCLES.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
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SYMBOL	DESCRIPTION	DATE	APPROVED

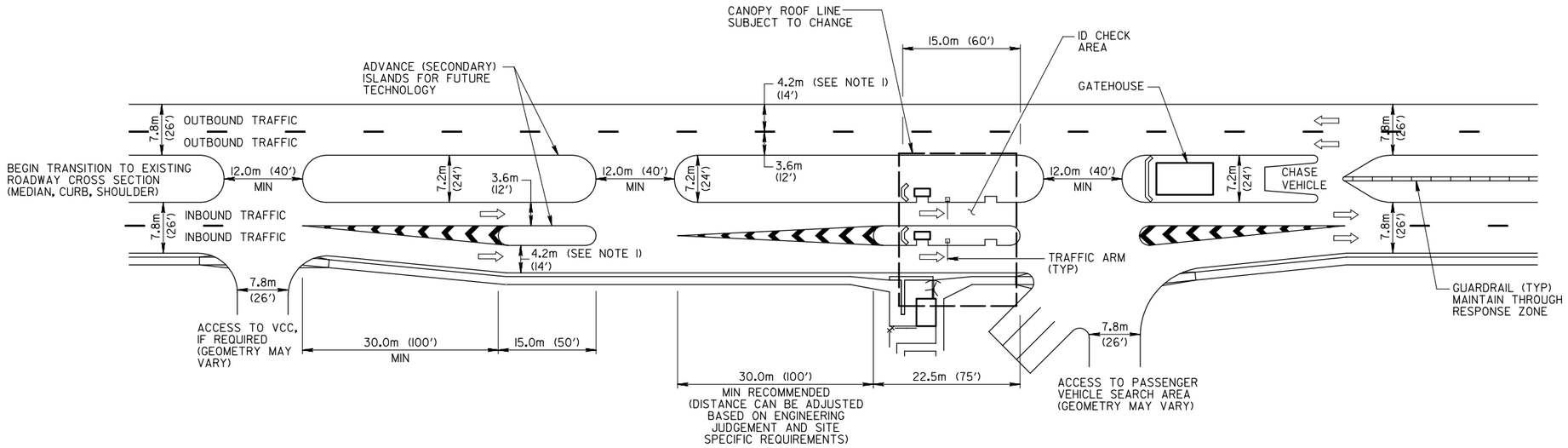
REV. --
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DRN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0001C314
PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD
CHIEF:
DRAWING CODE: DEF872-50-01

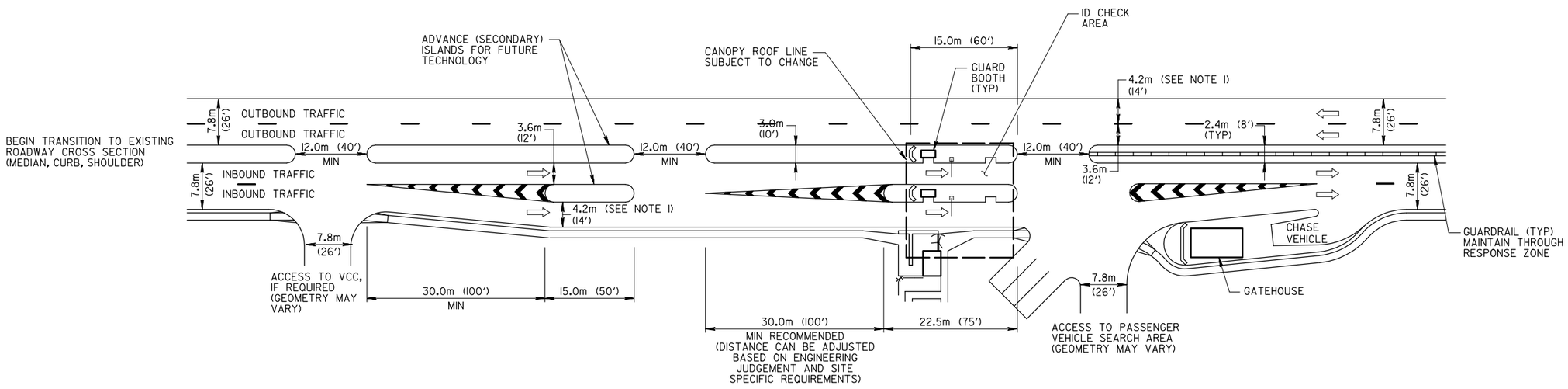
DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

PROTECTIVE SYSTEMS
VEHICLE PRESENCE DETECTION

SHEET REFERENCE NUMBER
C3.14
SHEET 17 OF 40



ACCESS CONTROL ZONE -
MEDIAN GATEHOUSE LANE DETAILS



ACCESS CONTROL ZONE -
RIGHT SHOULDER GATEHOUSE LANE DETAILS

NOTES:

1. LANE SHOULD BE 3.6m (12') WIDE, PLUS 0.6m (2') FOR CURB & GUTTER. PROVIDE 5.1m (17') TO ACCOMODATE BICYCLE ACTIVITY IF APPROPRIATE.

0 5 10 20 m
SCALE: 1:400

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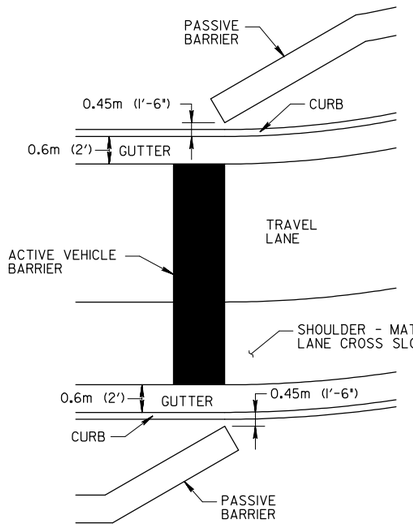
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	DATE: X	REV. --	CONTRACT NO. X
DWN BY: JAC / CKD BY: RJT	DESIGN FILE NO. 0001C901	SPEC.	
REVIEWED BY: USACE-OD	PLOT SCALE RATIO: 1:400		
SUBMITTED BY: USACE-OD	DRAWING CODE: DEF872-50-01		
CHIEF:			

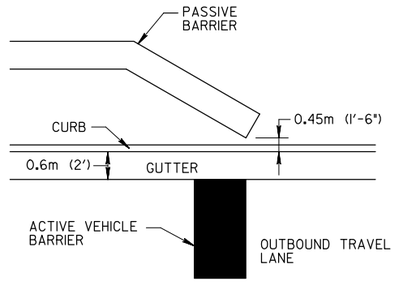
DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
ACCESS CONTROL ZONE DETAILS

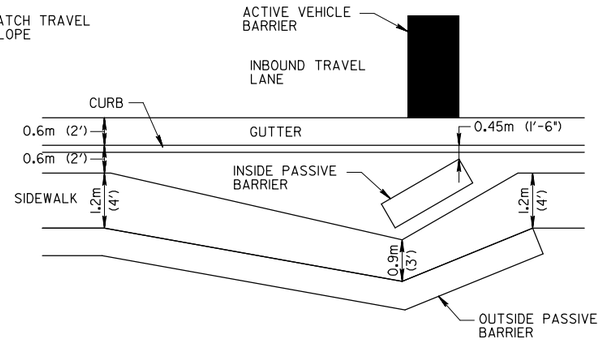
SHEET REFERENCE NUMBER
C9.01
SHEET 18 OF 40



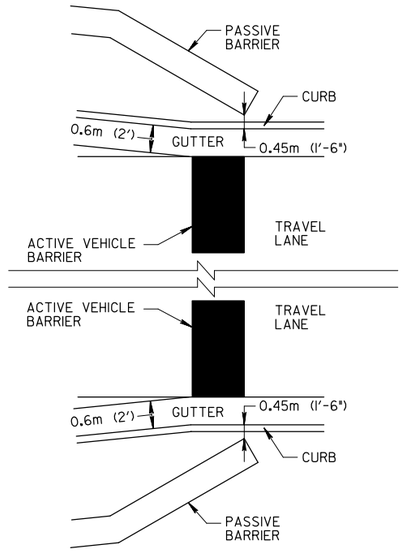
COMMERCIAL VEHICLE ACP - BARRIER
NORMALLY CLOSED OPERATION



OUTBOUND - CONVENTIONAL ACP



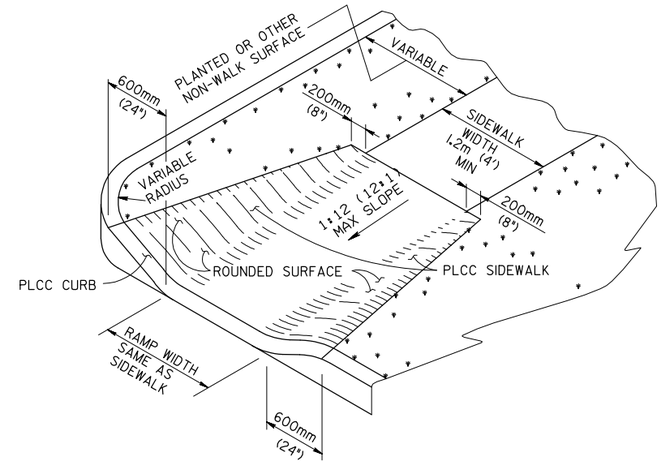
INBOUND - CONVENTIONAL ACP



COMMERCIAL VEHICLE ACP - BARRIER
NORMALLY OPEN OPERATION

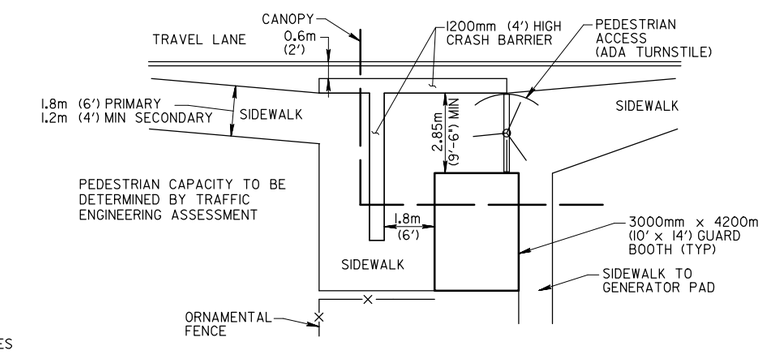
FINAL VEHICLE BARRIER/PASSIVE BARRIER DETAIL

NOT TO SCALE



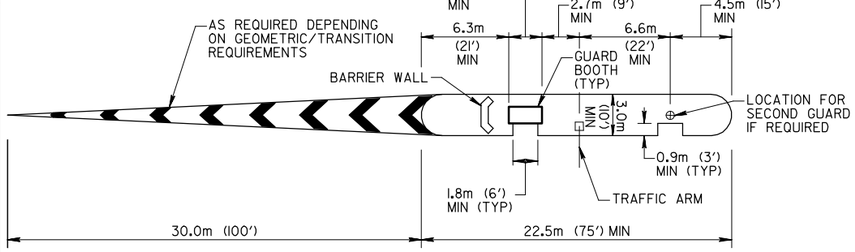
CURB RAMP DETAIL

NOT TO SCALE



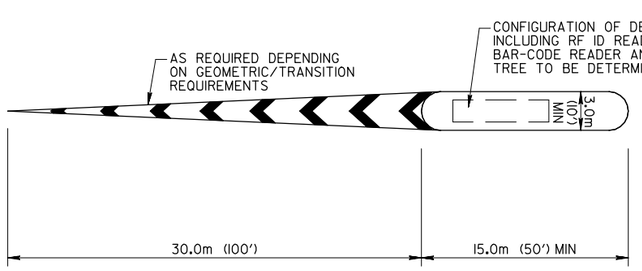
PEDESTRIAN GUARD BOOTH DETAIL

NOT TO SCALE



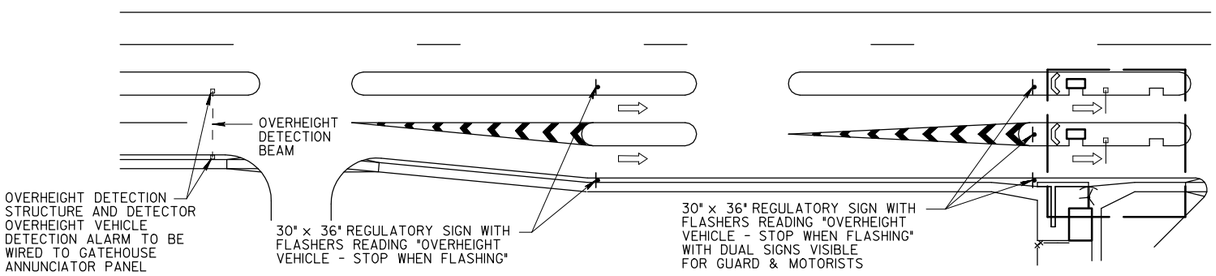
TANDEM PROCESSING OPTION

NOT TO SCALE



ADVANCE (SECONDARY) ISLAND DETAIL

NOT TO SCALE
FOR USE AT PRIMARY AND SECONDARY ACP'S



OPTIONAL OVERHEIGHT DETECTION

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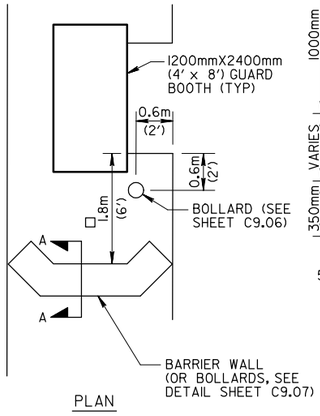
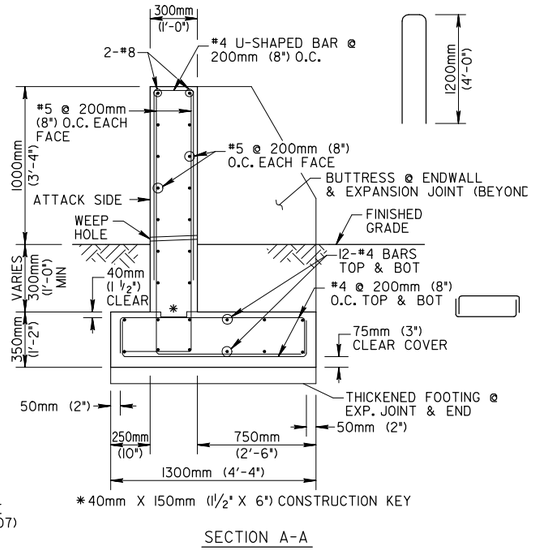


PLAN



SECTION A-A

GUARD BOOTH CRASH BARRIER DETAIL

NOT TO SCALE
FOR ADDITIONAL INFORMATION SEE SHEET C9.07

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

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Omaha District

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SYMBOL	DESCRIPTION	DATE	APPROVED

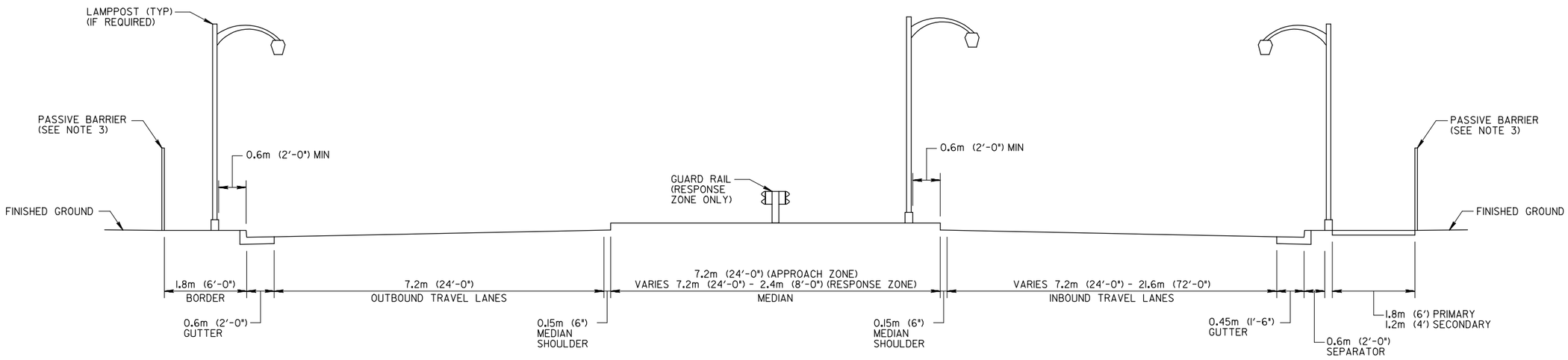
REV.	SPEC. NO.	CONTRACT NO.
--		

DESIGNED BY: GANNETT FLEMING	DATE: X		
DWN BY: JAC	CKD BY: RJT	DESIGN FILE NO. 0D01C902	PLOT SCALE RATIO: NO SCALE
REVIEWED BY: USACE-OD		SUBMITTED BY: USACE-OD	DRAWING CODE: DEF872-50-01
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
ACP DETAILS

SHEET REFERENCE NUMBER
C9.02
SHEET 19 OF 40



APPROACH AND RESPONSE ZONE TYPICAL SECTION

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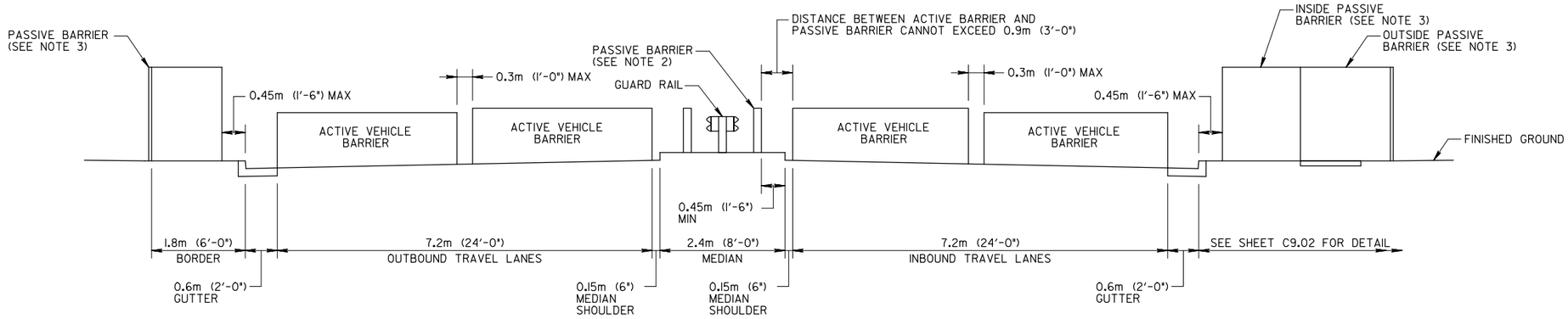
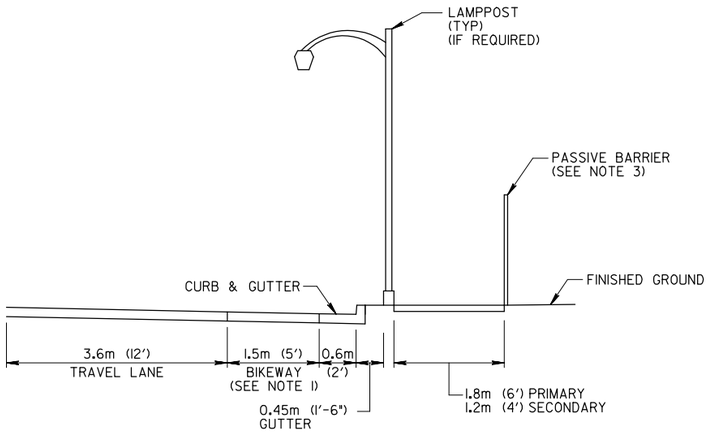


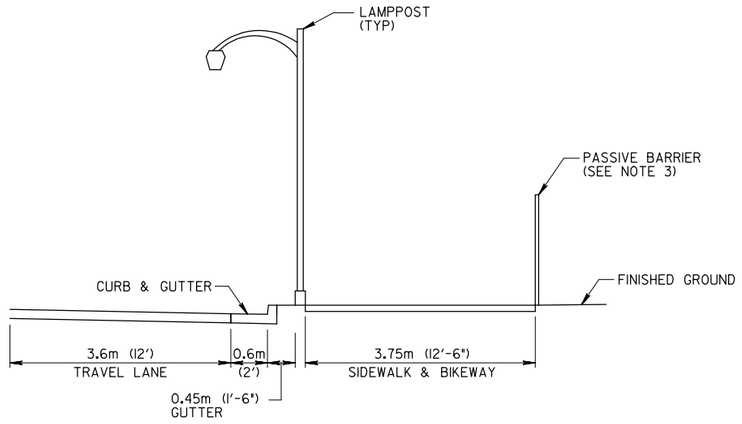
ACTIVE VEHICLE BARRIER TYPICAL SECTION

NOT TO SCALE



SIDEWALK/BIKEWAY DETAIL

NOT TO SCALE



COMBINATION SIDEWALK/BIKEWAY DETAIL

NOT TO SCALE

NOTES:

1. PROVIDE 1.5m (5') BIKEWAY IF APPROPRIATE
2. NUMBER OF PASSIVE BARRIERS IS DETERMINED BY WIDTH OF MEDIAN AND DISTANCE BETWEEN PASSIVE BARRIERS NOT EXCEEDING 0.9m (3'-0)
3. TYPE AND SIZE OF PASSIVE BARRIERS TO BE DETERMINED IN FINAL DESIGN. PASSIVE BARRIERS MUST PROVIDE VEHICLE PENETRATION RESISTANCE AND PROVIDE A BARRIER TO PEDESTRIAN ACCESS.

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SYMBOL	DESCRIPTION	DATE	APPROVED

REV.	SPEC. NO.	CONTRACT NO.
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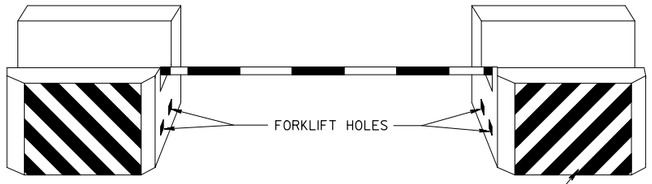
DESIGNED BY: GANNETT FLEMING
DRWN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0D01C903
PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD
CHIEF:
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
TYPICAL SECTIONS

SHEET REFERENCE NUMBER
C9.03
SHEET 20 OF 40



BARRIER RATING: CONDITION DESIGNATION K-4

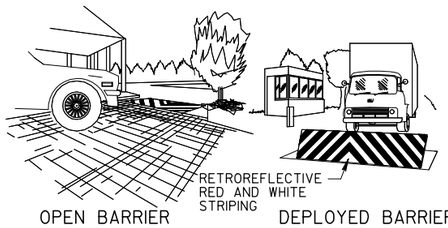
OPERATION: TRANSPORTABLE VEHICLE BARRIER, MANUAL OR HYDRAULIC OPERATION.

MANUFACTURER: D

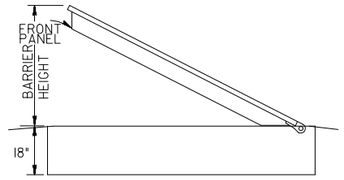
COMMENT:

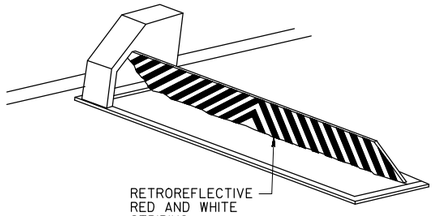
TRANSPORTABLE ACTIVE VEHICLE BARRIER

NOT TO SCALE



OPEN BARRIER DEPLOYED BARRIER



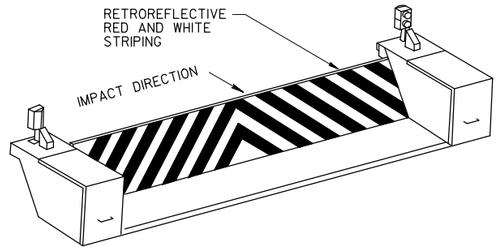


BARRIER RATING: MODELS MEET UP TO DEPT. OF STATE CONDITION DESIGNATION KI2.

OPERATION: RAMP RISES FROM A RECESS IN THE ROADWAY, PRESENTING AN ALMOST VERTICAL FACE TO THE ONCOMING VEHICLE

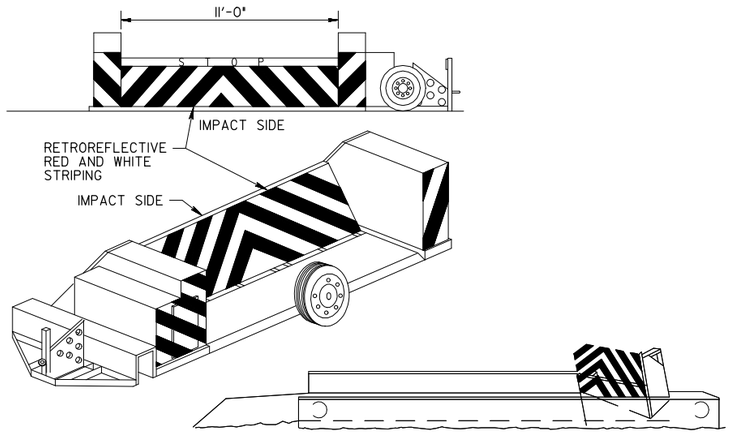
MANUFACTURER: D,N, I, BBA & C

COMMENT: DESIGN CAPACITY = 0.45 TO 1.3 MILL. FT. LBS



SHALLOW FOUNDATION AND SURFACE MOUNT BARRIERS

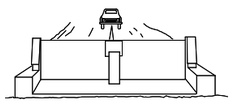
NOT TO SCALE

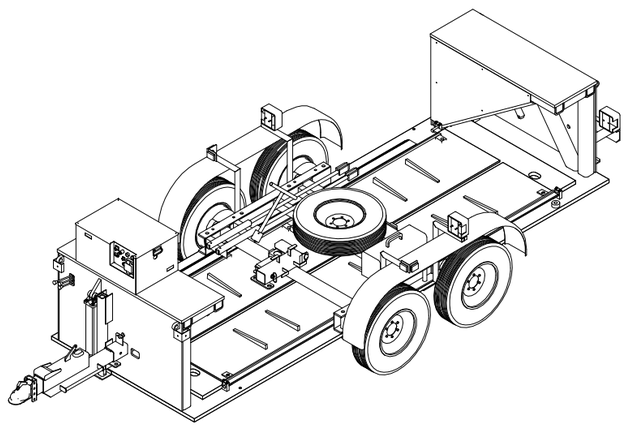


BARRIER RATING: CONDITION DESIGNATION K4 & KI2

OPERATION: PORTABLE VEHICLE BARRIER, N & D MODELS CAN BE SPECIFIED FOR MANUAL OR HYDRAULIC OPERATION

MANUFACTURER: BBA (K4), C (KI2), N & D (K4)





PORTABLE ACTIVE VEHICLE BARRIERS

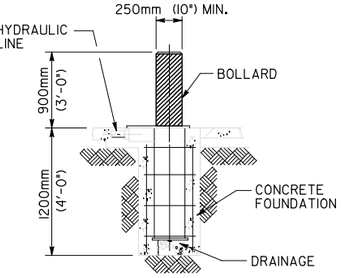
NOT TO SCALE

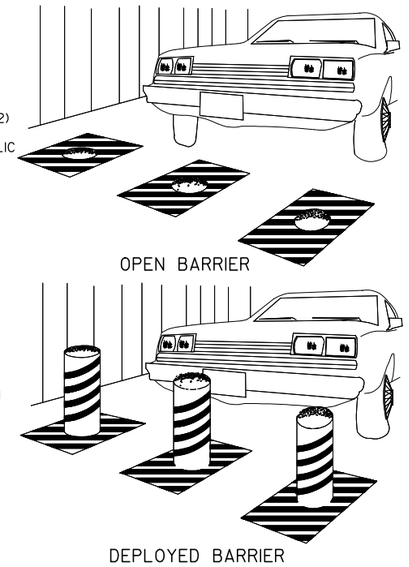
BARRIER RATING: CONDITION DESIGNATION K4, K8, KI2

OPERATION: THE BOLLARDS RISE FROM THE ROADWAY

MANUFACTURER: D (K4, K8, KI2), BBA (K8), I (K4), N (KI2), NO (K4, K8), P (KI2), NITS (KI2)

COMMENT: DEPLOYMENT SPEED VARIES WITH HYDRAULIC OR PNEUMATIC OPERATORS





OPEN BARRIER

DEPLOYED BARRIER

BOLLARDS

NOT TO SCALE

REFERENCE MATERIAL

DEPT. OF STATE, D.O.S., SD-SDT-02.01: SPECIFICATION FOR VEHICLE CRASH TESTING OF PERIMETER BARRIERS AND GATES

UFC 4-020-01/UFC 4-020-02 SECURITY ENGINEERING PLANNING AND DESIGN MANUALS

UFC 4-022-01 ENTRY CONTROL FACILITIES/ACCESS CONTROL POINTS

UFC 4-022-03 SECURITY ENGINEERING: DESIGN OF SECURITY FENCING, GATES, BARRIERS, AND GUARD FACILITIES.

UFC 4-022-02 SECURITY ENGINEERING: DESIGN AND SELECTION OF VEHICLE BARRIERS

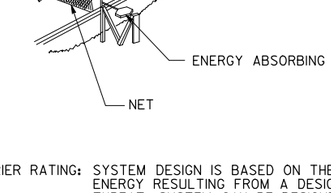
ACTIVE VEHICLE BARRIERS

CAUTION: THE FORCE OF IMPACT CONDITIONS BASED ON A RANGE OF ANY VEHICLE RAMMING THESE BARRIERS AT SPEEDS ABOVE 20 MPH MAY BE LETHAL TO THE OCCUPANTS OF THAT VEHICLE. CERTAIN CIRCUMSTANCES MAY RESULT IN FATALITIES AT SPEEDS SIGNIFICANTLY LOWER THAT 20 MPH. THEREFORE, EXTREME CAUTION MUST BE EXERCISED TO ENSURE THAT THEY ARE NOT ACTIVATED AT THE WRONG TIME.

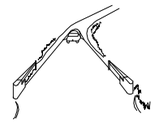
FOR LEGEND OF MANUFACURERS, DESIGN PARAMETERS, AND BARRIER SELECTION CRITERIA SEE SHEET C9.05.

BARRIER COSTS

BARRIER MANUFACTURERS LISTED ON SHEET C9.05 ARE LISTED WITH GENERAL SERVICES ADMINISTRATION (GSA) ON THEIR GSA PRICING SCHEDULE.



DEPLOYED BARRIER



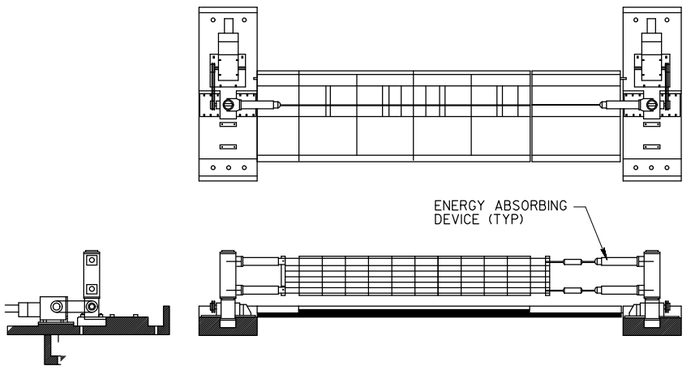
BARRIER ENGAGED

BARRIER RATING: SYSTEM DESIGN IS BASED ON THE KINETIC ENERGY RESULTING FROM A DESIGN VEHICLE THREAT. SYSTEM CAN BE DESIGNED TO STOP A PASSENGER CAR UP TO A TRACTOR TRAILER.

OPERATION: ENERGY OF RAMMING VEHICLE IS ABSORBED BY A NET OR CABLE SYSTEM.

MANUFACTURER: EN & USR (KI2)

COMMENT: BRINGS VEHICLE TO A STOP IN A SHORT DISTANCE.



NET BARRIERS

NOT TO SCALE

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Omaha District

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SYMBOL	DESCRIPTION	DATE	APPROVED

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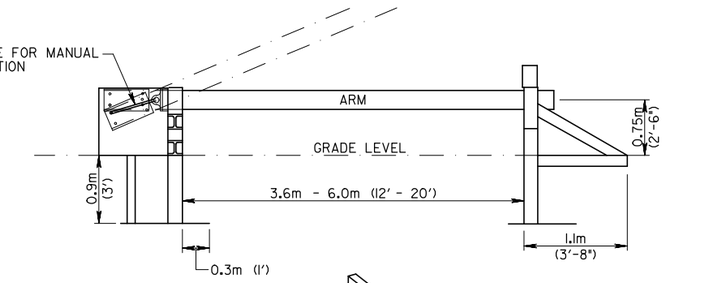
SPEC. NO.
CONTRACT NO.

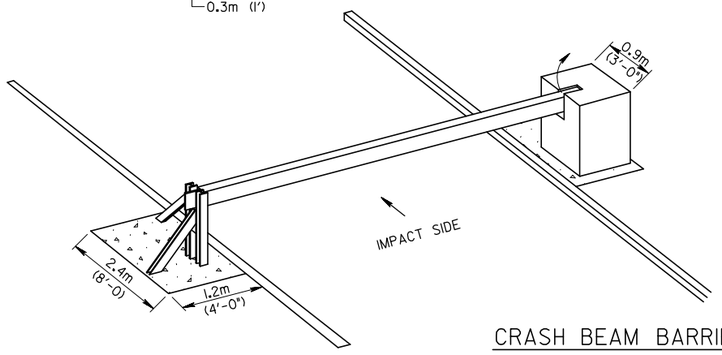
DESIGNED BY: GANNETT FLEMING
DWN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0001C904
PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD
CHIEF:
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

BARRIERS
ACTIVE VEHICLE BARRIERS

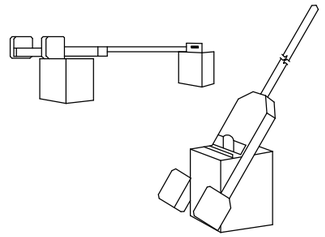
SHEET REFERENCE NUMBER
C9.04
SHEET 21 OF 40





CRASH BEAM BARRIERS

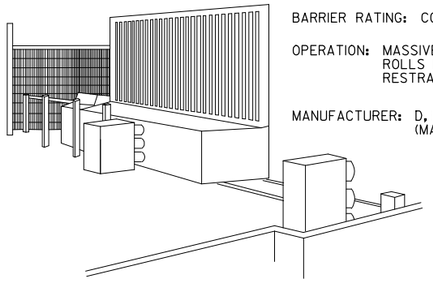
NOT TO SCALE



BARRIER RATING: MANUFACTURER TYPES RANGE FROM A 10,000 POUND VEHICLE TRAVELLING AT 15 MPH UP TO CONDITION DESIGNATION K12

OPERATION: MANUAL RASING AND LOWERING (OPTION FOR HYDRAULIC OR MOTOR OPERATION)

MAUFACTURER : N, NO, D & BBA



BARRIER RATING: CONDITION DESIGNATION K4 & K12

OPERATION: MASSIVE BASE WITH HEAVY RAILING SECTION ROLLS HORIZONTALLY INTO PLACE TO BE RESTRAINED BY HEAVY STANDARDS.

MANUFACTURER: D, BBA, TY(K4), NO(K4) & CBP (MANUAL OPERATED SWING GATE)

ANTI-CRASH GATE

NOT TO SCALE

IMPACT (KINETIC ENERGY)

$$\text{IMPACT ENERGY IN FT-LBS} = \frac{W \times V^2}{2 \times 32.2}$$

WHERE: W=VEHICLE WEIGHT IN POUNDS
V=VEHICLE SPEED IN FT/SEC

$$V^2 = \text{MPH} \times \frac{5280 \text{ FT}}{\text{MILE}} \times \frac{1 \text{ HOUR}}{3600 \text{ SECONDS}}$$

OR

$$KE = 0.03344 \times W \times V^2$$

WHERE: KE=KINETIC ENERGY MEASURED IN FOOT-POUNDS
W=VEHICLE WEIGHT IN POUNDS
V=VEHICLE SPEED IN FT/SEC

NOTE:

THE DESIGN CAPACITY OF EACH BARRIER IS CURRENT WITH THE PREPERATION OF THESE DRAWINGS, VARIOUS GOVERNMENT AGENCIES ARE DEVELOPING DESIGN STANDARDS TO APPLY TO THESE BARRIERS.

MANUFACTURERS

THE BARRIER SHOWN ON THESE DRAWINGS ARE COMMERCIALLY AVAILABLE. SOME HAVE BEEN TESTED, AND TEST DATA IS AVAILABLE FROM THE MANUFACTURERS.

THE FOLLOWING MANUFACTURERS OF VEHICLE BARRIERS HAVE BEEN IDENTIFIED. UNDOUBTEDLY THERE ARE MANY OTHERS. THE FOLLOWING ARE BARRIER MANUFACTURERS THAT HAVE PRODUCTS TESTED TO STATE DEPT CRITERIA. THEY ARE LISTED TO PROVIDE POTENTIAL USERS WITH SOURCES OF INFORMATION

SYMBOL	MANUFACTURER
C	CRISP & ASSOCIATES SECURITY DESIGN GROUP 272 AIRPORT ROAD OLIVER SPRINGS, TN 37840 (865) 435-6602
D	DELTA SCIENTIFIC CORP 24901 WEST AVENUE STANFORD VALENCIA, CA 91355 (661) 257-1800
EN	ENTWISTLE CO HUDSON, MA (617) 481-4800
P	PERIMETER DEFENSE TECHNOLOGIES P.O. BOX 473 MIDLAND, TX 79701 (915) 687-1033
BBA	B & B ARMR 2724 DORR AVE, BAY #4 FAIRFAX, VA 22031 (703) 876-9844
N	NASTKA BARRIER INC 8405 DANGERFIELD PLACE CLINTON, MD 20735-2814 (310) 868-0301
NO	NORSHIELD SECURITY PRODUCTS 3224 MOBILE HIGHWAY MONTGOMERY, AL 36108 (334) 286-4348
I	INTEREX COMPANIES 25322 RYE CANYON ROAD VALENCIA, CA 91355-1209 (661) 702-2222
CBP	CREATIVE BUILDING PRODUCTS 6409 HIGHVIEW DRIVE FORT WAYNE, IN 46818 1-800-830-0245
AM	AMERISTAR 1555 N MINGO TULSA, OK 74116 1-800-321-8724
USR	USR, INC (UNIVERSAL SAFETY RESPONSE, INC) P.O. BOX 3934 CHARLOTTEVILLE, VA 22902-0934 (434) 244-8772
TY	TYMETAL CORP 2566 STATE ROUTE 40 GREENWICH, NY 12834 1-800-328-4283
NITS	NATIONAL INTELLIGENT TRAFFIC SYSTEMS 5131 POST RD. DUBLIN, OH 43017 (614) 526-3231

DESIGN PARAMETERS

A VEHICLE MOVING TOWARD A BARRIER HAS KINETIC ENERGY DETERMINED BY THE VEHICLES WEIGHT AND SPEED. ON IMPACT WITH THE BARRIER, SOME OF THIS ENERGY IS CONVERTED TO HEAT, SOUND, AND PERMANENT DEFORMATION OF THE VEHICLE. THE REMAINDER OF THE KINETICE ENERGY MUST BE ABSORBED BY THE BARRIER IF THE VEHICLE IS TO BE STOPPED. THE KINETIC ENERGY OF A VEHICLE VARIES LINERARLY WITH THE VEHICLE'S WEIGHT AND BY THE SQUARE OF IT'S SPEED. THUS SPEED IS MORE OF A DETERMINATE OF THE KINETIC ENERGY OF A VEHICLE THAN IT'S WEIGHT. THE STANDARD ILLUSTRATION IS THE VW TRAVELING AT 60 MPH HAVING MORE HITTING POWER THAN AN ARMORED CAR WEIGHING 30 TIMES THE VW BUT ONLY TRAVELING AT 10 MPH. IF THE VEHICLE'S WEIGHT AND SPEED EXCEED THE DESIGN PARAMETER OF A BARRIER, ONE OF TWO EVENTS WILL OCCUR. THE BARRIER MAY BREAK LOOSE FROM IT'S RESTRAINTS ALLOWING THE VEHICLE TO CONTINUE WITH MINIMAL DAMAGE. HOWEVER, IF THE BARRIER CAUSES SUFFICIENT DAMAGE TO THE VEHICLE OR THE OCCUPANTS BEFORE IT FAILS, THE VEHICLE WILL BE UNABLE TO CONTINUE. BARRIERS LIKE CHAIN LINK GATES WILL FAIL IN THE FORMER MANNER. HOWEVER, BARRIERS DESIGNED FOR A DEFINED VEHICLE THREAT WILL FAIL IN THE SECOND MANNER. IF A BARRIER IS DAMAGED TO THE POINT WHERE IT MUST BE REPLACED OR IT'S CONCRETE HOUSING REPAIRED, THE LOSS WILL BE SLIGHT.

BARRIER SELECTION

THESE STANDARD DRAWINGS SHOW ACTIVE AND PASSIVE BARRIERS. THE SELECTION OF BARRIER TYPE IS LEFT TO LOCAL SECURITY PLANNERS. BASE SELECTION ON THE DEFINED THREAT, THE TERRAIN ENCOUNTERED, THE SPEED OF DEPLOYMENT, AND THE INITIAL COST OF THE BARRIERS. ALSO CONSIDER FACTORS SUCH AS ANNUAL MAINTENANCE COST, REPLACEMENT OR REPAIR COST SHOULD THE BARRIER EVER BE USED, AND THE SAGETY OF INNOCENT PERSONS WHO COULD POTENTIALLY BE CAUGHT IN THE BARRIER WHEN IT IS DEPLOYED. THESE BARRIERS REPRESENT A LETHAL FORCE TO THE ONCOMING VEHICLE. IF ONE OF THESE BARRIERS IS DEPLOYED TO HALT THE THREAT, ALL OTHER TRAFFIC WILL ENCOUNTER THE SAME LETHAL BARRIER QUITE UNEXPECTEDLY. THE WIDTHS OF SOME BARRIERS MAY BE VARIED, OTHERS MAY BE PROVIDED IN GREATER OR LESSER MULTIPLES. THESE CHANGES WILL VARY THE COST OF THE BARRIERS AND THEIR EFFECTIVENESS AGAINST SOME THREATS.

STATE DEPARTMENT CONDITION DESIGNATION

K4 = 15,000 POUND VEHICLE TRAVELING AT 48 KPH (30 MPH)

K8 = 15,000 POUND VEHICLE TRAVELING AT 64 KPH (40MPH)

K12 = 15,000 POUND VEHICLE TRAVELING AT 80 KPH (50 MPH)

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
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CAMP HILL, PA 17011-2316
(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

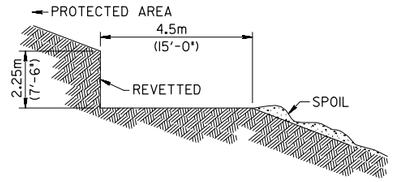
REV.	SPEC. NO.	CONTRACT NO.
--		

DESIGNED BY: GANNETT FLEMING	DATE: X	PLOT SCALE RATIO: NO SCALE	DRAWING CODE: DEF872-50-01
DWN BY: JAC	DESIGN FILE NO. 00012905		
CKD BY: RJT			
REVIEWED BY: USACE-OD			
SUBMITTED BY: USACE-OD CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

BARRIERS
ACTIVE VEHICLE BARRIERS

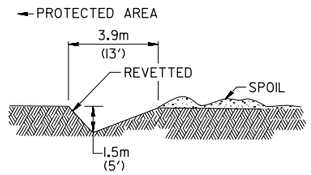
SHEET REFERENCE NUMBER
C9.05
SHEET 22 OF 40



DESCRIPTION: THE SIDEHILL CUT DITCH IS A VARIATION OF THE TRIANGULAR DITCH ADAPTED TO HILLY LOCATIONS. THESE DITCHES ARE RELATIVELY EASY TO CONSTRUCT; HOWEVER, A VEHICLE STOPPED IN THE DITCH CAN BACK OUT AND TRY ANOTHER ROUTE. SIDEHILL CUT DITCHES ARE USUALLY APPROXIMATELY 2.25m (7.5') DEEP AND 4.5m (15') WIDE, BUT THESE DIMENSIONS CAN BE VARIED TO MAKE THE BEST USE OF THE NATURAL TERRAIN.

SIDEHILL CUT DITCH

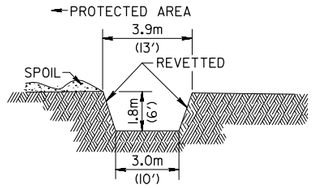
NOT TO SCALE



DESCRIPTION: THE TRIANGULAR DITCH CAN BE CUT INTO THE EARTH TO PREVENT VEHICLES FROM APPROACHING A FACILITY. THIS TYPE OF DITCH IS RELATIVELY EASY TO CONSTRUCT; HOWEVER, A VEHICLE STOPPED IN THE DITCH CAN USUALLY BACK OUT AND TRY ANOTHER ROUTE. TRIANGULAR DITCHES ARE APPROXIMATELY 1.5m (5') DEEP AND 3.9m (13') WIDE.

TRIANGULAR DITCH

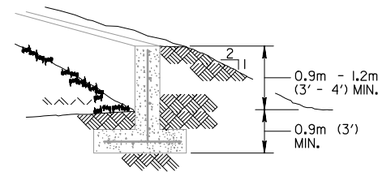
NOT TO SCALE



DESCRIPTION: THE TRAPEZOIDAL DITCH CAN BE CUT INTO THE EARTH TO ENTRAP VEHICLES AND THUS PREVENT THEM FROM ENTERING A FACILITY. THIS TYPE OF DITCH TAKES APPROXIMATELY TWICE AS LONG TO CONSTRUCT AS THE TRIANGULAR OR SIDEHILL CUT DITCHES, BUT ARE A MUCH MORE EFFECTIVE BARRIER. TRAPEZOIDAL DITCHES ARE APPROXIMATELY 1.8m (6') DEEP AND 3.9m (13') WIDE AT THE TOP.

TRAPEZOIDAL DITCH

NOT TO SCALE



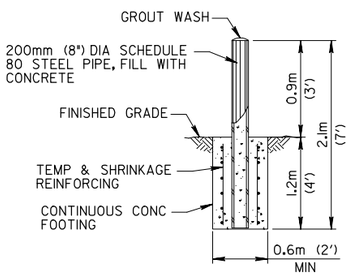
BARRIER RATING: NOT TESTED

CONSTRUCTION: CONCRETE RETAINING WALL BACKED UP WITH EARTH BERM, WALL FACES THREAT.

COMMENT: NONE

BERM @ RETAINING WALL

NOT TO SCALE



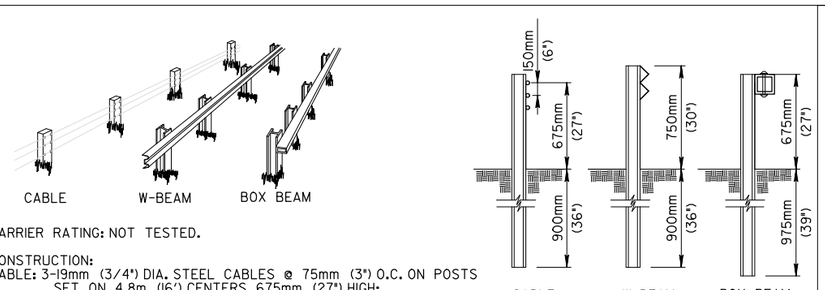
NOTE: KINETIC ENERGY RATING IS DEPENDANT ON BOLLARD SPACING

CONSTRUCTION: 200mm (8") DIA. STEEL PIPE FILLED WITH CONCRETE SET IN CONCRETE FOOTING, LOCATED 0.9m (3') ON CENTER FOR 90° IMPACT AND 1.2m (4') ON CENTER FOR PARALLEL TRAFFIC FLOW. (K.E. RATING OF 135,000 FT. LBS.)

COMMENT: MAY BE MADE REMOVABLE. A STEEL CABLE RUNNING THROUGH OR LOOPED OVER THESE POSTS MAY BE USED TO EXCLUDE MOTORCYCLES.

BOLLARDS

NOT TO SCALE



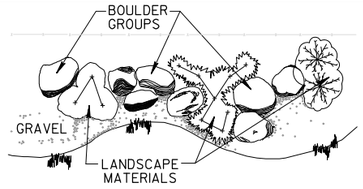
BARRIER RATING: NOT TESTED.

CONSTRUCTION:
CABLE: 3-19mm (3/4") DIA. STEEL CABLES @ 75mm (3") O.C. ON POSTS SET ON 4.8m (16') CENTERS, 675mm (27") HIGH;
W-BEAM: CORRUGATED W BEAM ON POSTS SET ON 1.8m (6') CENTERS, 675mm - 750mm (27" - 30") HIGH;
BOX BEAM: 150X150 (6X6) OR 150X200 (6X8) STEEL TUBE ON POSTS SET 1.2m - 1.8m (4' - 6') APART; 675mm (27") HIGH.

COMMENT: NOT DESIGNED TO PREVENT HEAD-ON PENETRATION; WILL IMMOBILIZE A LIGHTWEIGHT VEHICLE ATTEMPTING INTRUSION.

GUARDRAILS

NOT TO SCALE



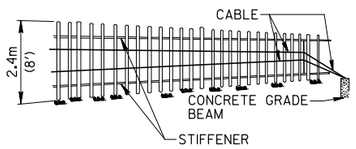
BARRIER RATING: MASS ALONE IS EFFECTIVE AGAINST A VEHICLE THREAT.

CONSTRUCTION: GROUPINGS OF LARGE BOULDERS, MINIMUM OF 2268kg (2.5 TONS) EACH BOULDER, SOME PARTIALLY BURIED IN THE GROUND, GROUPS NOT MORE THAN 1.2m (4') APART.

COMMENT: COST EFFECTIVE IF NATURAL MATERIAL IS READILY AVAILABLE.

BOULDERS

NOT TO SCALE



BARRIER RATING: K8

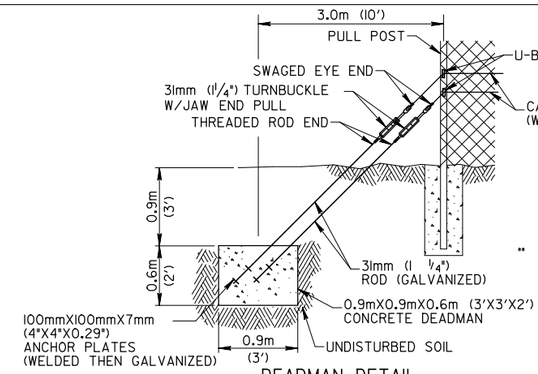
CONSTRUCTION: IMPROVED STEEL FENCE.

MANUFACTURER: AM

COMMENT: MINIMUM DEADMAN SPACING OF 60.0m (200')

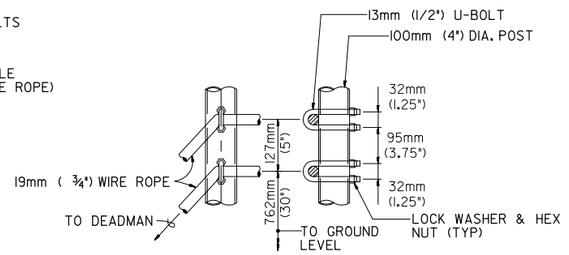
REINFORCED ORNAMENTAL FENCE

NOT TO SCALE



DEADMAN DETAIL

NOT TO SCALE



U-BOLT AT CABLE PULL POST DETAIL

NOT TO SCALE

BARRIER RATING: LESS THAN K4

COMMENT: MINIMUM DEADMAN SPACING OF 60.0m (200')

REINFORCED CHAIN-LINK SECURITY FENCE

NOT TO SCALE

PASSIVE BARRIERS

VEHICLE BARRIER

A BARRIER IS PASSIVE IF ITS EFFECTIVENESS RELIES ON ITS BULK, MASS, OR POSITION. PASSIVE BARRIERS HAVE NO MOVING PARTS. A BARRIER IS ACTIVE IF IT REQUIRES ACTION BY PERSONNEL OR EQUIPMENT TO PERMIT OR DENY ENTRY. ACTIVE BARRIERS ARE THOSE DEVICES USED TO CONTROL ACCESS THROUGH A GATE OR ENTRANCE. PASSIVE BARRIERS ARE USED TO CHANNEL THE FLOW OF TRAFFIC TO PREVENT VEHICLES FROM BYPASSING ENTRY POINTS.

SELECTION OF PASSIVE BARRIERS

IN THESE CONCEPTS, BARRIERS SUCH AS BOLLARDS (BOTH VERTICAL AND ANGLED), CONCRETE SHAPES SET IN STRATEGIC LOCATIONS, DITCHES OR MOATS, BARRIER WALLS, EARTH-FILLED BARRIERS, AND JERSEY BARRIERS HAVE BEEN ENVISIONED. HOWEVER, SPECIFIC PASSIVE BARRIERS HAVE NOT BEEN IDENTIFIED. THE SELECTION OF A SPECIFIC BARRIER IS LEFT TO THE LOCAL SECURITY PLANNERS. SELECT BARRIERS BASED ON THE THREAT IDENTIFIED, THE TERRAIN ENCOUNTERED, THE VISUAL APPEARANCE DESIRED, AND THE BUDGET FOR THE BARRIERS. ALSO CONSIDER MAINTENANCE COSTS INCLUDING REMOVAL OF PLANT GROWTH, TRASH AND SNOW REMOVAL; REPAIR OR REPLACEMENT COSTS IF THE BARRIER IS BREACHED; EASE OF RELOCATING THE BARRIER; AND THE HAZARD PRESENTED TO INNOCENT PERSONNEL WHO MAY ACCIDENTALLY STRIKE THE BARRIER.

ADDITIONAL NOTES

APPEARANCE IS A MAJOR CONSIDERATION WHEN SELECTING PASSIVE BARRIERS.

THE INSTALLATION OF BARRIERS AROUND A SITE WILL NOT PREVENT PENETRATION OF THE SITE BY UNAUTHORIZED PERSONNEL. GIVEN TIME, ANY OF THESE BARRIERS MAY BE PENETRATED. THE BARRIERS DO PREVENT EASY MOBILE ACCESS FROM BOTH OUTSIDE AND INSIDE, DO DELAY BREACHING, AND DO DEMONSTRATE AN ADVERSARY'S INTENT. PLACING BARRIERS NEAR THE OUTSIDE PERIMETER FORCES THE ADVERSARY TO HAND CARRY HIS WEAPON TO HIS TARGET.

THESE PASSIVE BARRIERS ARE TO BE USED AT THE MAIN ENTRY POINTS. MANY WILL NOT EXCLUDE PERSONNEL ON FOOT OR ON MOTORCYCLES. IF THESE BARRIERS ARE UNDER THE OBSERVATION OF GUARD PERSONNEL, PROTECTION AGAINST MOTORCYCLES AND PEDESTRIANS MAY NOT BE NECESSARY. OTHERWISE THOSE BARRIERS SHOULD BE SUPPLEMENTED TO EXCLUDE THESE THREATS.

IN ADDITION TO THE PROBLEMS OF PLANT GROWTH, WINDBLOWN TRASH, AND SNOW, DETECTION SENSOR LOCATIONS AND VIDEO ASSESSMENT POSITIONS MUST BE CONSIDERED WHEN ADDING PASSIVE BARRIERS TO A SITE. ALSO PASSIVE BARRIERS MAY BE USED BY AN ADVERSARY FOR FIRING POSITIONS OR CONCEALMENT. GROWTH CHARACTERISTICS OF PLANTS USED IN PLANTERS MUST BE CONSIDERED TO AVOID OBSTRUCTING THE GUARD'S VIEWS OF ONCOMING TRAFFIC.

REFERENCE MATERIAL

1. DEPT. OF STATE, D.O.S., SD-SDT-02.01: SPECIFICATION FOR VEHICLE CRASH TESTING OF PERIMETER BARRIERS AND GATES
2. UFC 4-020-01 SECURITY ENGINEERING: PLANNING MANUAL
3. UFC 4-020-02 SECURITY ENGINEERING: DESIGN MANUAL
4. UFC 4-022-01 ENTRY CONTROL FACILITIES/ACCESS CONTROL POINTS
5. UFC 4-022-03 SECURITY ENGINEERING: DESIGN OF SECURITY FENCING, GATES, BARRIERS, AND GUARD FACILITIES
6. UFC 4-022-02 SECURITY ENGINEERING: DESIGN AND SELECTION OF VEHICLE BARRIERS

RELATED DRAWINGS

STD 872-90-00 STANDARD DETAILS FOR CHAIN-LINK SECURITY FENCES, FARM STYLE FENCES AND A DOUBLE CABLE BARRIER

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

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Omaha District

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SYMBOL	DESCRIPTION	DATE	APPROVED

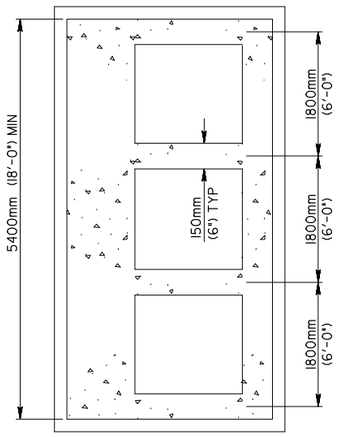
REV.	SPEC. NO.	CONTRACT NO.
--		

DESIGNED BY: GANNETT FLEMING	DATE: X	
DWN BY: JAC	CKD BY: RJT	DESIGN FILE NO. 0D01C906
REVIEWED BY: USACE-OD		PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD		DRAWING CODE: DEF872-90-01
CHIEF:		

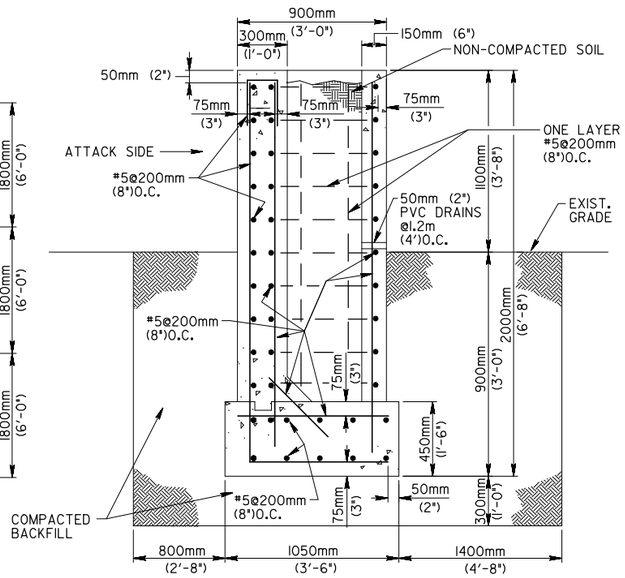
DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

BARRIERS
PASSIVE VEHICLE BARRIERS

SHEET REFERENCE NUMBER
C9.06
SHEET 23 OF 40



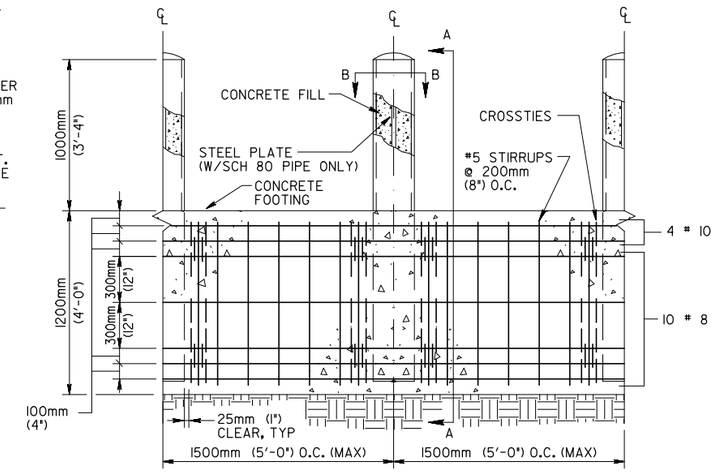
PLAN



SECTION

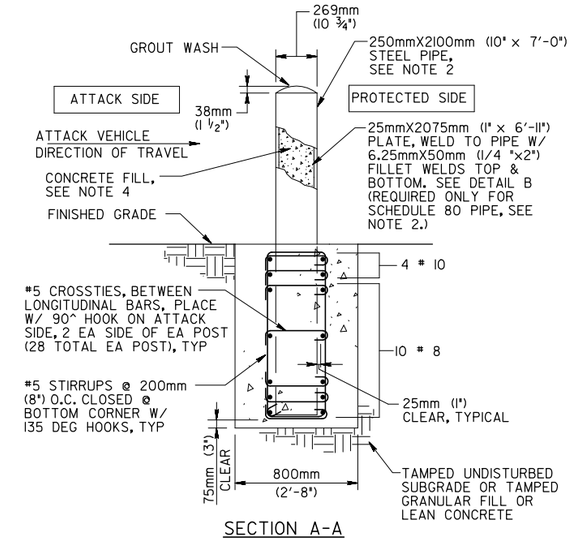
DS-9 PLANTER; KI2 RATING

NOT TO SCALE



ELEVATION (ATTACK SIDE)

NOT TO SCALE

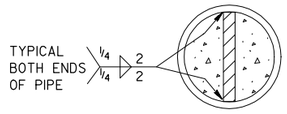


SECTION A-A

NOT TO SCALE

NOTES:

1. REINFORCING SHALL BE ASTM A-615, Fy = 60 KSI.
2. STEEL PIPE SHALL BE ASTM A-53 GRADE B, Fy = 36 KSI
   OPTION 1: SCHEDULE 140 (25mm (I") WALL THICKNESS)
   OPTION 2: SCHEDULE 80 (12mm (½") WALL THICKNESS) WITH 25mmX2075mm (I"X83") PLATE (SEE DETAILS).
3. STEEL PLATE SHALL BE ASTM A-36, Fy = 36 KSI.
4. CONCRETE MINIMUM F'c = 24,130 kPa (3500 PSI) IN ACCORDANCE WITH ASTM C31, C39 AND C470.
5. SOILS SHALL BE COMPACTED TO 90% MAXIMUM DENSITY.
6. STAGGERED CLASS A TENSION SPLICES SHALL BA ALLOWED FOR HORIZONTAL REINFORCING.
7. CROSSTIES SHALL HAVE STANDARD 90° AND 180° BENDS AND SHALL BE PLACED WITH 90° BEND TOWARD THE ATTACK SIDE OF THE FOOTING. PROVIDE 7 PAIRS OF CROSSTIES COMBINED WITH FIRST STIRRUP EACH SIDE OF EACH BOLLARD (SEE ELEVATION).



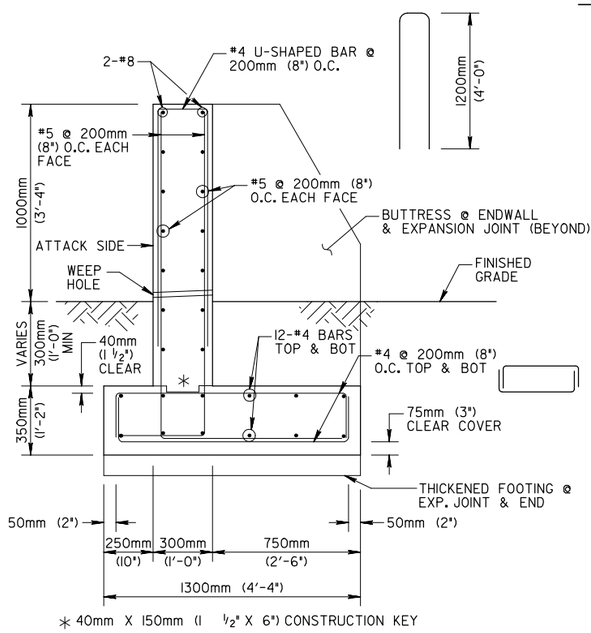
WELD STEEL PLATE WITHIN STEEL PIPE PARALLEL TO VEHICLE TRAVEL DIRECTION. PLATE REQUIRED ONLY FOR SCHEDULE 80 PIPE. (SEE NOTE 2, OPTION 2)

SECTION B-B

NOT TO SCALE

ANTI-RAM WALL; KI2 RATING

NOT TO SCALE



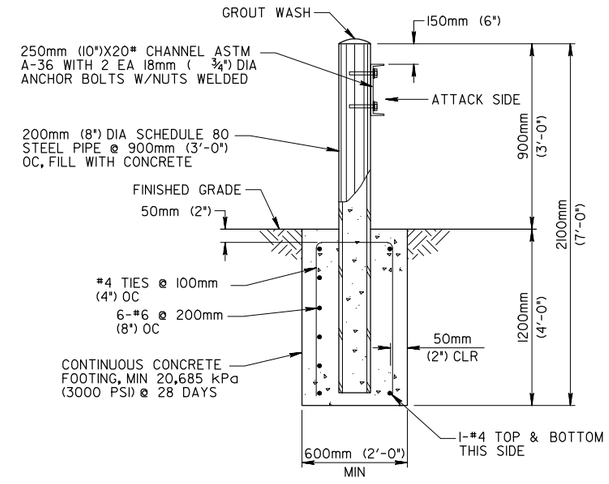
* 40mm X 150mm (I ½" X 6") CONSTRUCTION KEY

DS-50 IMETER ANTI-RAM KNEE WALL

NOT TO SCALE

DS-22 BOLLARD; KI2 RATING

NOT TO SCALE



DS-3 BOLLARD W/C CHANNEL RAIL; KI2 RATING

NOT TO SCALE

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
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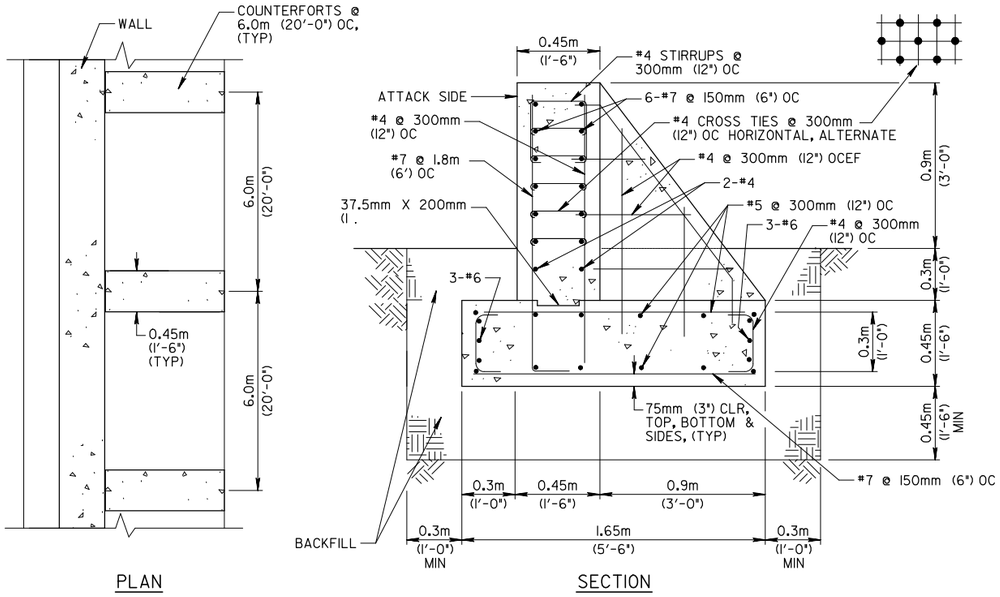
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	DATE: X	REV.: -	
DWN BY: JAC	CKD BY: RJT	DESIGN FILE NO. 00D1C907	SPEC. NO.
REVIEWED BY: USACE-OD		PLOT SCALE RATIO: NO SCALE	CONTRACT NO.
SUBMITTED BY: USACE-OD		DRAWING CODE: DEF872-50-01	
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

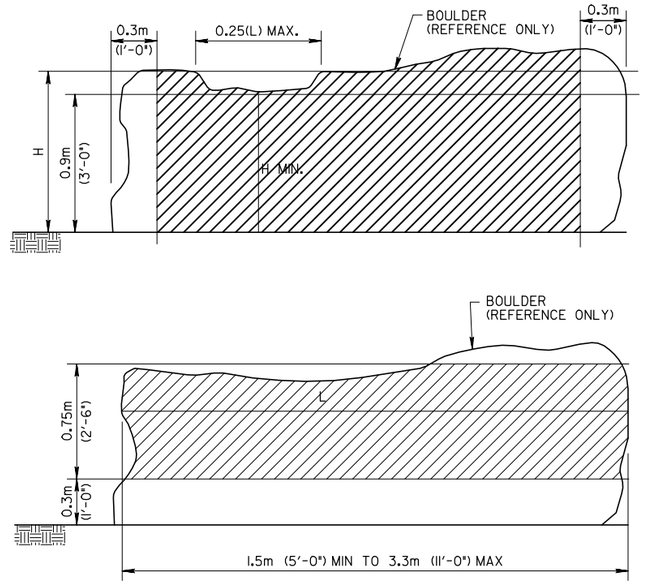
BARRIERS
PASSIVE VEHICLE BARRIERS

SHEET REFERENCE NUMBER
C9.07
SHEET 24 OF 40

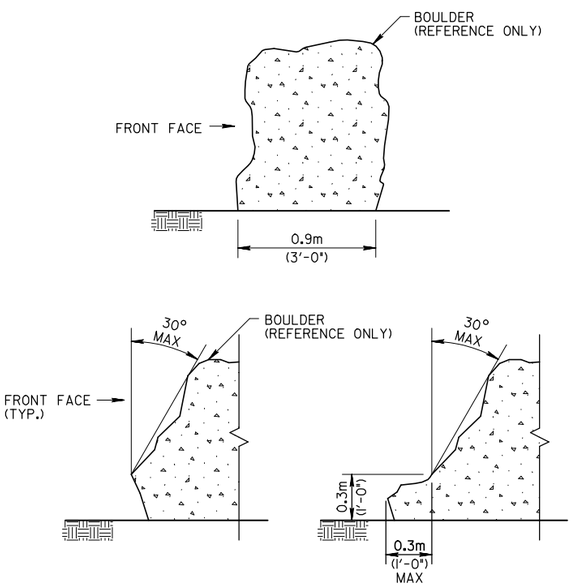


DS-6 COUNTERFORT WALL; K8 RATING

NOT TO SCALE



FRONT ELEVATIONS



SIDE ELEVATIONS

BOULDER CRITERIA

NOT TO SCALE

NOTES:

1. FOR PARALLEL TRAFFIC FLOW SPACING NOT TO EXCEED 1.2m (4'). FOR 90° APPROACH, NOT TO EXCEED .9m (3').
2. K4 RATING FOR A MINIMUM 5' BOULDER LENGTH.

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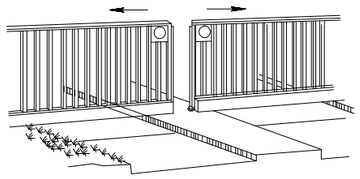
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	DATE: X	REV. --	
DWN BY: JAC / CKD BY: RJT	DESIGN FILE NO. 0001C908	SPEC. NO.	CONTRACT NO.
REVIEWED BY: USACE-OD	PLOT SCALE RATIO: NO SCALE		
SUBMITTED BY: USACE-OD / CHIEF:	DRAWING CODE: DEF872-50-01		

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

BARRIERS
PASSIVE VEHICLE BARRIERS

SHEET REFERENCE NUMBER
C9.08
SHEET 25 OF 40



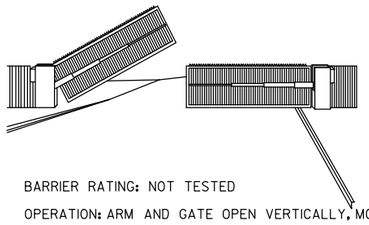
BARRIER RATING: NOT TESTED

OPERATION: GATE SLIDES HORIZONTALLY, MANUALLY OR MOTOR OPERATED

COMMENT: GREATER MASS OF LOWER SECTION AND RESTRAINT OF GATE SECTION IMPROVES EFFECTIVENESS

SLIDING GATE

NOT TO SCALE



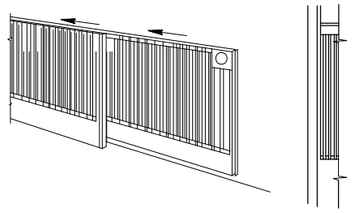
BARRIER RATING: NOT TESTED

OPERATION: ARM AND GATE OPEN VERTICALLY, MOTORIZED.

COMMENT: QUICK OPENING

VERTICAL LIFT GATE

NOT TO SCALE



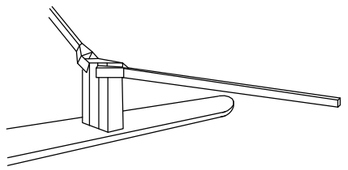
BARRIER RATING: NOT TESTED

OPERATION: MULTIPLE SECTIONS MOVE HORIZONTALLY, MANUALLY OR MOTOR OPERATED.

COMMENT: OPERATES FASTER THAN A NORMAL SLIDING GATE, HEAVY LOWER SECTION AND LATERAL RESTRAINT OF GATE IMPROVES ITS EFFECTIVENESS.

TELESCOPING GATE

NOT TO SCALE



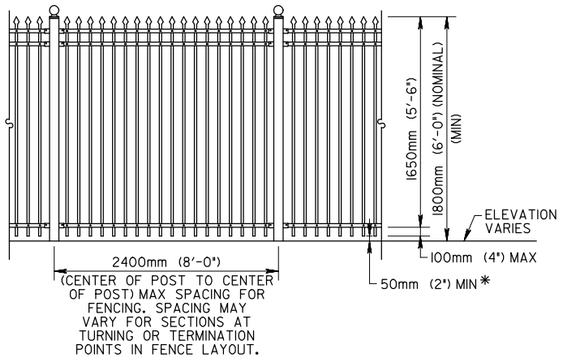
BARRIER RATING: NOT TESTED

OPERATION: BEAMED RAISED TO ALLOW TRAFFIC TO PASS, FREE END RESTRAINED.

COMMENT: USEFUL FOR TRAFFIC CONTROL ONLY.

TRAFFIC ARM

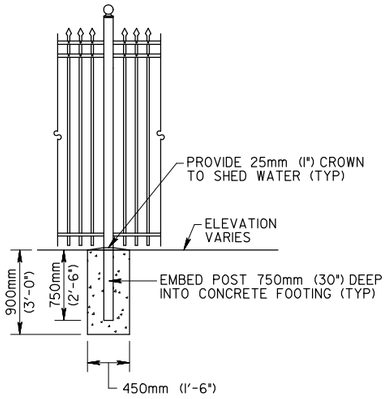
NOT TO SCALE



FENCING ELEVATION DETAIL

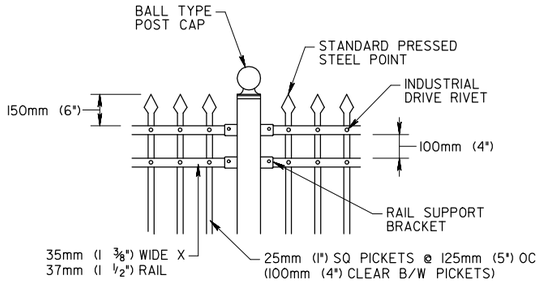
NOT TO SCALE

*CLEARANCE BETWEEN FENCE AND GROUND SHALL BE BETWEEN 50mm (2") MIN AND 100mm (4") MAX.



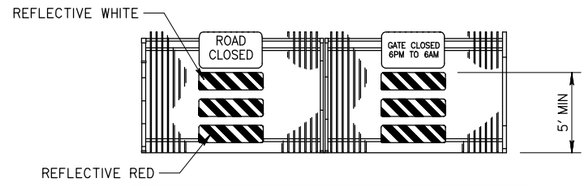
FENCE POST DETAIL

NOT TO SCALE



RAIL/POST DETAIL

NOT TO SCALE



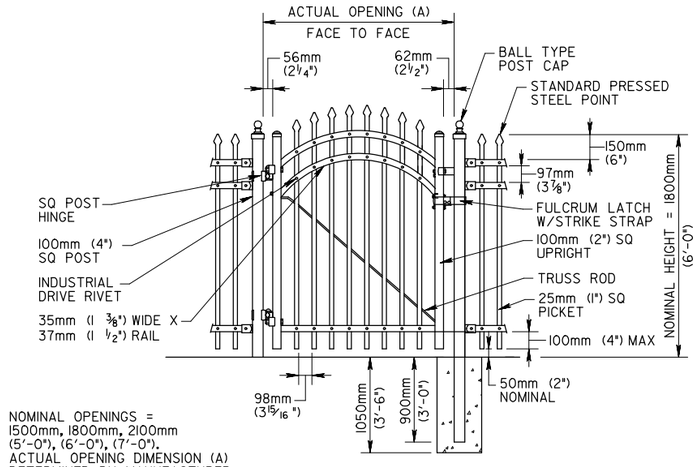
TYPE III BARRICADES

- TYPE III BARRICADES SHOULD BE USED DURING THE TIMES WHEN THE ACP IS CLOSED TO TRAFFIC
- A 'GATE CLOSED' SIGN LISTING THE HOURS OF OPERATION SHOULD BE INSTALLED PRIOR TO THE BARRICADE, AND AT THE BARRICADE AS WELL.

FOR ACPs THAT HAVE FIXED HOURS AND ARE MORE THAN ONE MILE AWAY FROM THE PRIMARY ROADWAY, INSTALL SIGNS SHOWING THE HOURS OF ACP OPERATION IN ADVANCE OF THE ACP.

SIGNAGE DETAIL FOR ENTRY GATE

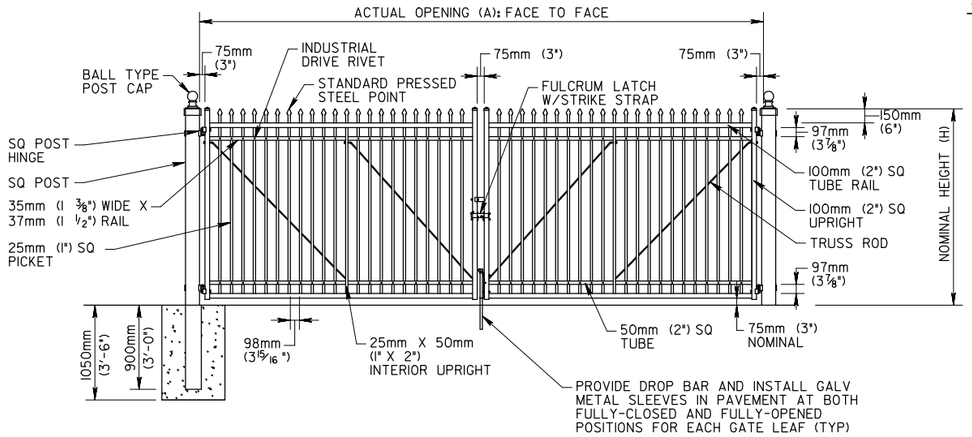
NOT TO SCALE



NOMINAL OPENINGS = 1500mm, 1800mm, 2100mm (5'-0"), (6'-0"), (7'-0"). ACTUAL OPENING DIMENSION (A) DETERMINED BY MANUFACTURER.

PERSONNEL SWING GATE DETAIL

NOT TO SCALE



ORNAMENTAL METAL FENCE DOUBLE SWING GATE ELEVATION DETAIL

NOT TO SCALE

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US Army Corps of Engineers
Omaha District

Gannett Fleming
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SYMBOL	DESCRIPTION	DATE	APPROVED

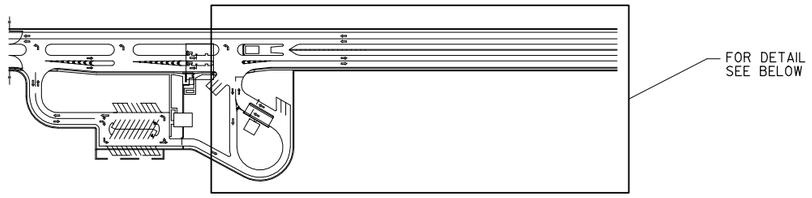
REV. —
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DWN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
SUBMITTED BY: USACE-OD
CHIEF:
DATE: X
DESIGN FILE NO. 0D01C809
PLOT SCALE RATIO: NO SCALE
DRAWING CODE: DEF872-50-01

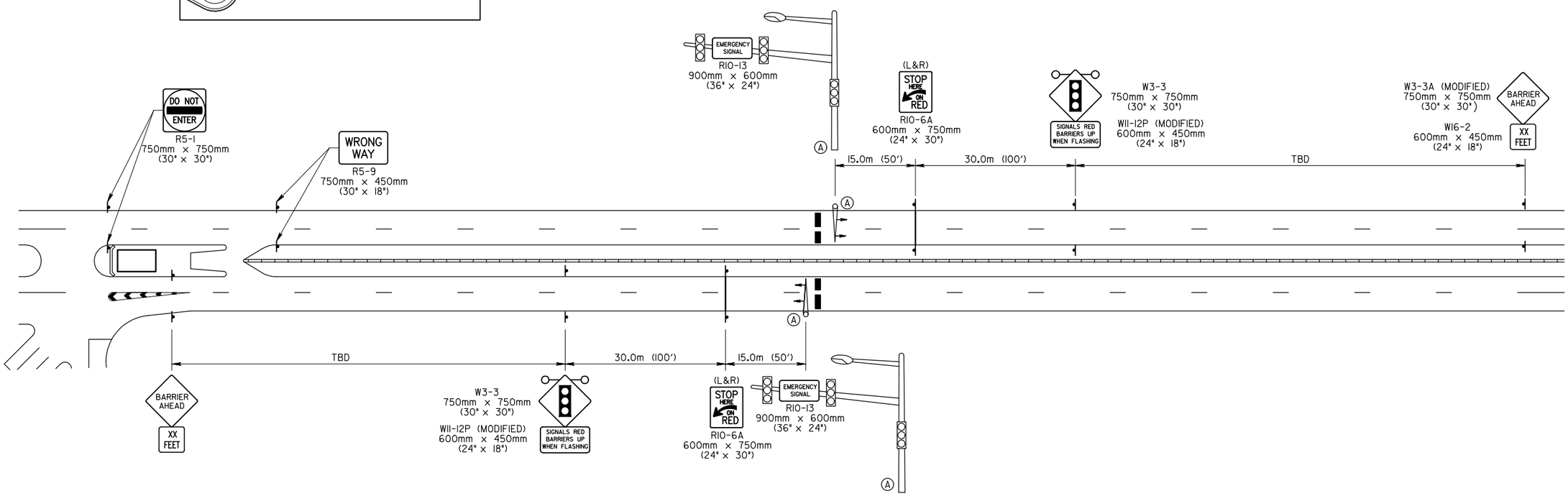
DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

GATES AND FENCES

SHEET REFERENCE NUMBER
C9.09
SHEET 26 OF 40



FOR DETAIL SEE BELOW



TRAFFIC CONTROL AND SAFETY AT ACTIVE BARRIERS	OPERATIONAL SEQUENCE PER SECOND (MIN FOR SAFETY - 40 KPH (25 MPH) DESIGN SPEED)											
	TRAFFIC CONTROL	--	1	2	3	4	5	6	7	8	9	10
		NORMAL OPS	GUARD PERCEPTION AND REACTION TIME TO THREAT (BUTTON)			YELLOW CLEARENCE (MUTCD MINIMUM)			ALL RED	DEPLOYING BARRIER		THREAT CONTAINED
SIGN AND SIGNAL WARNING SYSTEM	WARNING SIGN WITH BEACONS	BLANK	BLANK	BLANK	BLANK	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY	ALT FY
	TRAFFIC SIGNAL	FY	FY	FY	FY	Y	Y	Y	R	R	R	R
	IN-ROADWAY LIGHTS OR BARRIER	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	BLANK	FR	FR	FR	FR
	ACTIVE BARRIER	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	DOWN	ACTIVATED	ACTIVATED	DEPLOYED

LEGEND

- TRAFFIC FLOW PATTERN
- Y/100mm (4") PAINT STRIPE STYLE/WIDTH
- DY DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER OR ORNAMENTAL FENCE AS NOTED
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP

ACTIVE BARRIER SIGNS AND SIGNALS

NOT TO SCALE

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SYMBOL	DESCRIPTION	DATE	APPROVED

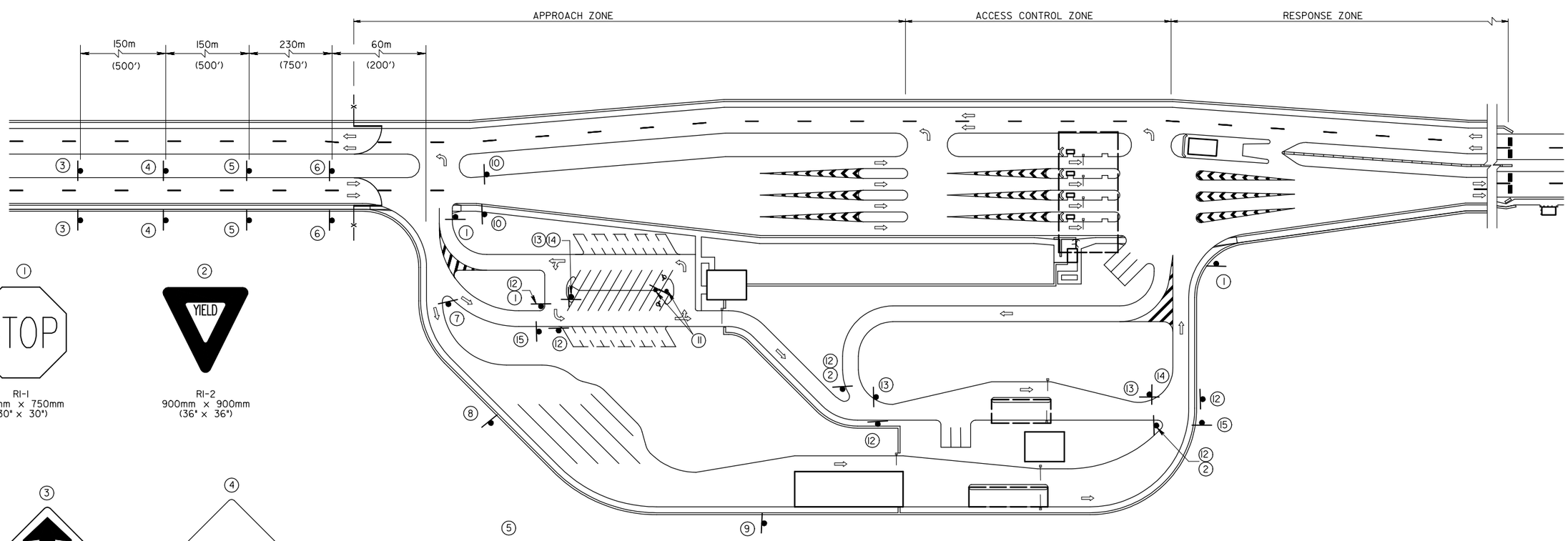
REV. --
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DRWN BY: JAC
CKD BY: RJT
REVIEWED BY:
SUBMITTED BY: USACE-OD
CHIEF:
DATE: X
DESIGN FILE NO. 0D01C910
PLOT SCALE RATIO: NO SCALE
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

ACTIVE BARRIER SIGNS AND SIGNALS

SHEET REFERENCE NUMBER
C9.10
SHEET 27 OF 40



PRIMARY ACP

WITH VCC AND COMMERCIAL VEHICLE

NOT TO SCALE

NOTES:

1. FOR SPEEDS GREATER THAN 40 KPH (25 MPH), SEE CURRENT MUTCD FOR SIGN DIMENSIONS.
2. SEE SHEET C9.09 FOR ACTIVE VEHICLE BARRIER SIGNING APPLICATIONS.
3. SIGN PLAN AND DETAILS ARE INTENDED TO PROVIDE GUIDANCE. THE FINAL SIGNING PLAN SHOULD BE DEVELOPED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

① STOP
R1-1
750mm × 750mm
(30" × 30")

② YIELD
R1-2
900mm × 900mm
(36" × 36")

③ SPEED LIMIT 25
W3-5(25)
900mm × 900mm
(36" × 36")

④ CHECKPOINT
(BLACK ON YELLOW)
900mm × 900mm
(36" × 36")

XXXX FEET
W16-2a
750mm × 600mm
(30" × 24")

⑤ SPEED LIMIT 25
R2-1(25)
600mm × 750mm
(24" × 30")

⑥ VISITORS → TRUCKS →
(BLACK ON WHITE)
1200mm × 600mm
(48" × 24")

⑦ ← VISITORS TRUCKS ↗
(BLACK ON WHITE)
1200mm × 600mm
(48" × 24")

⑧ HOLDING AREA
(BLACK ON WHITE)
600mm × 600mm
(24" × 24")

⑨ 16'-9" MAX HEIGHT
16'-0" MAX WIDTH
(BLACK ON WHITE)
1200mm × 600mm
(48" × 24")

⑩ 14'-3" MAX HEIGHT
10'-0" MAX WIDTH
(BLACK ON WHITE)
1200mm × 600mm
(48" × 24")

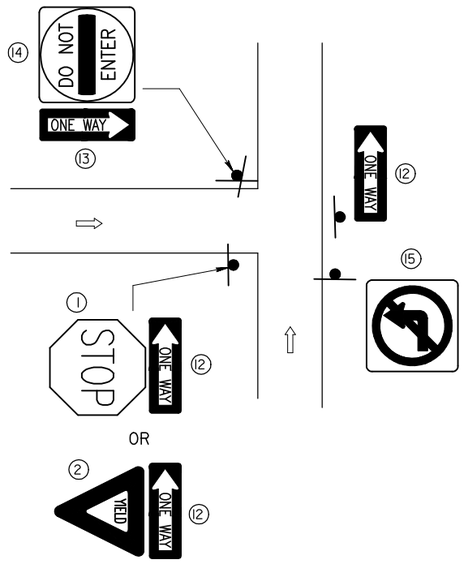
⑪ RESERVED PARKING
R7-8
600mm × 750mm
(24" × 30")

⑫ ONE WAY
R6-1L
900mm × 300mm
(36" × 12")

⑬ ONE WAY
R6-1R
900mm × 300mm
(36" × 12")

⑭ DO NOT ENTER
R5-1
750mm × 750mm
(30" × 30")

⑮
R3-2
600mm × 600mm
(24" × 24")



TYPICAL ONE WAY INTERSECTION SIGNING

NOT TO SCALE

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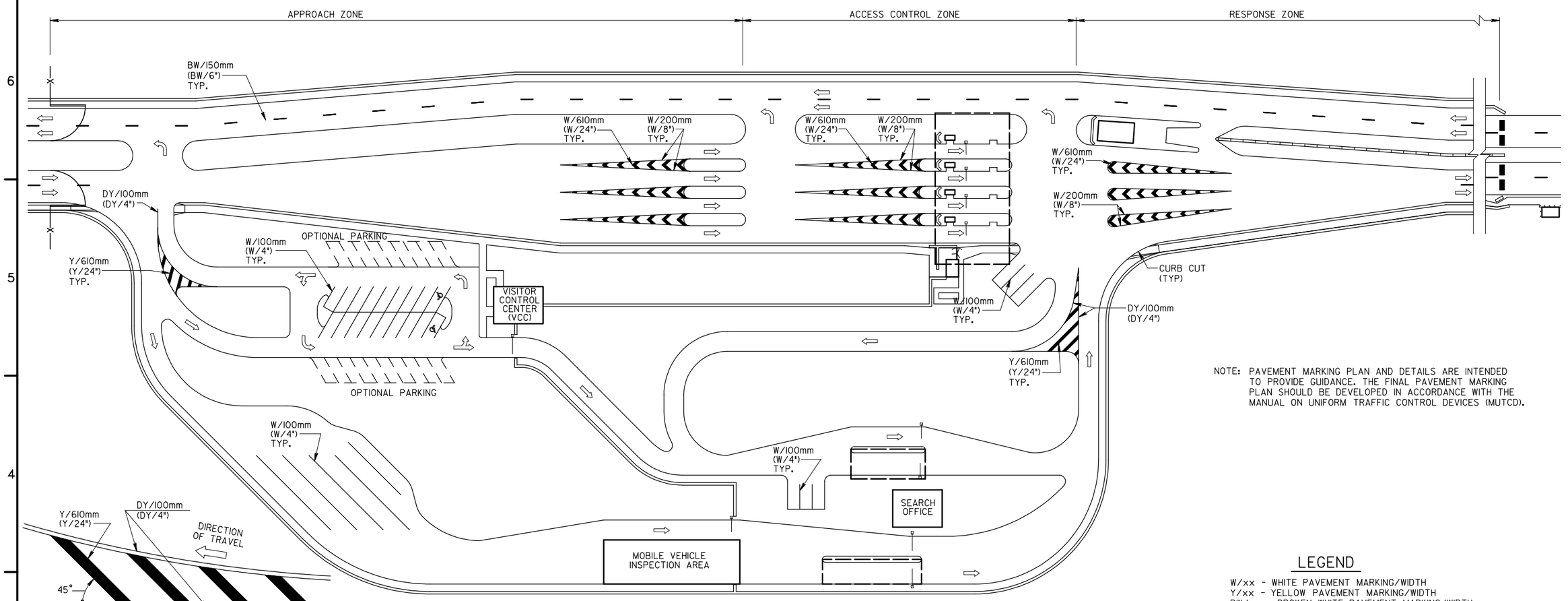
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	CKD BY: RJT	DATE: X	REV.: --
DWN BY: RJK		DESIGN FILE NO. OD01C911	SPEC. NO.
REVIEWED BY: USACE-OD		PLOT SCALE RATIO: NO SCALE	CONTRACT NO.
SUBMITTED BY: USACE-OD		DRAWING CODE: DEF872-50-01	
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
SIGN DETAILS AND TYPICAL SIGN LAYOUT

SHEET REFERENCE NUMBER
C9.11
SHEET 28 OF 40



TYPICAL ACP PAVEMENT MARKINGS

NOT TO SCALE

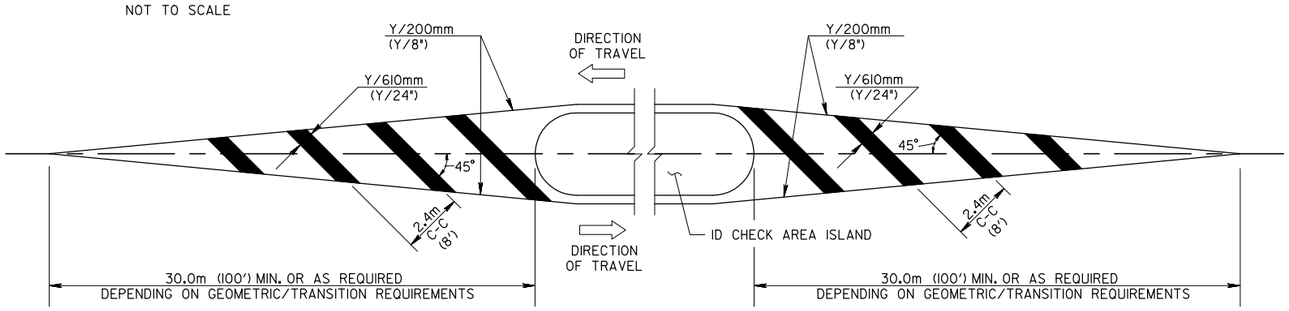
NOTE: PAVEMENT MARKING PLAN AND DETAILS ARE INTENDED TO PROVIDE GUIDANCE. THE FINAL PAVEMENT MARKING PLAN SHOULD BE DEVELOPED IN ACCORDANCE WITH THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).

LEGEND

W/xx - WHITE PAVEMENT MARKING/WIDTH
Y/xx - YELLOW PAVEMENT MARKING/WIDTH
BW/xx - BROKEN WHITE PAVEMENT MARKING/WIDTH
DY/xx - DOUBLE YELLOW PAVEMENT MARKING/WIDTH

45° GORE HATCHING

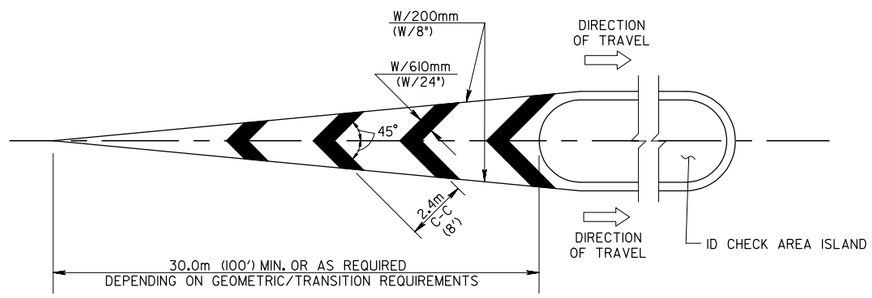
NOT TO SCALE



TYPICAL OBSTRUCTION MARKINGS

(OPPOSING DIRECTIONS)

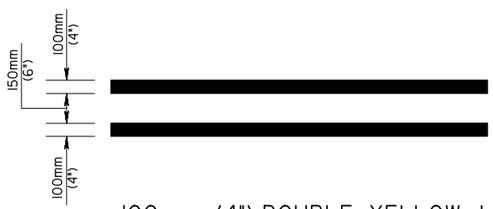
NOT TO SCALE
AS SHOWN ON SHEET C3.04



TYPICAL OBSTRUCTION MARKINGS

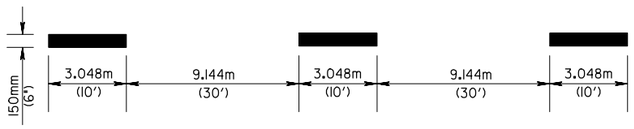
(SAME DIRECTION)

NOT TO SCALE



100mm (4") DOUBLE YELLOW LINE

NOT TO SCALE



150mm (6") BROKEN LANE LINE

NOT TO SCALE

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SYMBOL	DESCRIPTION	DATE	APPROVED

REV. --
SPEC. NO.
CONTRACT NO.

DESIGNED BY: GANNETT FLEMING
DWN BY: RJK
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0D01C912
PLOT SCALE RATIO: 1:300
SUBMITTED BY: USACE-OD
CHIEF: X SECTION
DRAWING CODE: DEF872-50-01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

PAVEMENT MARKING DETAILS

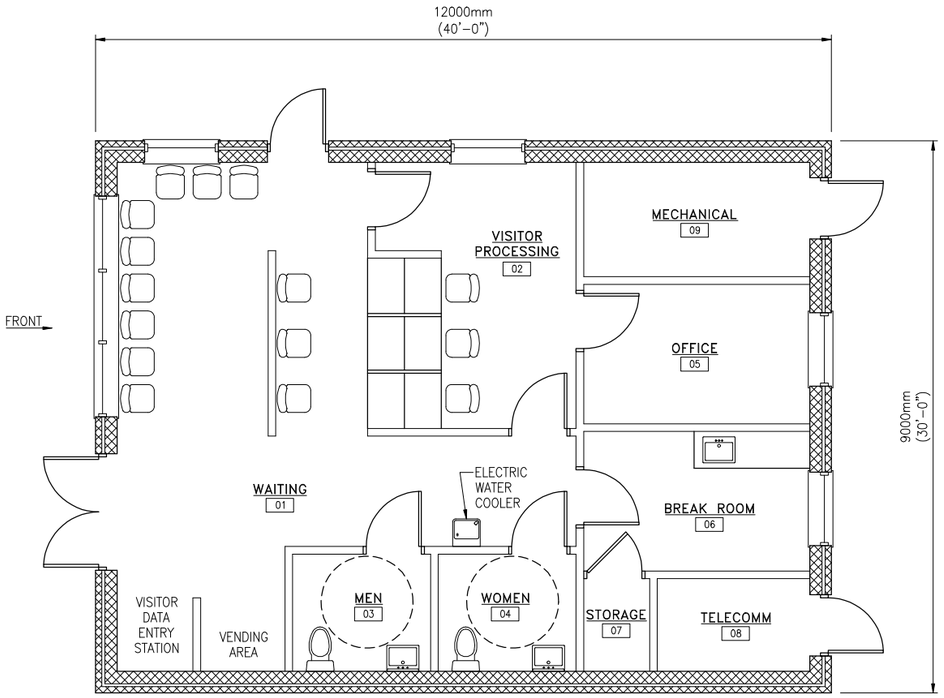
SHEET REFERENCE NUMBER
C9.12
SHEET 29 OF 40

GENERAL NOTES

1. MATERIAL SELECTIONS, EXTERIOR/ INTERIOR DESIGN DETAILS, MECHANICAL SYSTEMS, AND STRUCTURAL DESIGN MAY VARY IN RESPONSE TO LOCATION, GEOGRAPHIC AND ECONOMIC CONSIDERATIONS. ADDITIONAL MODIFICATIONS, WHEN AUTHORIZED BY HQ DA, MAY BE MADE TO THE FOLLOWING:
   A. THE SIZE OF THE MECHANICAL/ ELECTRICAL ROOM MAY BE INCREASED OR DECREASED TO ACCOMMODATE EQUIPMENT NECESSARY FOR VARIOUS CLIMATIC REQUIREMENTS. MECHANICAL AND ELECTRICAL ROOMS MAY BE SEPARATED PER APPLICABLE CODES.
   B. ADDITIONAL PARKING MAY BE INCLUDED. NUMBER OF PARKING SPACES SHALL BE CALCULATED ON A PROJECT–BY–PROJECT BASIS, BASED ON THE OCCUPANT LOAD.
   C. MINOR ADJUSTMENTS TO INCREASE ROOM AREAS ARE ALLOWED WHERE CONSTRUCTION ADJUSTMENTS ARE NEEDED FOR MECHANICAL WALL CHASES, STRUCTURAL COLUMNS, AND INTERIOR DIMENSIONING COORDINATION RELATED TO DESIGN REQUIREMENTS.
   D. MODIFICATIONS FOR SUPPORT FACILITIES SUCH AS UTILITIES, STORM DRAINAGE, PRIMARY HEATING AND COOLING SOURCE, PARKING, CURB AND GUTTER, LANDSCAPING AND OTHER SITE IMPROVEMENTS MAY BE NECESSARY.
2. THE VISITOR CONTROL CENTER (VCC) SHALL BE DESIGNED TO BE HANDICAPPED ACCESSIBLE FOLLOWING THE UNIFORM FEDERAL ACCESSIBILITY STANDARDS (UFAS), MOST RECENT EDITION. THIS INCLUDES PARKING SPACES, RAMPS AT CURBS, DOOR HARDWARE, TOILET FACILITIES, AND OTHER AREAS REQUIRED BY THESE STANDARDS. ALL APPLICABLE CODES, ORDINANCES AND SAFETY REGULATIONS IN EFFECT REGARDING HANDICAPPED ACCESSIBILITY AT EACH INSTALLATION SHALL BE FOLLOWED.
3. LINEAR DIMENSION REFERENCES ARE BASED ON THE RECOGNIZED BUILDING DESIGN MODULE OF 100mm = 4".
4. LOCATE INTERIOR DOOR FRAMES 4" FROM THE OUTSIDE FACE OF THE DOOR FRAME TO THE NEAREST INSIDE WALL CORNER UNLESS NOTED OTHERWISE.
5. LIGHTS AND DIFFUSERS ARE NOT SHOWN ON THE REFLECTED CEILING PLAN. QUANTITY AND LOCATIONS TO BE DETERMINED DURING DESIGN.
6. EXTERIOR MASONRY PATTERNING AND COURSING TO BE DETERMINED DURING DESIGN.
7. ALL WINDOWS TO BE TINTED AND COATED TO REDUCE SPECULAR TRANSMISSION. INTERIOR SURFACES TO BE DARK IN COLOR.

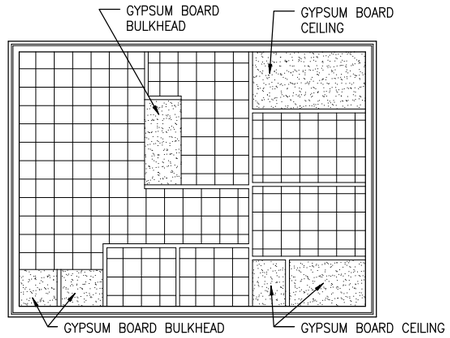
VISITOR CONTROL CENTER ROOM FINISH SCHEDULE

ROOM	NAME	M²/FT²	FLOOR	WALL BASE	WALL	CEILING	COMMENTS
01	WAITING	38.5/414	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
02	VISITOR PROCESSING	14.6/158	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
03	MEN	4.5/48	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
04	WOMEN	4.5/48	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
05	OFFICE	8.7/93	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
06	BREAK ROOM	8.7/93	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
07	STORAGE	1.7/18	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
08	TELECOMM	3.9/42	CONCRETE	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
09	MECHANICAL	7.1/76	CONCRETE	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING



VISITOR CONTROL CENTER FLOOR PLAN

0 500 1000 2000
SCALE: 1:50



VISITOR CONTROL CENTER REFLECTED CEILING PLAN

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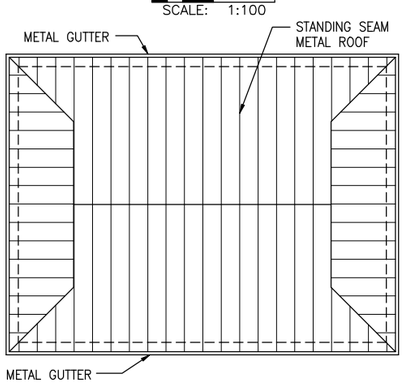

VISITOR CONTROL CENTER ROOF PLAN

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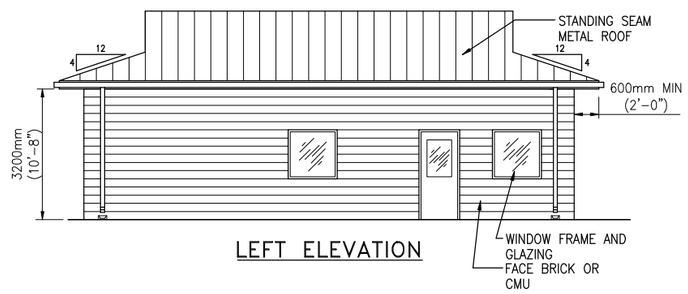
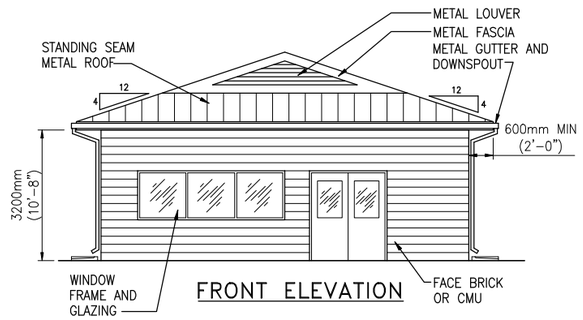
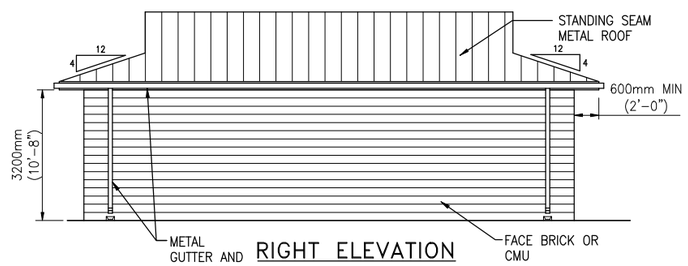
SCALE: 1:100



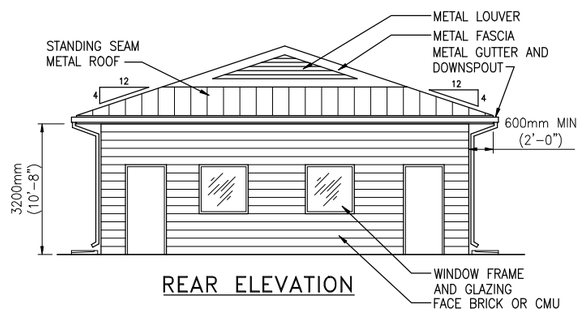
LEFT ELEVATION



FRONT ELEVATION



RIGHT ELEVATION



REAR ELEVATION

VISITOR CONTROL CENTER ELEVATIONS

0 1000 2000 4000
SCALE: 1:75

SCALES ARE BASED ON A STANDARD METRIC DRAWING SIZE OF 841mm X 594mm. IF ANY OTHER SIZE DRAWINGS ARE FURNISHED THE SCALES SHALL BE PROPORTIONED ACCORDINGLY. THE CONTRACTOR SHALL ALSO ADVISE HIS SUB–CONTRACTORS OF THE ABOVE.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
207 SENATE AVENUE
CAMP HILL, PA 17011–2316
(717) 763–7211

REV.	DESCRIPTION	DATE	APPROVED

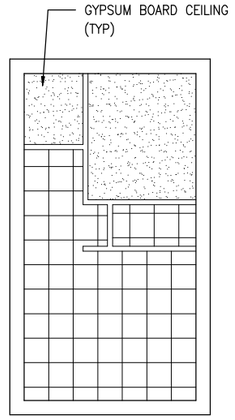
DESIGNED BY: GANNETT FLEMING
DRAWN BY: BJO
CHK BY: CHB
REVIEWED BY: USACE–OD
DATE: X
DESIGN FILE NAME: XXXXA101
PLOT SCALE RATIO: VARIES
SUBMITTED BY: USACE–OD
CHIEF:
SPEC. NO.
CONTRACT NO.
DRAWING CODE: DEF872–50–01

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
ARCHITECTURAL
VISITOR CONTROL CENTER

SHEET REFERENCE NUMBER
A1.01
SHEET 30 OF 40

GENERAL NOTES

1. LINEAR DIMENSION REFERENCES ARE BASED ON THE RECOGNIZED BUILDING DESIGN MODULE OF 100mm = 4".
2. LOCATE INTERIOR DOOR FRAMES 4" FROM THE OUTSIDE FACE OF THE DOOR FRAME TO THE NEAREST INSIDE WALL CORNER UNLESS NOTED OTHERWISE.
3. LIGHTS AND DIFFUSERS ARE NOT SHOWN ON THE REFLECTED CEILING PLAN. QUANTITY AND LOCATIONS TO BE DETERMINED DURING DESIGN.
4. BUILDING, DOORS, WINDOWS, AND FRAMES SHALL MEET LEVEL 3 BALLISTIC STANDARDS UL–752 AS A MINIMUM.
5. EXTERIOR MASONRY PATTERNING AND COURSING TO BE DETERMINED DURING DESIGN.
6. FRONT WINDOWS OF THE GATEHOUSE SHOULD TILT INWARD BASED ON IESNA G–03 FIG. 19.
7. WINDOWS SHALL UTILIZE SPECULAR–REFLECTING, LOW TRANSMISSION GLAZING. INTERIOR SURFACES IN THE GATEHOUSE SHALL BE DARK IN COLOR.



REFLECTED CEILING PLAN (TYP)

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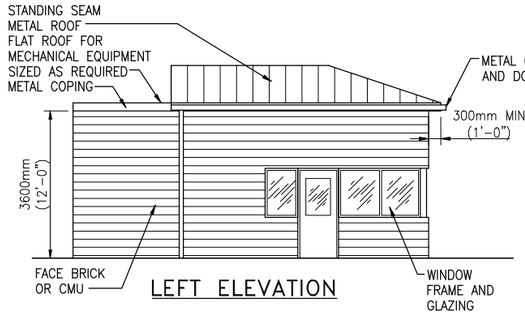
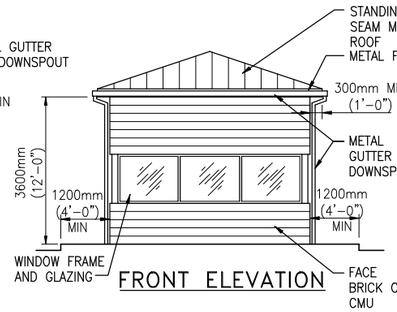
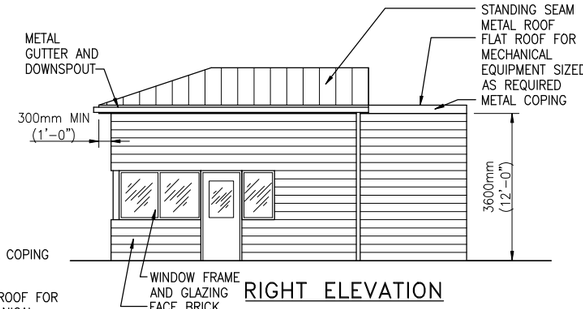
SCALE: 1:75



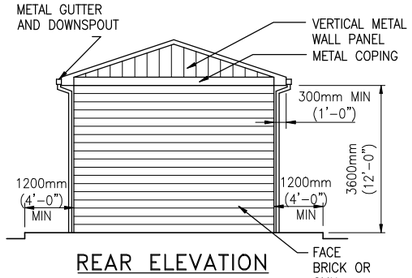
LEFT ELEVATION



FRONT ELEVATION



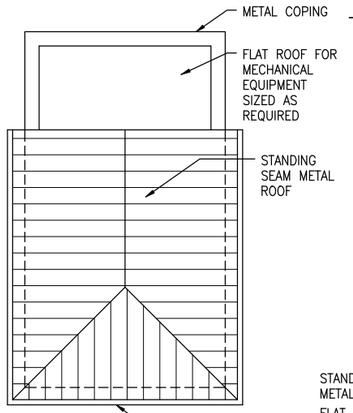
RIGHT ELEVATION



REAR ELEVATION

CENTERLINE GATEHOUSE ELEVATIONS

0 1000 2000 4000
SCALE: 1:75

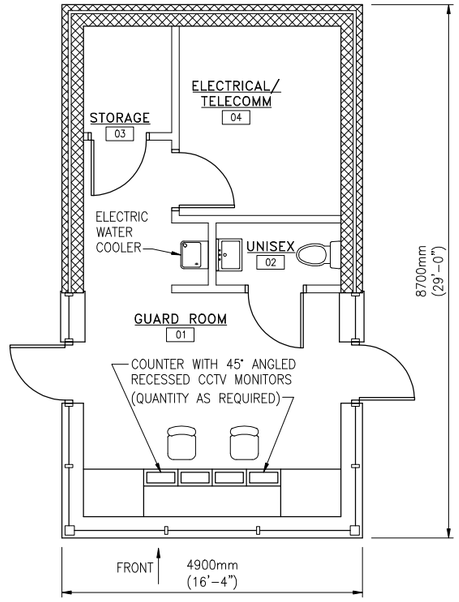


ROOF PLAN (TYPICAL)

0 1000 2000 4000
SCALE: 1:75

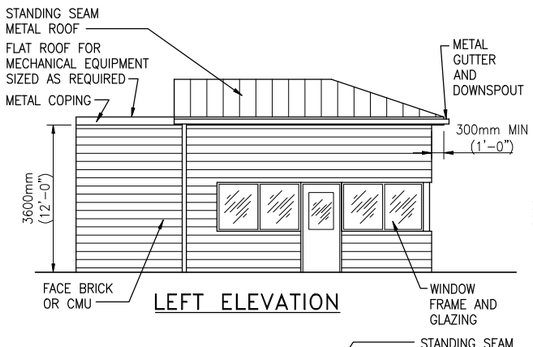
GATEHOUSE ROOM FINISH SCHEDULE

ROOM	NAME	M²/FT²	FLOOR	WALL BASE	WALL	CEILING	COMMENTS
01	GUARD ROOM	19.5/210	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
02	UNISEX	2.1/23	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
03	STORAGE	2.6/28	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
04	ELECTRICAL/TELECOMM	8.4/90	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING

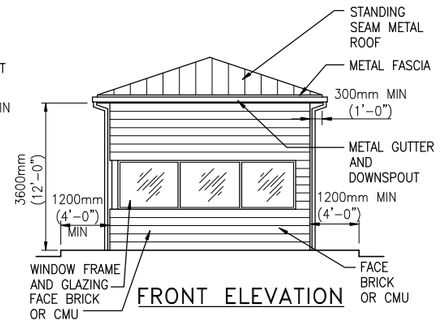


CENTERLINE GATEHOUSE FLOOR PLAN

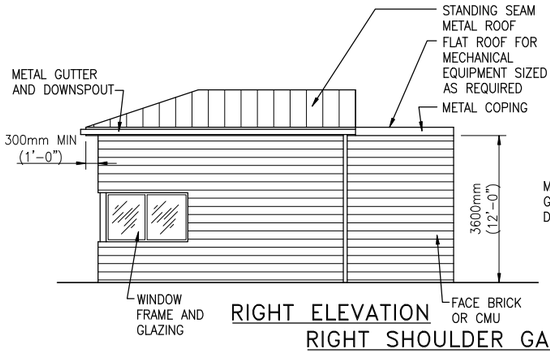
0 500 1000 2000
SCALE: 1:50



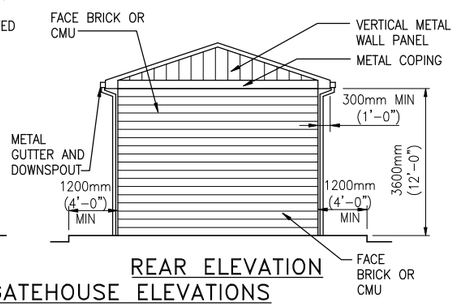
LEFT ELEVATION



FRONT ELEVATION



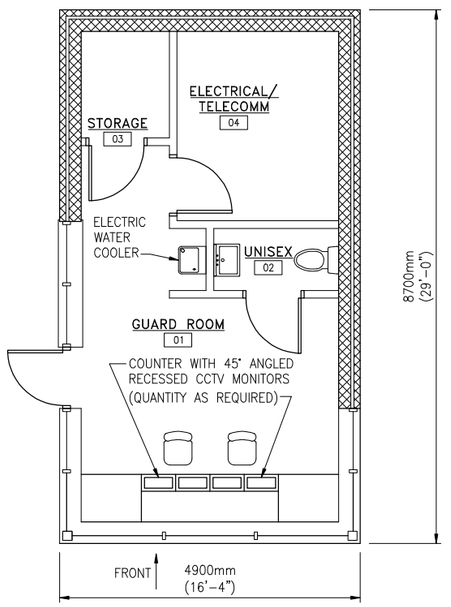
RIGHT ELEVATION



REAR ELEVATION

RIGHT SHOULDER GATEHOUSE ELEVATIONS

0 1000 2000 4000
SCALE: 1:75



RIGHT SHOULDER GATEHOUSE FLOOR PLAN

0 500 1000 2000
SCALE: 1:50

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STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
207 SENATE AVENUE
CAMP HILL, PA 17011–2316
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SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING
DRAWN BY: BJO
CHK BY: CHB
REVIEWED BY: USACE–OD
SUBMITTED BY: USACE–OD
CHIEF:
DATE: X
DESIGN FILE NAME: XXXXA102
PLOT SCALE RATIO: VARIES
DRAWING CODE: DEF872–50–01
REV.
SPEC. NO.
CONTRACT NO.

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
ARCHITECTURAL
GATEHOUSE

SHEET REFERENCE NUMBER
A1.02
SHEET 31 OF 40

GENERAL NOTES

1. LINEAR DIMENSION REFERENCES ARE BASED ON THE RECOGNIZED BUILDING DESIGN MODULE OF 100mm = 4".
2. LIGHTS AND DIFFUSERS ARE NOT SHOWN ON THE REFLECTED CEILING PLAN. QUANTITY AND LOCATIONS TO BE DETERMINED DURING DESIGN OR PROCUREMENT.
3. EXTERIOR FINISH MATCHING INSTALLATION ARCHITECTURAL THEME TO BE SELECTED DURING DESIGN AND OR PROCUREMENT.
4. OVERWATCH POSITION,GUARD BOOTH, AND PEDESTRIAN GUARD BOOTH DOORS, WINDOWS, AND FRAMES SHALL MEET LEVEL 3 BALLISTIC STANDARDS UL-752 AS A MINIMUM.
5. EXTERIOR MASONRY PATTERNING AND COURSING TO BE DETERMINED DURING DESIGN.
6. ALL WINDOWS TO BE TINTED AND COATED TO REDUCE SPECULAR TRANSMISSION. INTERIOR SURFACES TO BE DARK IN COLOR.
7. RECOMMEND ANTI-FATIGUE MATS BE PROVIDED FOR EACH GUARD BOOTH.

PREFABRICATED GUARDBOOTH ROOM FINISH SCHEDULE

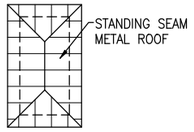
ROOM	NAME	M²/FT²	FLOOR	WALL BASE	WALL	CEILING	COMMENTS
01	GUARD ROOM	3.0/32	DIAMOND PLATE	--	METAL PANEL	METAL PANEL	2.4m (8') CEILING

SITE BUILT PEDESTRIAN GUARDBOOTH ROOM FINISH SCHEDULE

ROOM	NAME	M²/FT²	FLOOR	WALL BASE	WALL	CEILING	COMMENTS
01	GUARD ROOM	6.4/69	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
02	OUTDOOR STORAGE	1.3/14	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING

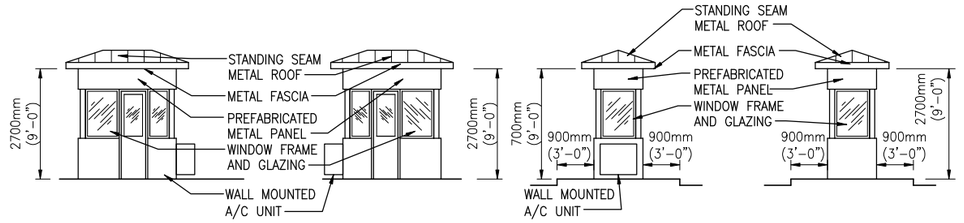
SITE BUILT OVERWATCH POSITION ROOM FINISH SCHEDULE

ROOM	NAME	M²/FT²	FLOOR	WALL BASE	WALL	CEILING	COMMENTS
01	GUARD ROOM	2.0/22	CONCRETE	--	PAINTED	GYPSUM BOARD	2.4m (8') CEILING



PREFABRICATED GUARDBOOTH ROOF PLAN

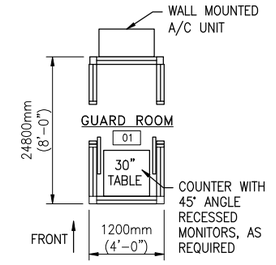
SCALE: 1:75



RIGHT ELEVATION LEFT ELEVATION REAR ELEVATION FRONT ELEVATION

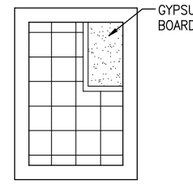
PREFABRICATED GUARDBOOTH ELEVATIONS

SCALE: 1:75



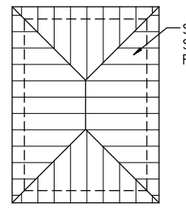
PREFABRICATED GUARDBOOTH FLOOR PLAN

SCALE: 1:50



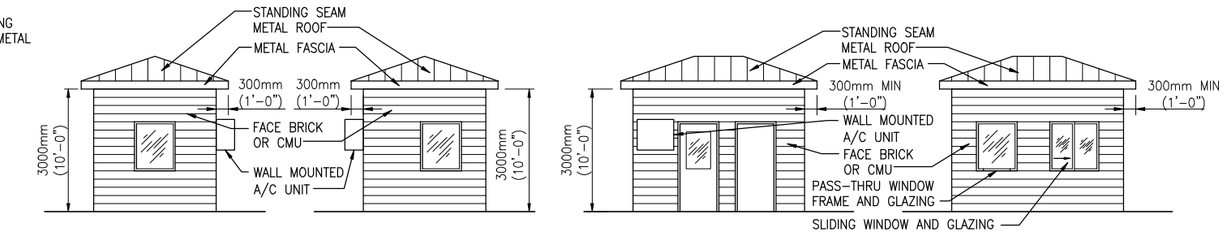
SITE-BUILT PEDESTRIAN GUARDBOOTH REFLECTED CEILING PLAN

SCALE: 1:75



SITE-BUILT PEDESTRIAN GUARDBOOTH ROOF PLAN

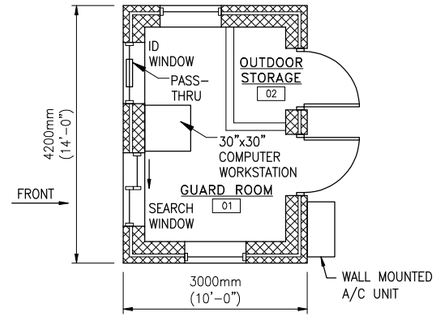
SCALE: 1:75



RIGHT ELEVATION LEFT ELEVATION REAR ELEVATION FRONT ELEVATION

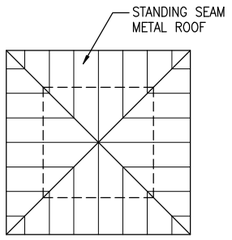
SITE-BUILT PEDESTRIAN GUARDBOOTH ELEVATIONS

SCALE: 1:75



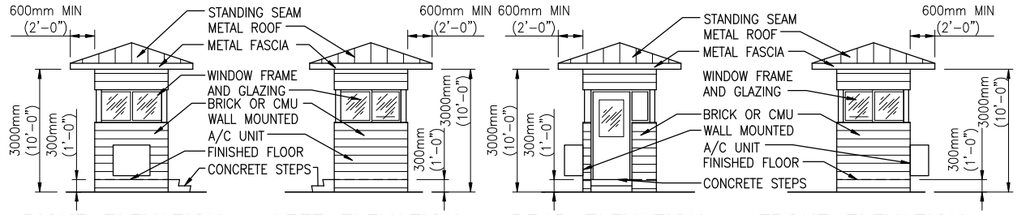
SITE-BUILT PEDESTRIAN GUARDBOOTH FLOOR PLAN

SCALE: 1:50



OVERWATCH POSITION ROOF PLAN

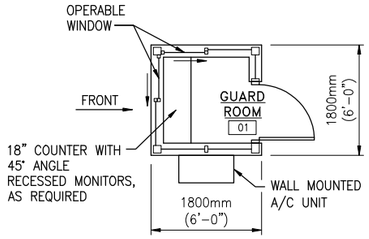
SCALE: 1:50



RIGHT ELEVATION LEFT ELEVATION REAR ELEVATION FRONT ELEVATION

SITE-BUILT OVERWATCH POSITION ELEVATIONS

SCALE: 1:75



SITE-BUILT OVERWATCH POSITION FLOOR PLAN

SCALE: 1:50

SCALES ARE BASED ON A STANDARD METRIC DRAWING SIZE OF 841mm X 594mm. IF ANY OTHER SIZE DRAWINGS ARE FURNISHED THE SCALES SHALL BE PROPORTIONED ACCORDINGLY. THE CONTRACTOR SHALL ALSO ADVISE HIS SUB-CONTRACTORS OF THE ABOVE.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
207 SENATE AVENUE
CAMP HILL, PA 17011-2316
(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING
DRAWN BY: BJO
CHK BY: CHB
REVIEWED BY: USACE-OD
SUBMITTED BY: USACE-OD
CHIEF:
DATE: X
DESIGN FILE NAME: XXXXA104
PLOT SCALE RATIO: VARIES
DRAWING CODE: DEF872-50-01
REV.
SPEC. NO.
CONTRACT NO.

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
ARCHITECTURAL
GUARDBOOTH, PEDESTRIAN GUARDBOOTH, AND OVERWATCH POSITION

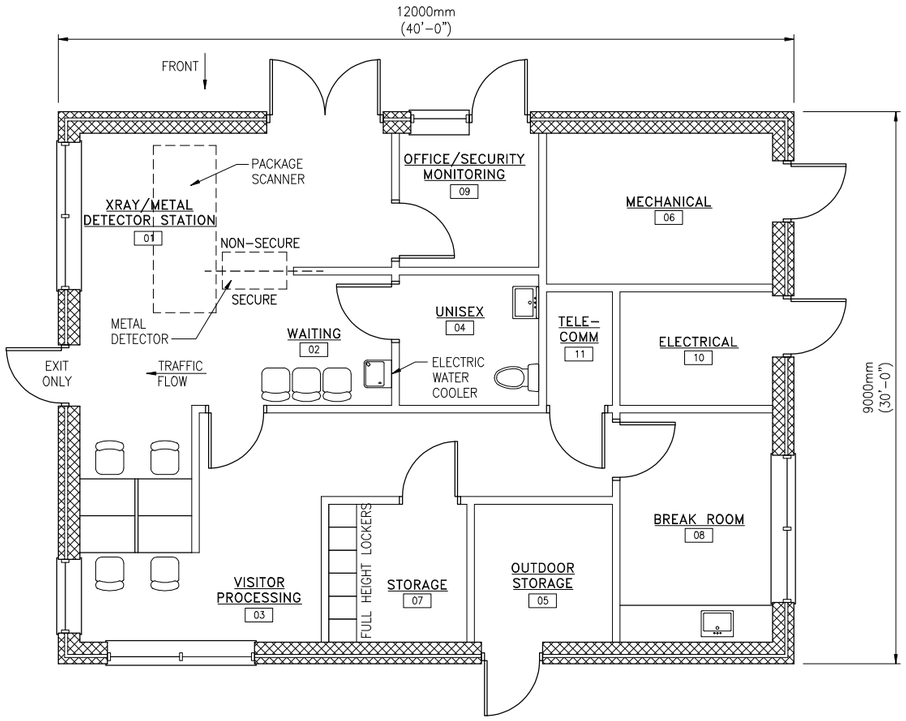
SHEET REFERENCE NUMBER
A1.03
SHEET 32 OF 40

GENERAL NOTES

1. LINEAR DIMENSION REFERENCES ARE BASED ON THE RECOGNIZED BUILDING DESIGN MODULE OF 100mm = 4".
2. LOCATE INTERIOR DOOR FRAMES 4" FROM THE OUTSIDE FACE OF THE DOOR FRAME TO THE NEAREST INSIDE WALL CORNER UNLESS NOTED OTHERWISE.
3. LIGHTS AND DIFFUSERS ARE NOT SHOWN ON THE REFLECTED CEILING PLAN. QUANTITY AND LOCATIONS TO BE DETERMINED DURING DESIGN.
4. EXTERIOR MASONRY PATTERNING AND COURSING TO BE DETERMINED DURING DESIGN.
5. THE SEARCH OFFICE WILL INCLUDE A CONTROL CONSOLE WITH CCTV MONITORS, AN ANNUNCIATION PANEL, AND COMMUNICATIONS TO THE INSTALLATION'S CENTRAL SECURITY MONITORING STATION.
6. SIZE WAITING AREA FOR EXPECTED NUMBER OF SEARCHED VEHICLES.

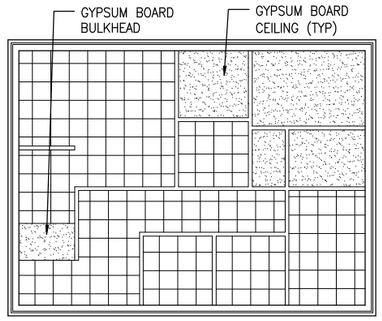
SEARCH OFFICE W/ PACKAGE SCANNER & METAL DETECTOR ROOM FINISH SCHED

ROOM	NAME	M²/FT²	FLOOR	WALL BASE	WALL	CEILING	COMMENTS
01	XRAY/MTL DETECTOR	13.3/143	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
02	WAITING	12.0/139	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
03	VISITOR PROCESSING	19.7/212	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
04	UNISEX	5.0/54	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
05	OUTDOOR STORAGE	5.2/56	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
06	MECHANICAL	9.3/101	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
07	STORAGE	5.2/56	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
08	BREAK ROOM	9.6/103	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
09	OFFICE/SECURITY MONITORING	5.1/55	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
10	ELECTRICAL	4.75/51	CONCRETE	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
11	TELECOMM	2.1/22	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING



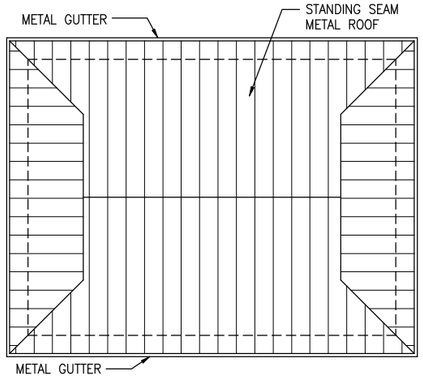
SEARCH OFFICE WITH PACKAGE SCANNER AND METAL DETECTOR FLOOR PLAN

0 500 1000 2000
SCALE: 1:50



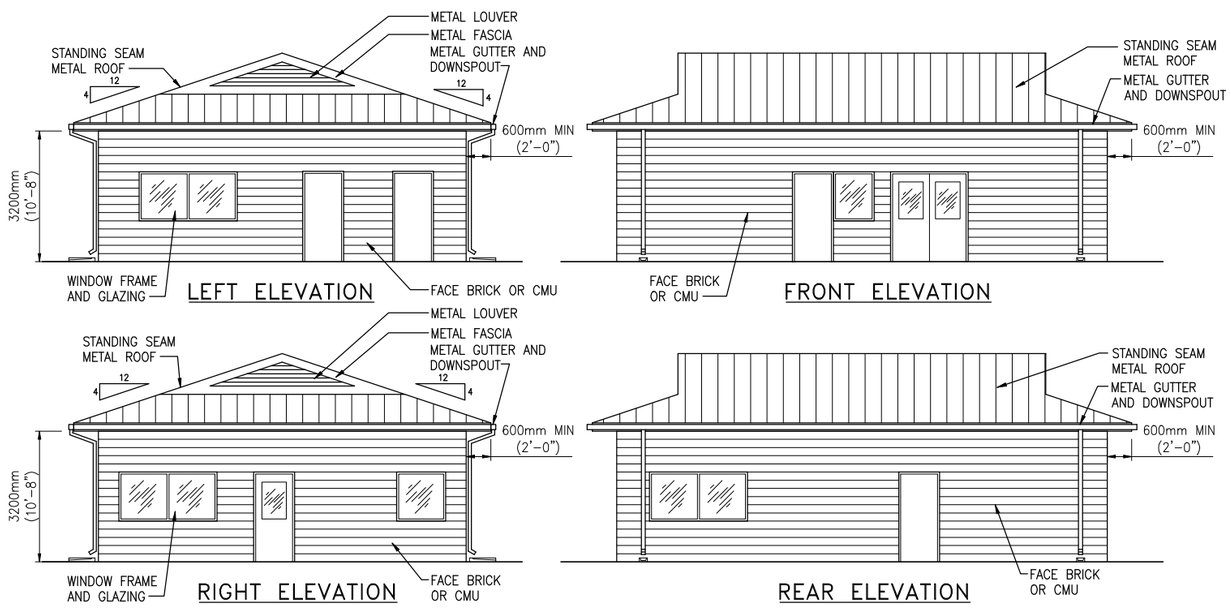
SEARCH OFFICE WITH PACKAGE SCANNER AND METAL DETECTOR REFLECTED CEILING PLAN

0 1000 2000 4000
SCALE: 1:100



SEARCH OFFICE WITH PACKAGE SCANNER AND METAL DETECTOR ROOF PLAN

0 1000 2000 4000
SCALE: 1:100



SEARCH OFFICE WITH PACKAGE SCANNER AND METAL DETECTOR ELEVATIONS

0 1000 2000 4000
SCALE: 1:75

SCALES ARE BASED ON A STANDARD METRIC DRAWING SIZE OF 841mm X 594mm. IF ANY OTHER SIZE DRAWINGS ARE FURNISHED THE SCALES SHALL BE PROPORTIONED ACCORDINGLY. THE CONTRACTOR SHALL ALSO ADVISE HIS SUB-CONTRACTORS OF THE ABOVE.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
207 SENATE AVENUE
CAMP HILL, PA 17011-2316
(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

REV.		SPEC. NO.		CONTRACT NO.
DESIGNED BY: GANNETT FLEMING	CHK BY: CHB	DESIGN FILE NAME: XXXXA106	DATE: X	
DRAWN BY: BJO		PLOT SCALE RATIO: VARIES		
REVIEWED BY: USACE-OD				
SUBMITTED BY: USACE-OD		DRAWING CODE:		DEF872-50-01
CHIEF:				

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
ARCHITECTURAL
SEARCH OFFICE WITH PACKAGE SCANNER AND METAL DETECTOR

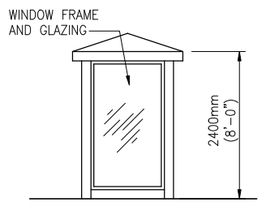
SHEET REFERENCE NUMBER
A1.04
SHEET 33 OF 40

GENERAL NOTES

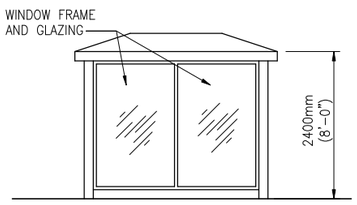
1. LINEAR DIMENSION REFERENCES ARE BASED ON THE RECOGNIZED BUILDING DESIGN MODULE OF 100mm = 4".
2. LOCATE INTERIOR DOOR FRAMES 4" FROM THE OUTSIDE FACE OF THE DOOR FRAME TO THE NEAREST INSIDE WALL CORNER UNLESS NOTED OTHERWISE.
3. LIGHTS AND DIFFUSERS ARE NOT SHOWN ON THE REFLECTED CEILING PLAN. QUANTITY AND LOCATIONS TO BE DETERMINED DURING DESIGN.
4. EXTERIOR MASONRY PATTERNING AND COURSING TO BE DETERMINED DURING DESIGN.
5. THE SEARCH OFFICE WILL INCLUDE A CONTROL CONSOLE WITH CCTV MONITORS, AN ANNUNCIATION PANEL, AND COMMUNICATIONS TO THE INSTALLATION'S CENTRAL SECURITY MONITORING STATION.
6. SHELTER SHOULD BE PROVIDED NEAR ANY INSPECTION LANE FOR OCCUPANTS OF A VEHICLE THAT IS TO BE SEARCHED. THE SHELTER SHOULD BE SIMILAR TO A BUS STOP SHELTER, WITH SEE-THROUGH WALLS TO ALLOW SECURITY PERSONNEL TO OBSERVE THE VEHICLE OCCUPANTS AT ALL TIMES.

SEARCH OFFICE W/O PACKAGE SCANNER AND METAL DETECTOR ROOM FINISH SCHEDULE

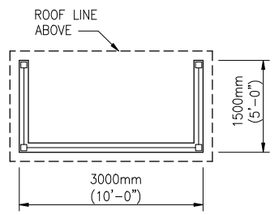
ROOM	NAME	M²/FT²	FLOOR	WALL BASE	WALL	CEILING	COMMENTS
01	WAITING	13.8/149	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
02	UNISEX	3.7/39	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
03	VISITOR PROCESSING	7.0/76	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
04	BREAK ROOM	9.3/100	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
05	OUTDOOR STORAGE	2.6/28	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
06	MECHANICAL/ELECTRICAL	4.7/51	VCT	100mm (4") VINYL COVE	PAINTED	GYPSUM BOARD	2.4m (8') CEILING
07	STORAGE	2.8/30	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING
08	OFFICE/SECURITY MONITORING	3.7/40	VCT	100mm (4") VINYL COVE	PAINTED	SUSP ACOUS PANEL	2.4m (8') CEILING



SIDE ELEVATION



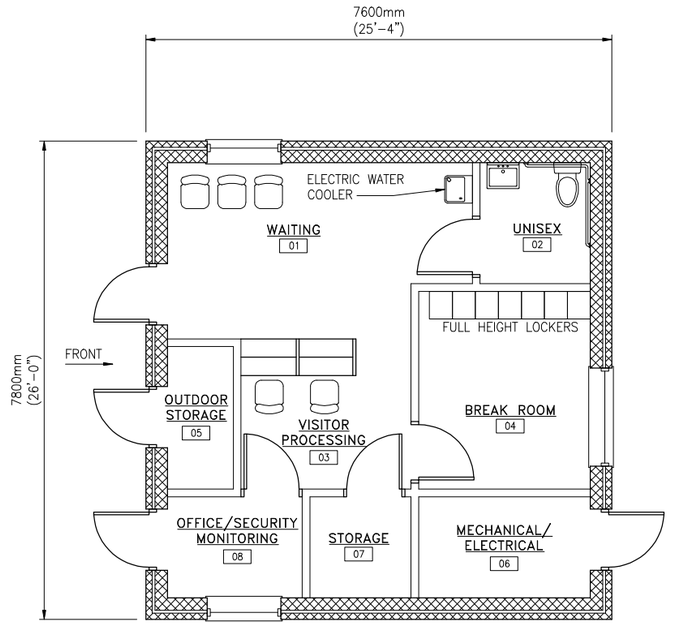
FRONT ELEVATION



FLOOR PLAN

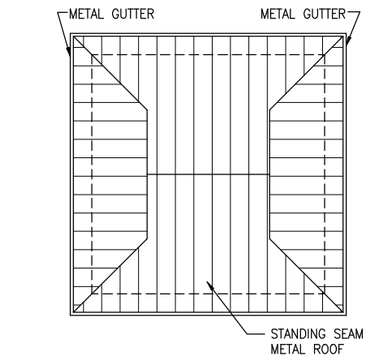
SEARCH AREA SHELTER

0 500 1000 2000
SCALE: 1:50



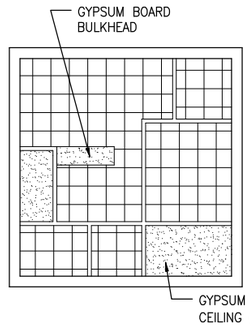
SEARCH OFFICE W/O PACKAGE SCANNER AND METAL DETECTOR FLOOR PLAN

0 500 1000 2000
SCALE: 1:50



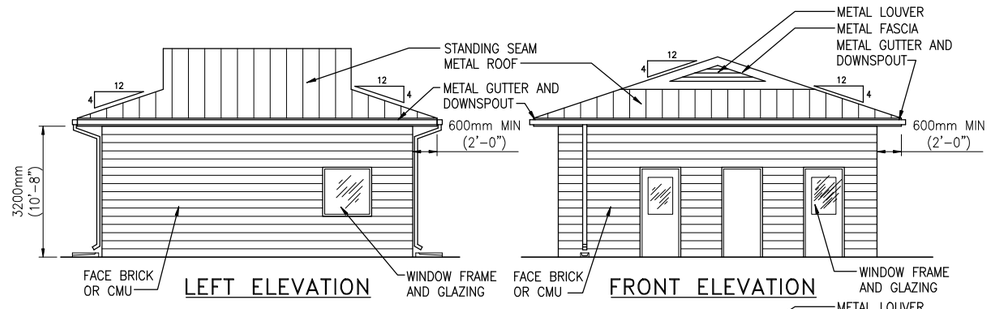
SEARCH OFFICE W/O PACKAGE SCANNER AND METAL DETECTOR ROOF PLAN

0 1000 2000 4000
SCALE: 1:100



SEARCH OFFICE W/O PACKAGE SCANNER AND METAL DETECTOR REFLECTED CEILING PLAN

0 1000 2000 4000
SCALE: 1:100



SEARCH OFFICE W/O PACKAGE SCANNER AND METAL DETECTOR ELEVATIONS

0 1000 2000 4000
SCALE: 1:75

SCALES ARE BASED ON A STANDARD METRIC DRAWING SIZE OF 841mm X 594mm. IF ANY OTHER SIZE DRAWINGS ARE FURNISHED THE SCALES SHALL BE PROPORTIONED ACCORDINGLY. THE CONTRACTOR SHALL ALSO ADVISE HIS SUB-CONTRACTORS OF THE ABOVE.

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

US Army Corps of Engineers
Omaha District

Gannett Fleming
207 SENATE AVENUE
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(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

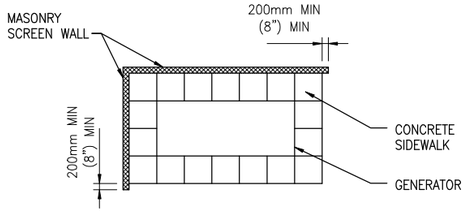
REV.	SPEC. NO.	CONTRACT NO.
DESIGNED BY: GANNETT FLEMING	DATE: X	
DRAWN BY: BJO	CHK BY: CHB	DESIGN FILE NAME: XXXXA107
REVIEWED BY: USACE-OD	PLOT SCALE RATIO: VARIES	
SUBMITTED BY: USACE-OD	DRAWING CODE: DEF872-50-01	
CHIEF:		

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
ARCHITECTURAL
SEARCH OFFICE W/O PACKAGE SCANNER AND METAL DETECTOR

SHEET REFERENCE NUMBER
A1.05
SHEET 34 OF 40

GENERAL NOTES

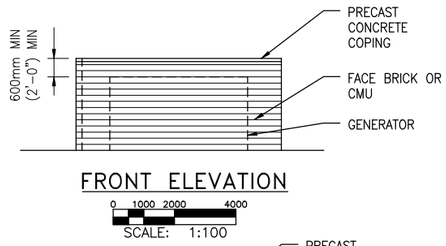
1. LINEAR DIMENSION REFERENCES ARE BASED ON THE RECOGNIZED BUILDING DESIGN MODULE OF 100mm = 4".
2. LIGHTS AND DIFFUSERS ARE NOT SHOWN ON THE SOFFIT PLAN. QUANTITY AND LOCATIONS TO BE DETERMINED DURING DESIGN.
3. CANOPIES ARE SHOWN AT 14'-6" VERTICAL CLEARANCE ABOVE FINISHED ROADWAY SURFACE.
4. BOLLARDS OR OTHER COLUMN PROTECTION MEASURES SHOULD BE PLACED AS REQUIRED.
5. CANOPY COLUMNS TO BE PLACED 5'-0" FROM THE EDGE OF CURB.
6. CANOPY WIDTH DETERMINED BY ADDING THE LANES, COLUMN SETBACKS, AND CANOPY OVERHANG.
7. CANOPIES WILL BE CONSTRUCTED SO COLUMNS DO NOT OBSTRUCT GUARD'S LINE OF SIGHT.



NOTE: DIMENSIONS OF SCREEN WALL TO BE DETERMINED BASED ON SELECTED GENERATOR

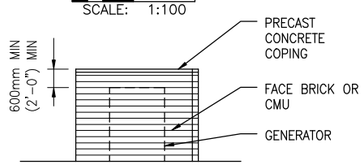
GENERATOR SCREEN WALL PLAN

0 1000 2000 4000
SCALE: 1:100



FRONT ELEVATION

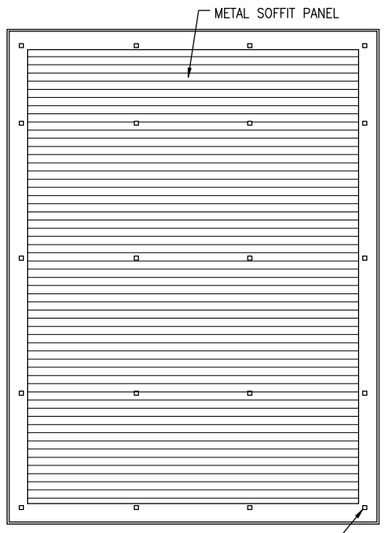
0 1000 2000 4000
SCALE: 1:100



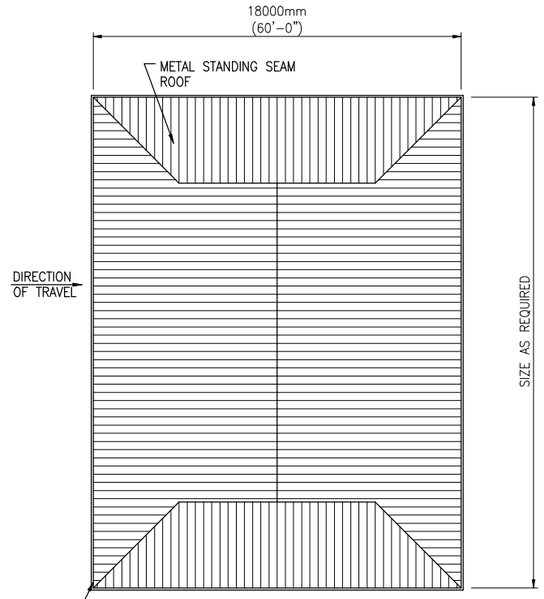
SIDE ELEVATION

GENERATOR SCREEN WALL ELEVATIONS

0 1000 2000 4000
SCALE: 1:100



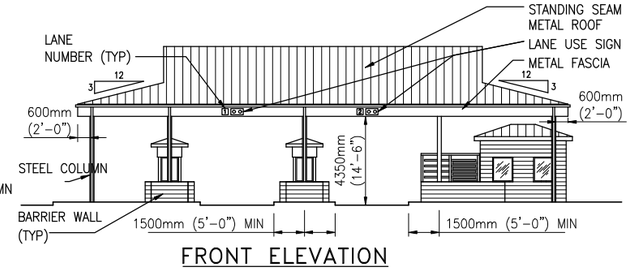
CANOPY SOFFIT PLAN



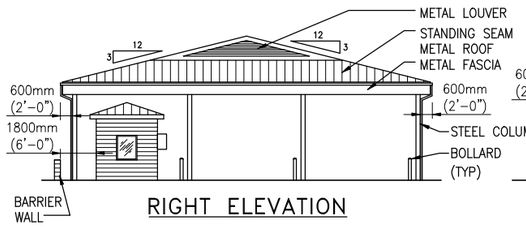
CANOPY ROOF PLAN

0 500 1000 2000 4000
SCALE: 1:150

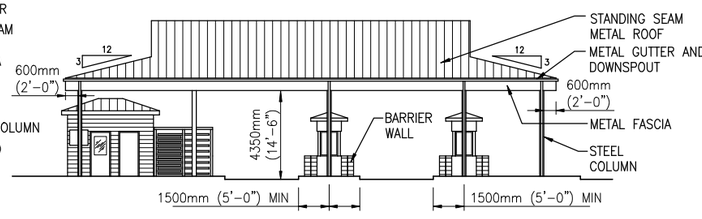
LEFT ELEVATION



FRONT ELEVATION



RIGHT ELEVATION



REAR ELEVATION

ID CHECK AREA CANOPY ELEVATIONS

0 500 1000 2000 4000
SCALE: 1:150

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US Army Corps of Engineers
Omaha District

Gannett Fleming
207 SENATE AVENUE
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SYMBOL	DESCRIPTION	DATE	APPROVED

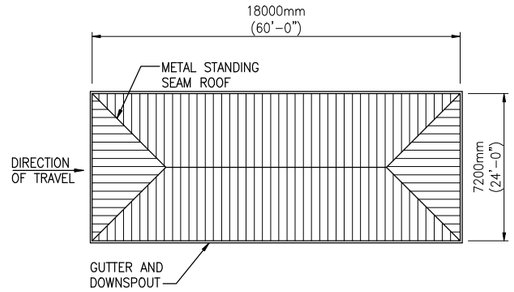
DESIGNED BY: GANNETT FLEMING
DRAWN BY: BJO
CHK BY: CHB
REVIEWED BY: USACE-OD
SUBMITTED BY: USACE-OD
CHIEF:
DATE: X
DESIGN FILE NAME: XXXXA10B
PLOT SCALE RATIO: VARIES
DRAWING CODE: DEF872-50-01
REV.
SPEC. NO.
CONTRACT NO.

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
ARCHITECTURAL
ID CHECK AREA CANOPY

SHEET REFERENCE NUMBER
A1.06
SHEET 35 OF 40

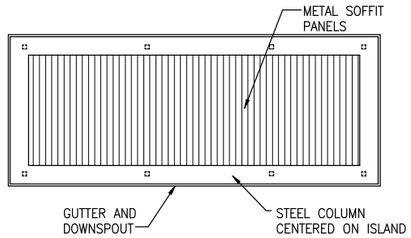
GENERAL NOTES

1. LINEAR DIMENSION REFERENCES ARE BASED ON THE RECOGNIZED BUILDING DESIGN MODULE OF 100mm = 4".
2. LIGHTS AND DIFFUSERS ARE NOT SHOWN ON THE SOFFIT PLAN. QUANTITY AND LOCATIONS TO BE DETERMINED DURING DESIGN.
3. CANOPIES ARE SHOWN AT 14'-6" VERTICAL CLEARANCE FOR POV LANES AND 17'-0" VERTICAL CLEARANCE FOR TRUCKS ABOVE FINISHED ROAD SURFACE.
4. BOLLARDS OR OTHER COLUMN PROTECTION MEASURES SHOULD BE PLACED AS REQUIRED.
5. CANOPY COLUMNS TO BE PLACED 5'-0" FROM THE EDGE OF CURB OR CENTERED IN THE ISLAND.
6. CANOPY WIDTH DETERMINED BY ADDING THE LANES, COLUMN SETBACKS, AND CANOPY OVERHANG.
7. CURB RAMPS ARE REQUIRED FROM THE ISLANDS AND SIDEWALKS TO THE SEARCH OFFICE.
8. 150mm (6") VERTICAL CURBING PROVIDED ADJACENT TO THE TRAVEL WAY AND INSPECTION AREAS UNLESS OTHERWISE NOTED.
9. PROVIDE DELINEATION OF ISLANDS TO ONCOMING VEHICLES.



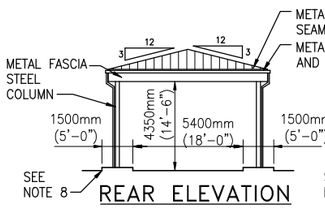
PASSENGER VEHICLE SEARCH AREA ROOF PLAN

0 2000 4000 8000
SCALE: 1:150

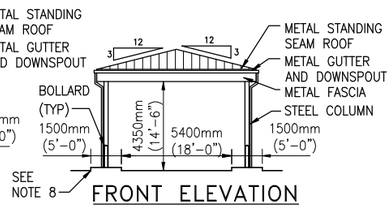


PASSENGER VEHICLE SEARCH AREA SOFFIT PLAN

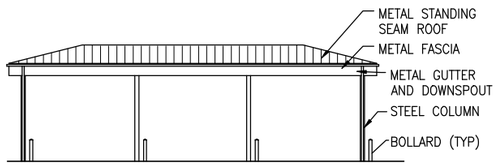
0 2000 4000 8000
SCALE: 1:150



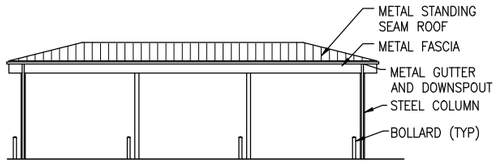
REAR ELEVATION



FRONT ELEVATION



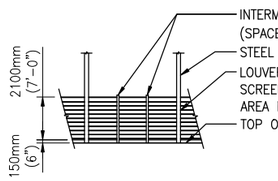
LEFT ELEVATION



RIGHT ELEVATION

PASSENGER VEHICLE SEARCH AREA CANOPY ELEVATIONS

0 2000 4000 8000
SCALE: 1:150



CANOPY SCREEN WALL
PARTIAL ELEVATION

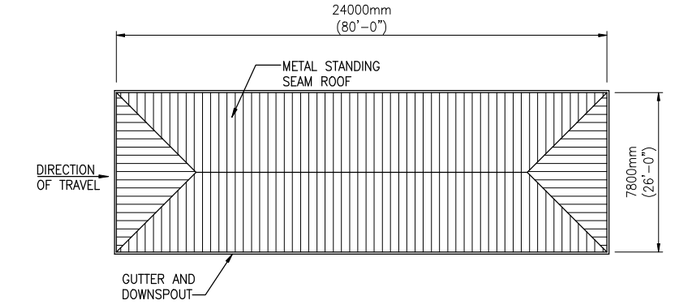
0 2000 4000 8000
SCALE: 1:150

NOTE: SCREENING OF INSPECTIONS CAN BE ACCOMPLISHED THROUGH A VARIETY OF NATURAL OR MAN MADE FEATURES. IF SCREENING CANNOT BE DESIGNED INTO THE SITE LAYOUT THEN ADD SCREENING TO THE STRUCTURES THEMSELVES, BUT PEDESTRIAN ACCESSIBILITY MUST BE MAINTAINED. THE FOLLOWING MANUFACTURERS OF LOUVERED SCREENS HAVE BEEN IDENTIFIED. UNDOUBTEDLY THERE ARE OTHERS. THESE ARE LISTED TO PROVIDE USERS WITH SOURCES OF INFORMATION AND ARE NOT AN ENDORSEMENT OF ANY ONE PRODUCT LINE.

AMETCO MANUFACTURING CORP.
4326 HAMANN PKWY
PO BOX 1210
WILLOUGHBY, OH 44096
(800)321-7042 FAX (440)951-2542

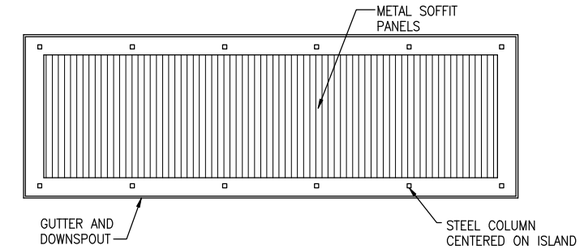
AT&T IRONWORKS, INC
25 CUFF ST
NEW ROCHELLE, NY 10801
(800)523-0973 FAX (914)632-2645

BARNETTBATES CORP
500 MILLS RD
JOLIET, IL 60433
(800) 541-3912 FAX (815)726-9210



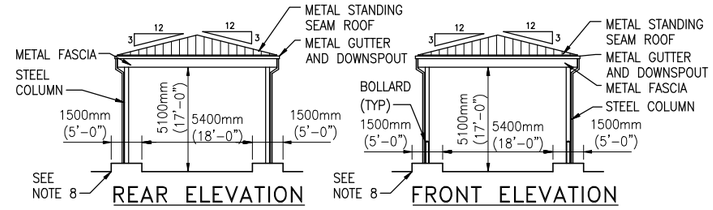
TRUCK SEARCH AREA CANOPY ROOF PLAN

0 2000 4000 8000
SCALE: 1:150



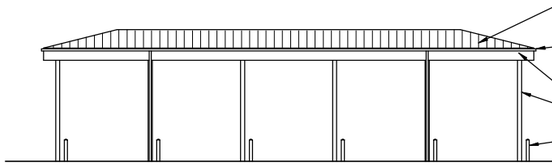
TRUCK SEARCH AREA CANOPY SOFFIT PLAN

0 2000 4000 8000
SCALE: 1:150

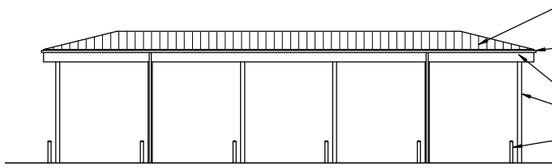


REAR ELEVATION

FRONT ELEVATION



LEFT ELEVATION



RIGHT ELEVATION

TRUCK SEARCH AREA CANOPY ELEVATIONS

0 2000 4000 8000
SCALE: 1:150

SCALES ARE BASED ON A STANDARD METRIC DRAWING SIZE OF 841mm X 594mm. IF ANY OTHER SIZE DRAWINGS ARE FURNISHED THE SCALES SHALL BE PROPORTIONED ACCORDINGLY. THE CONTRACTOR SHALL ALSO ADVISE HIS SUB-CONTRACTORS OF THE ABOVE.

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US Army Corps of Engineers
Omaha District

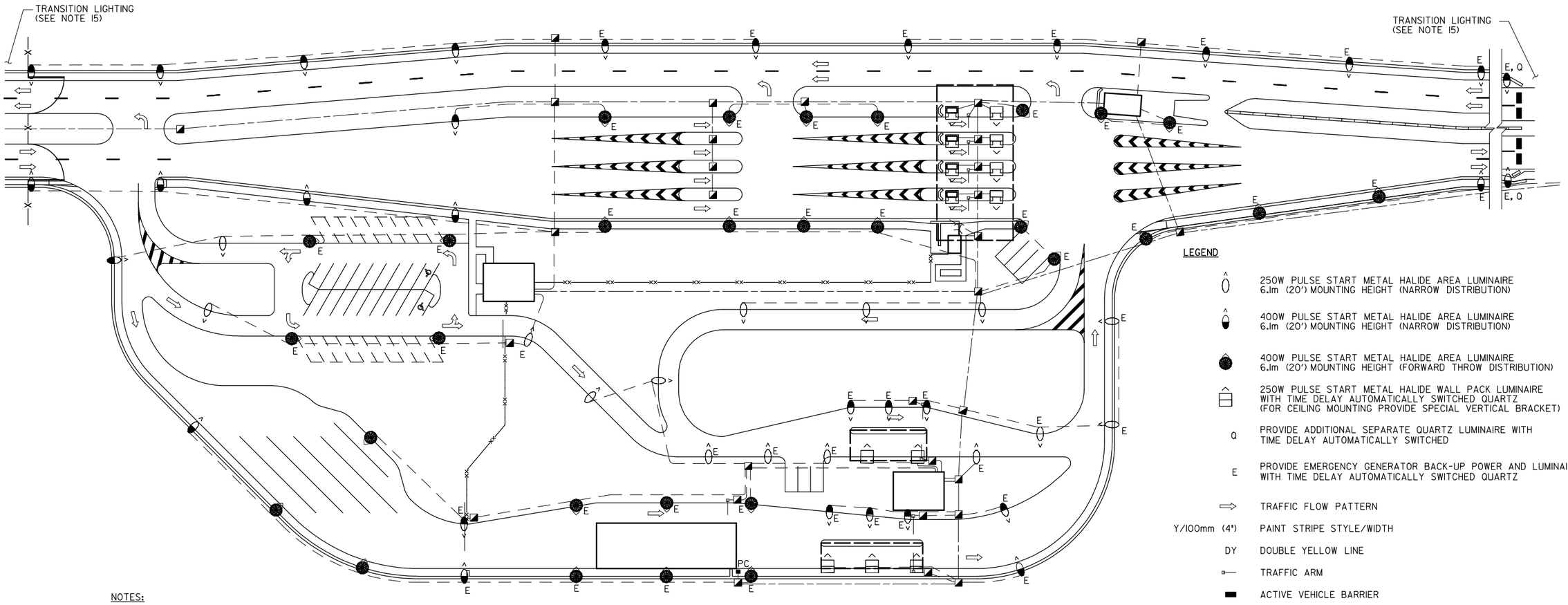
Gannett Fleming
207 SENATE AVENUE
CAMP HILL, PA 17011-2316
(717) 763-7211

SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	DATE: X	REV.	
DRAWN BY: BJO	CHK BY: CHB	DESIGN FILE NAME: XXXXA109	SPEC. NO.
REVIEWED BY: USACE-OD		PLOT SCALE RATIO: VARIES	CONTRACT NO.
SUBMITTED BY: USACE-OD		DRAWING CODE: DEF872-50-01	
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS
ARCHITECTURAL
PASSENGER VEHICLE AREA AND TRUCK
SEARCH AREA CANOPIES

SHEET REFERENCE NUMBER
A1.07
SHEET 36 OF 40



NOTES:

1. SEE DESIGN CRITERIA FOR LIGHTING LEVEL REQUIREMENTS.
2. SEE DESIGN CRITERIA FOR DESCRIPTIONS OF REQUIREMENTS FOR COMMUNICATIONS, DURESS ALARMS, INTRUSION DETECTION SENSORS, SPEED DETECTORS, WRONG-WAY DETECTORS, VEHICLE PRESENCE DETECTORS, AND ACTIVE VEHICLE BARRIER CONTROLS.
3. SIZE CONDUIT TO 40% FILL MAXIMUM PER CONDUIT.
4. PROVIDE THE REQUIRED NUMBER OF CONDUITS PLUS 2 SPARE CONDUITS FOR EACH DUCT BANK. SPARES SHOULD BE A MINIMUM OF 3" IN DIAMETER.
5. CONDUIT RUNS SHOULD NOT EXCEED 150.0m (500') IN TOTAL LENGTH.
6. SIZE CONDUCTORS FOR MAXIMUM 5% VOLTAGE DROP AND MAXIMUM AMPERES.
7. SPECIFY DIRECT BURIAL CABLE TO BE INSTALLED IN DIRECT BURIAL CONDUIT FOR LIGHTING CONDUCTORS. MINIMUM SIZE CONDUCTOR TO BE USED UNDERGROUND IS AWG#8.
8. SPECIFY CUTOFF TYPE LUMINAIRES TO REDUCE GLARE AND LIGHT TRESPASS.
9. LUMINAIRES SHOULD BE LOCATED PERPENDICULAR TO ROADWAY PAVEMENT UNLESS INDICATED OTHERWISE.
10. LOCATE POLES 0.6m (2') CLEAR FACE OF CURB OR AT BACK EDGE OF SIDEWALK OR 1.5m (5') FROM EDGE OF PAVEMENT OR SHOULDER.
11. FOR ANY UNPROTECTED POLES LOCATED INSIDE THE AASHTO CLEAR ZONE, PROVIDE POLES WITH BREAKAWAY BASES.
12. FOR ANY POLES LOCATED BEHIND GUARDRAIL, PROVIDE CLEARANCE FOR THE REQUIRED AASHTO GUARDRAIL DEFLECTION.
13. SPECIFY JUNCTION BOXES SIZED FOR SUFFICIENT SPACE TO MAKE REQUIRED CABLE CONNECTIONS. PROVIDE CONCRETE JUNCTION BOXES WITH TAMPER PROOF HARDWARE.
14. SPECIFY WATERTIGHT, SUBMERSIBLE, NON-FUSIBLE, PREMOLDED, DISCONNECTABLE CONNECTOR KITS FOR SPLICES IN JUNCTION BOXES.
15. TRANSITION LIGHTING - FOR 2 LANE ROADWAYS PROVIDE 2 ADDITIONAL LUMINAIRE/POLE LOCATIONS AND FOR ROADWAYS WITH 3 OR MORE LANES PROVIDE 4 ADDITIONAL LUMINAIRE/POLE LOCATIONS (2 EACH SIDE). TRANSITION TO EXISTING LIGHTING WHEN PRESENT IN THE SAME AREA.

LEGEND

- 250W PULSE START METAL HALIDE AREA LUMINAIRE 6.1m (20') MOUNTING HEIGHT (NARROW DISTRIBUTION)
- 400W PULSE START METAL HALIDE AREA LUMINAIRE 6.1m (20') MOUNTING HEIGHT (NARROW DISTRIBUTION)
- 400W PULSE START METAL HALIDE AREA LUMINAIRE 6.1m (20') MOUNTING HEIGHT (FORWARD THROW DISTRIBUTION)
- 250W PULSE START METAL HALIDE WALL PACK LUMINAIRE WITH TIME DELAY AUTOMATICALLY SWITCHED QUARTZ (FOR CEILING MOUNTING PROVIDE SPECIAL VERTICAL BRACKET)
- Q — PROVIDE ADDITIONAL SEPARATE QUARTZ LUMINAIRE WITH TIME DELAY AUTOMATICALLY SWITCHED
- E — PROVIDE EMERGENCY GENERATOR BACK-UP POWER AND LUMINAIRE WITH TIME DELAY AUTOMATICALLY SWITCHED QUARTZ
- TRAFFIC FLOW PATTERN
- Y/100mm (4") — PAINT STRIPE STYLE/WIDTH
- DY — DOUBLE YELLOW LINE
- TRAFFIC ARM
- ACTIVE VEHICLE BARRIER
- PASSIVE VEHICLE BARRIER
- ORNAMENTAL FENCE
- BOLLARDS
- CANOPY
- BARRIER WALL
- DOUBLE FACE GUARD RAIL
- SINGLE FACE GUARD RAIL
- GUARD BOOTH
- GENERATOR PAD W/SIDEWALK
- CURB RAMP
- PC — POWER AND COMMUNICATIONS CABINET
- JUNCTION BOX
- DUCT BANK: POWER/LIGHTING, COMMUNICATIONS CCTV/SECURITY, BARRIER/TRAFFIC CONTROL
- BRANCH POWER CIRCUIT

STANDARDS DEVELOPED UTILIZING COMMON ENGINEERING AND ARCHITECTURAL RESOURCES. ENGINEERING JUDGEMENT APPLIED WHERE APPROPRIATE. ALL FEATURES AND DIMENSIONS SHOULD BE VALIDATED AND ADJUSTED AS APPROPRIATE AS PART OF THE DESIGN PROCESS.

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SYMBOL	DESCRIPTION	DATE	APPROVED

REV. -- | SPEC. NO. | CONTRACT NO. X

DESIGNED BY: GANNETT FLEMING | DATE: X | DESIGN FILE NO. 0001ELO1 | PLOT SCALE RATIO: NO SCALE | DRAWING CODE: DEF872-50-01

DWN BY: JAC | CKD BY: RJT

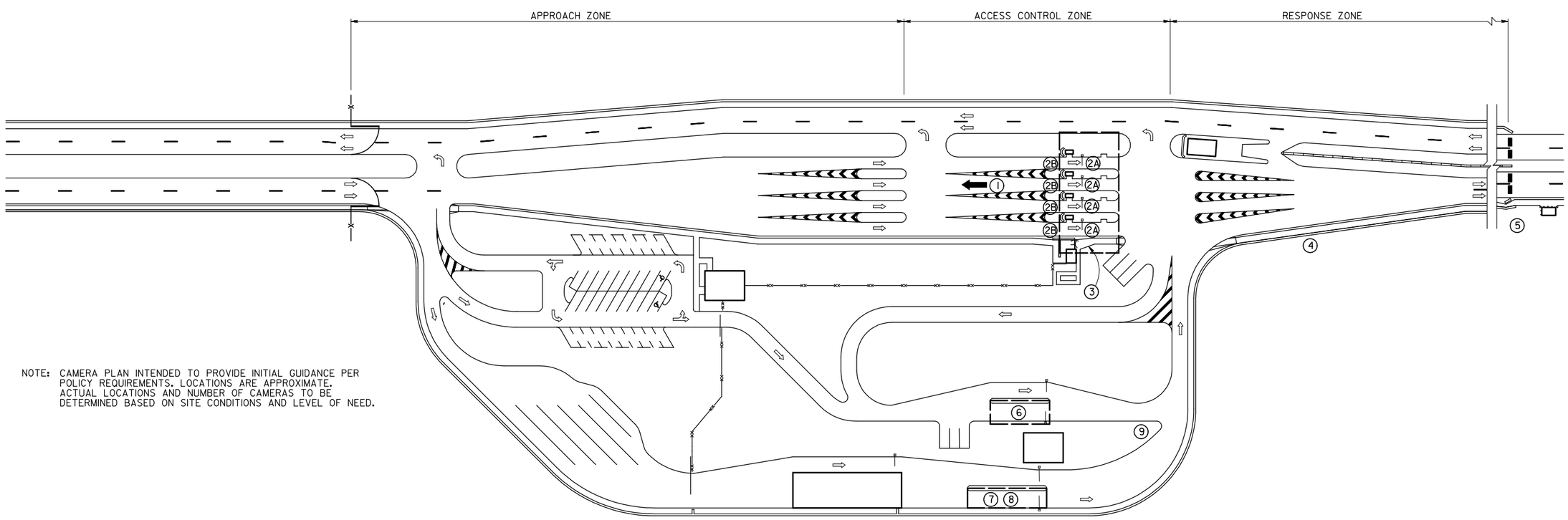
REVIEWED BY: USACE-OD

SUBMITTED BY: USACE-OD CHIEF:

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

SITE PLAN
LIGHTING AND CONDUIT PLAN

SHEET REFERENCE NUMBER
EL.01
SHEET 37 OF 40



NOTE: CAMERA PLAN INTENDED TO PROVIDE INITIAL GUIDANCE PER POLICY REQUIREMENTS. LOCATIONS ARE APPROXIMATE. ACTUAL LOCATIONS AND NUMBER OF CAMERAS TO BE DETERMINED BASED ON SITE CONDITIONS AND LEVEL OF NEED.

PRIMARY ACP
WITH VCC AND COMMERCIAL VEHICLE

ZONE/FACILITY	NUMBER	DESCRIPTION	VIEW	CAMERA LOCATION	MONITOR LOCATION	LOCATION TYPE	NUMBER OF CAMERAS	FIXED OR PTZ
APPROACH ZONE	①	APPROACH ZONE OVERWATCH	VIEW APPROACHING TRAFFIC	POLE OR CANOPY ROOF	GATEHOUSE	EXTERNAL	1 OR 2 (SEE NOTE 1)	F
ID CHECK AREA	2A	LANE OPERATIONS	DRIVER, VEHICLE, AND ID CHECK GUARD	UNDERSIDE OF CANOPY	GATEHOUSE	COVERED	1 PER LANE	F
	2B	REAR LICENSE PLATE - FUTURE	REAR LICENSE PLATE USING SPECIAL LIGHTING	PRIMARY ISLANDS	TBD	COVERED	1 PER LANE (SEE NOTE 2)	F
	③	PEDESTRIAN ID CHECK OPERATIONS	PEDESTRIAN GUARD BOOTH AND PEDESTRIAN ACTIVE BARRIER	UNDERSIDE OF CANOPY	GATEHOUSE	COVERED	1	F
	④	ID CHECK AREA OVERWATCH	ID CHECK AREA, TURNAROUND, AND SEARCH AREA ENTRANCE/EXIT	POLE OR GATEHOUSE ROOF	CENTRAL SECURITY MONITORING STATION	EXTERNAL	1	PTZ
RESPONSE ZONE	⑤	FINAL BARRIER OVERWATCH	FINAL BARRIERS	POLE	GATEHOUSE	EXTERNAL	1	F
PASSENGER VEHICLE SEARCH AREA	⑥	SEARCH OPERATIONS	DRIVER, VEHICLE, AND SEARCH GUARD	UNDERSIDE OF CANOPY	GATEHOUSE	COVERED	1	F
TRUCK SEARCH AREA	⑦	SEARCH OPERATIONS	DRIVER, VEHICLE, AND SEARCH GUARD	UNDERSIDE OF CANOPY	GATEHOUSE	COVERED	1	F
	⑧	AID SEARCH AREA GUARDS - OPTIONAL (SEE NOTE 3)	TOP OF VEHICLE BEING SEARCHED	UNDERSIDE OF CANOPY	SEARCH AREA	COVERED	1	PTZ
SEARCH AREA	⑨	SEARCH AREA OVERWATCH	SEARCH AREAS	POLE	GATEHOUSE	EXTERNAL	1 (SEE NOTE 4)	PTZ
						TOTAL	12-16 ** FOR 4 LANE ENTRANCE	

NOTES:

1. AN ADDITIONAL CAMERA MAY BE REQUIRED TO VIEW APPROACH ZONE FOR PEDESTRIANS.
2. PROVIDE CONDUIT ONLY FOR FUTURE CAMERA AND LIGHTS.
3. OPTIONAL CAMERA TO AID SEARCH AREA GUARDS.
4. MAY REQUIRE 2 CAMERAS IF TRUCK AND PASSENGER VEHICLE SEARCH AREAS CANNOT BE COVERED BY ONE CAMERA.
5. SEE DESIGN CRITERIA FOR DESCRIPTION OF CCTV REQUIREMENTS.

** 10-12 FOR 2 LANE ENTRANCE
11-14 FOR 3 LANE ENTRANCE

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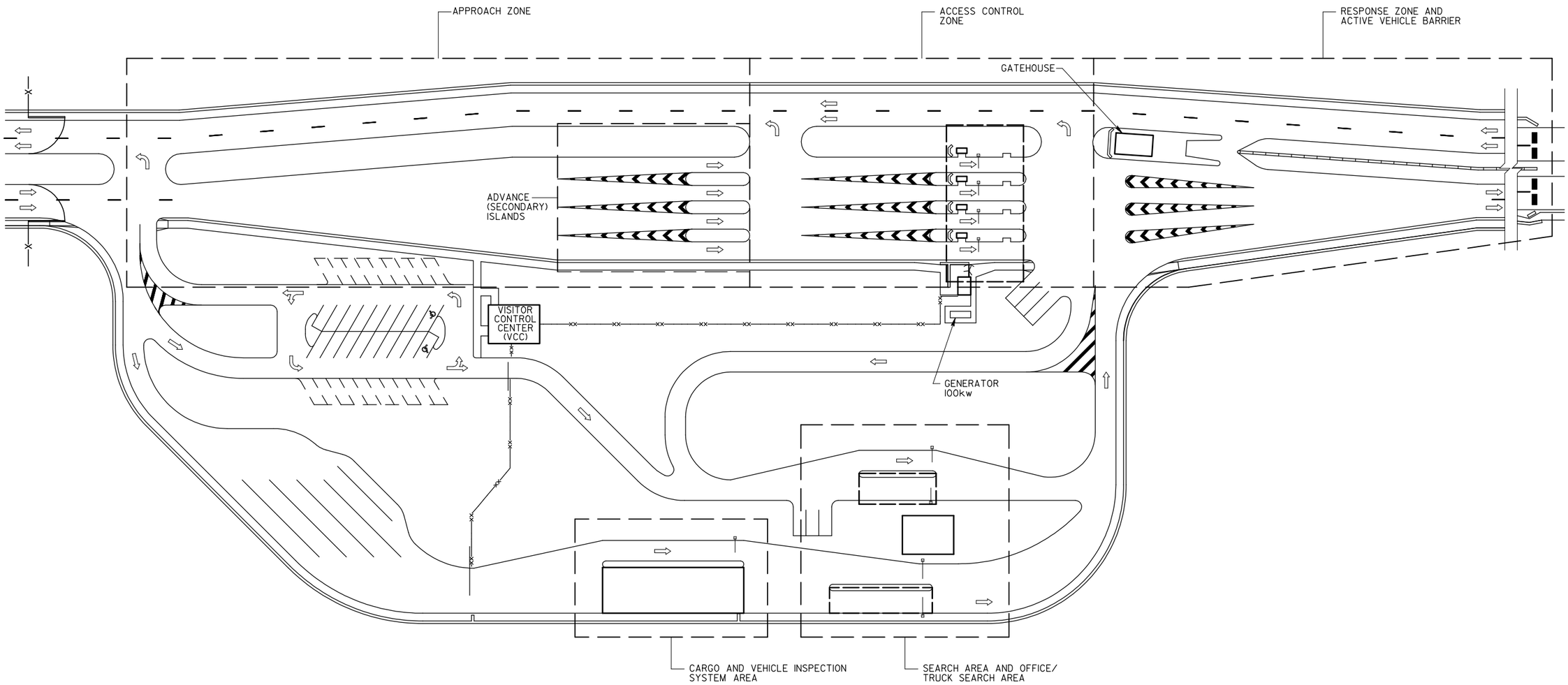
SYMBOL	DESCRIPTION	DATE	APPROVED

DESIGNED BY: GANNETT FLEMING	CKD BY: EER	DATE: X	REV. --
DWN BY: RJT	DESIGN FILE NO. 00016101		SPEC. NO.
REVIEWED BY: USACE-OD	PLOT SCALE RATIO: NO SCALE		CONTRACT NO.
SUBMITTED BY: USACE-OD	DRAWING CODE: DEF872-50-01		
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

ELECTRICAL PLAN
CAMERA PLAN

SHEET REFERENCE NUMBER
E1.01
SHEET 38 OF 40



POWER REQUIREMENTS

NOT TO SCALE

AREA	VA - CONNECTED			VA - DEMAND		
	UTILITY	GENERATOR	UPS	UTILITY	GENERATOR	UPS
APPROACH ZONE	7120.0	7120.0	2400.0	7120.0	7120.0	2400.0
ADVANCE (SECONDARY) ISLANDS	6240.0	6240.0	1200.0	1440.0	1440.0	1200.0
ACCESS CONTROL ZONE	32632.2	23919.2	9020.0	16992.2	16079.2	5980.0
GATEHOUSE	15184.6	8343.6	6934.0	11704.6	8343.6	6934.0
RESPONSE ZONE AND ACTIVE VEHICLE BARRIER	22578.0	22578.0	18550.0	4098.0	4098.0	70.0
OVERWATCH POSITION	2430.8	1276.8	1056.0	1710.8	1276.8	1056.0
VISITOR CONTROL CENTER (VCC)	24730.2	8555.2	3864.0	15740.2	8555.2	3864.0
SEARCH AREA AND OFFICE	38860.2	25685.2	6180.0	30910.2	23725.2	5420.0
TRUCK SEARCH AREA	8482.0	8482.0	830.0	7722.0	7722.0	70.0
CARGO AND VEHICLE INSPECTION SYSTEM AREA	100000.0	0.0	0.0	100000.0	0.0	0.0
ALL	258258.0	112200.0	50034.0	197438.0	78360.0	26994.0

NOTES:

1. POWER REQUIREMENTS PER ACP CRITERIA REQUIREMENTS AND STANDARD DRAWINGS.
2. STANDBY (BACKUP) & UPS REQUIREMENTS PER ACP CRITERIA REQUIREMENTS.
3. DESIGNER TO VERIFY UPS INTERFACE CAPABILITIES.
4. PHYSICAL LOCATION(S) AND SIZE OF UPS(S) SHALL BE DETERMINED BY THE ELECTRICAL DESIGNER.
5. SEE APPENDIX F FOR DETAILED LIST OF ELECTRICAL LOADS.

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SYMBOL	DESCRIPTION	DATE	APPROVED

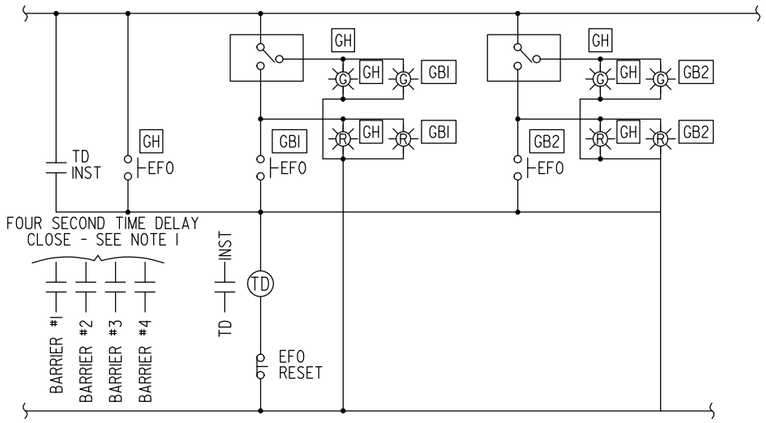
REV. --
SPEC. NO.
CONTRACT NO. X

DESIGNED BY: GANNETT FLEMING
DRWN BY: JAC
CKD BY: RJT
REVIEWED BY: USACE-OD
DATE: X
DESIGN FILE NO. 0D01E102
PLOT SCALE RATIO: NO SCALE
SUBMITTED BY: USACE-OD
DRAWING CODE: DEF872-50-01
CHIEF:

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

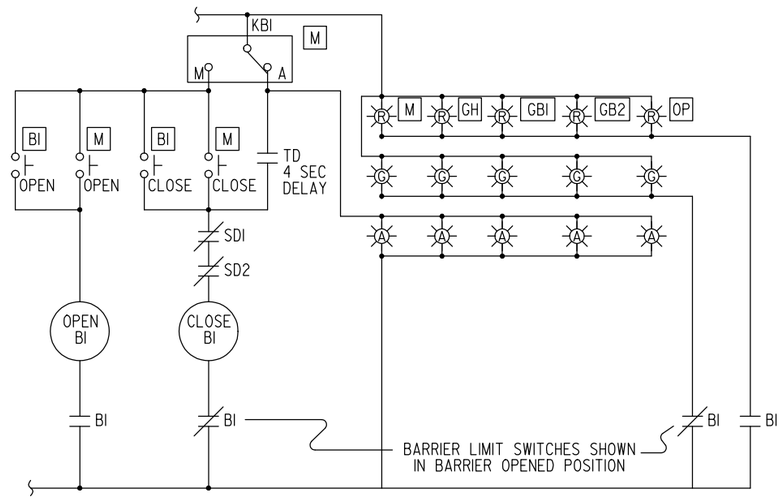
ELECTRICAL PLAN
POWER REQUIREMENTS

SHEET REFERENCE NUMBER
E1.02
SHEET 39 OF 40



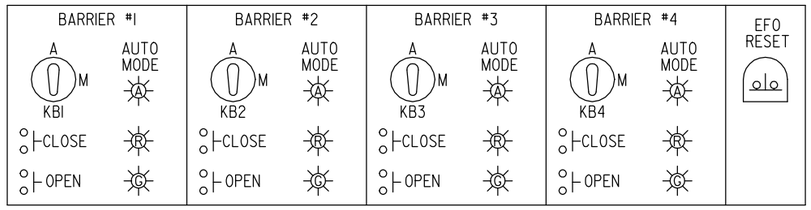
EMERGENCY FAST OPERATE CONTROL LOGIC

NOT TO SCALE



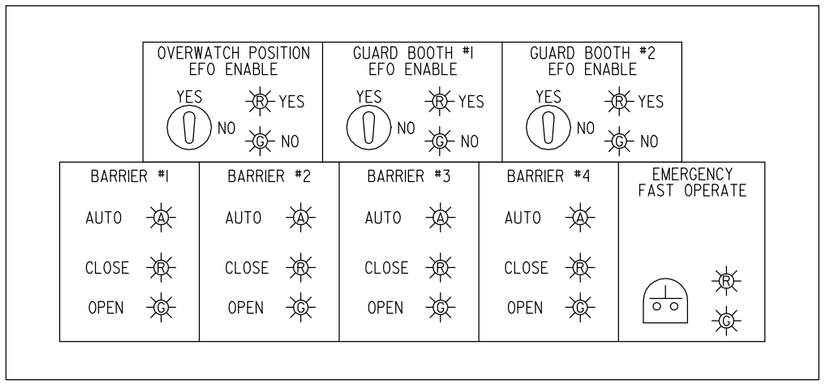
BARRIER #1 LOGIC (TYPICAL)

NOT TO SCALE



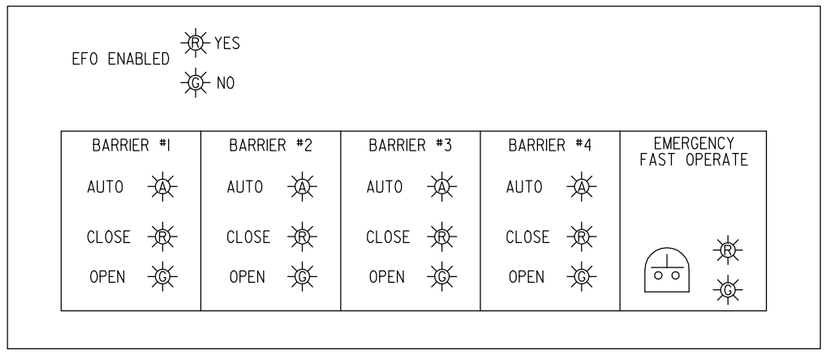
MAINTENANCE CONTROL PANEL

NOT TO SCALE



GATEHOUSE MASTER CONTROL PANEL

NOT TO SCALE



GUARD BOOTH OR OVERWATCH POSITION CONTROL PANEL

NOT TO SCALE

DEVICE LEGEND

EFO - EMERGENCY FAST OPERATE PUSHBUTTON WITH SAFETY COVER

TD - TIME DELAY RELAY WITH BOTH INSTANTANEOUS AND TIME DELAY CLOSE CONTACTS. SET AT 4-SECONDS DELAY TO ALLOW TIME FOR TRAFFIC SIGNAL SEQUENCE.

KBx - KEY OPERATED MANUAL-AUTOMATIC CONTROL SWITCH FOR EACH ACTIVE VEHICLE BARRIER. "x" DENOTES THE BARRIER NUMBER.

N-GBx - KEY OPERATED EFO ENABLE CONTROL SWITCH FOR EACH GUARD BOOTH. "x" DESIGNATES THE GUARD BOOTH NUMBER.

N-O - KEY OPERATED EFO ENABLE CONTROL SWITCH. "O" DESIGNATES THE OVERWATCH POSITION.

Bx - BARRIER LIMIT SWITCHES SHOWN IN THE BARRIER-OPENED POSITION. "x" DESIGNATES THE BARRIER NUMBER.

SDI - BARRIER SAFETY DEVICE (E.G., LOOP DETECTOR). CONTACT OPENS WHEN A VEHICLE IS DETECTED IMMEDIATELY OVER THE BARRIER.

SD2 - BARRIER SAFETY DEVICE (E.G., LOOP DETECTOR). CONTACT OPENS WHEN A VEHICLE IS DETECTED IN THE "STOP AND DETECT" SCHEME.

(G) - GREEN INDICATING LIGHT

(R) - RED INDICATING LIGHT

(A) - AMBER INDICATING LIGHT

DEVICE LOCATION SYMBOLS

GH - GATEHOUSE MASTER CONTROL PANEL

GBx - GUARD BOOTH CONTROL PANEL - "x" DENOTES GUARD BOOTH NUMBER

OP - OVERWATCH POSITION CONTROL PANEL

M - MAINTENANCE CONTROL PANEL (LOCATED IN THE ELECTRICAL ROOM IN THE GATEHOUSE)

Bx - BARRIER LOCAL CONTROL PANEL - "x" DENOTES THE BARRIER NUMBER

NOTES:

1. SET TIME DELAY FOR 4 SECONDS FOR SAFETY REGIME #1 (BARRIER "NORMALLY OPEN" MODE) AND 1 SECOND FOR SAFETY REGIMES #2 (BARRIER "NORMALLY CLOSED" MODE) AND #3 ("STOP AND DETECT").
2. SCHEMATICS SHOW GATE LOGIC, BUT CONTROL SHALL BE DONE WITH PROGRAMMABLE CONTROLLER.

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SYMBOL	DESCRIPTION	DATE	APPROVED

REV.	SPEC. NO.	CONTRACT NO.
--		X

DESIGNED BY: GANNETT FLEMING		DATE: X	
DWN BY: JRP	CKD BY: RJT	DESIGN FILE NO. 0D01E103	PLOT SCALE RATIO: NO SCALE
REVIEWED BY: USACE-OD		SUBMITTED BY: USACE-OD	DRAWING CODE: DEF872-50-01
CHIEF:			

DEPARTMENT OF THE ARMY
FACILITIES STANDARDIZATION PROGRAM
ACCESS CONTROL POINTS FOR U.S. ARMY INSTALLATIONS

ELECTRICAL PLAN
ACTIVE VEHICLE BARRIER CONTROLS

SHEET REFERENCE NUMBER
E1.03
SHEET 40 OF 40

APPENDIX D

DESIGN PROCEDURE

APPENDIX D
DESIGN PROCEDURE
INDEX

ATTACHMENTS

Appendix D
Design Procedure

A. General.

1. Designers shall use the following design procedure to determine ACP protective measures that can be used to effectively defeat the four Threat Scenarios defined in the Design Criteria (Appendix B). If additional Threat Scenarios are defined in the project specific criteria, designers can use the equations and methodologies in this Design Procedure to help define appropriate protective measures against these scenarios as well.
2. The Designer must select ACP features that detect possible threat vehicles and ACP features that delay the threat vehicle for the delay times described in the Design Criteria. Detection features include vehicle speed detectors, vehicle wrong-way detectors, and vehicle presence detectors along with detection by security guards. Delay features include straight roadways and roadways with chicanes, curves, or turns.
3. Based on the opportunities and constraints of the site, the designer must determine appropriate detection and delay features and perform calculations to assure that the selected features provide the delays required for the given Threat Scenarios.
4. The design engineer must prepare a Design Analysis including descriptions of selected ACP features, layouts of detection and delay features, and calculations verifying delay times.
5. Calculations are based on the following equations of motion:

a) V = Vo + a*T
b) D = Vo*T + ½*a*T^2
c) D = (V^2-Vo^2)/(2*a)
d) T = (-Vo+(Vo^2+2*a*D)^1/2)/a

Where V=final speed (feet per second), Vo=initial speed (feet per second), D=distance (feet), a=acceleration (feet/second^2), and T=time (seconds).

The Design Criteria (Appendix B) sets the maximum acceleration of the threat vehicle at a=11.3 feet/second^2.

The maximum deceleration rate of the threat vehicle (ad) is calculated from the relationship ad=f*g, where g is the acceleration of gravity (32.2 feet/second^2) and f is the friction factor. From page 122, Figure III-IA in “A Policy on Geometric Design of Highways and Streets 1990” from the American Association of State Highway and Transportation Officials

(AASHTO), f=0.75 for dry pavement and good tires. Therefore, ad=24.1 feet/second^2.

B. Conventional ACP Example.

1. Refer to Drawing C3.09 for the Conventional ACP example. In this example, the ACP roadways are straight with no features to slow a possible Threat Vehicle down. Required delays are attained by the length of the roadway between the point of detection and the active vehicle barriers.

2. The Conventional ACP consists of an Approach Zone, an Access Control Zone, and a Response Zone as shown on Drawing C3.09. The length of the Access Control Zone (Dacz) is governed by the size of the ID Check Area facilities and safety considerations of the roadways. In this example and the examples that follow, Dacz=255 feet. The length of the Approach Zone (Daz) is governed by traffic sorting and queuing requirements and, if necessary, by requirements to delay the Threat Vehicle. The length of the Response Zone (Drz) is governed only by requirements to delay the Threat Vehicle.

3. To determine the minimum lengths of the Approach and Response Zones required to delay the Threat Vehicle, evaluate delay and detection requirements for all threat scenarios per the following steps:

   Step 1 – Evaluate Threat Scenario #1. In Threat Scenario #1, the Threat Vehicle enters the ACP at the maximum speed (Vo) that can be attained at the ACP entrance. The protective strategy for this scenario includes detecting the attack at the ACP entrance using a speed detector. The speed detector setting shall be set at 10 mph over the posted speed limit to avoid excessive alarms. Assume the posted speed limit for this example is 25 mph, so the speed detector setting shall be 35mph. Therefore, in this scenario, the Threat Vehicle enters the ACP at some speed (Vo) at or above 35 mph and is detected by the speed detector at the ACP entrance. Per the design criteria in Appendix B, the required delay time from the point of detection is 9 seconds. The distance that a Threat Vehicle can travel in 9 seconds depends on its speed at the time of detection. In this scenario, this distance begins at the ACP entrance and ends at the final vehicle barriers, so the distance is the

length of the ACP (designated as Dacp). Dacp distances required to delay the threat vehicle for 9 seconds are shown in Table B-1 below for various Threat Vehicle initial speeds (Vo). Note, if physical features immediately before the ACP entrance will limit vehicle speeds to less than 35 mph (e.g., a right angle turn), then evaluation of Threat Scenario #1 can be eliminated. Also note, if the ACP speed limit is higher or lower than the 25 mph assumed for this example, the values in Table B-1 must be recalculated. Generally, the required length of Dacp will increase for higher speed limits and decrease for lower speed limits.

Vo(mph)	35	40	45	50	55	60	65	70
Vo(kph)	56	64	72	80	89	97	105	113
Dacp(feet)	920	986	1,052	1,118	1,184	1,250	1,316	1,382
Dacp(meters)	280	300	321	341	361	381	401	421

Table B-1 Minimum Length of ACP to Defeat Threat Scenario #1

Step 2 – Evaluate Threat Scenario #2. In Threat Scenario #2, the Threat Vehicle enters the Installation at or under the entrance speed detector setting so as not to be detected. The Threat Vehicle then begins the attack immediately after passing the detector by accelerating toward the final vehicle barriers. Without additional speed detectors, the Threat Vehicle may go undetected until it essentially reaches the ID Check Position, where ID Check Area guards will detect it. The distance it can travel (Dtv) in the required 9 seconds of delay from the point of detection depends on its speed when it is detected at the ID Check Position. Since the Threat Vehicle starts to accelerate immediately after passing the entrance speed detector, its speed at the time it gets to the ID Check Position depends on the distance between the speed detector at the ACP entrance and the ID Check Position. This distance, designated as Dei, is the Approach Zone length (Daz) plus the distance between the end of the Approach Zone and the ID Check position (Dai); that is Dei=Daz+Dai. In this and the examples that follow, Dai=165 feet (see Drawing C3.09). Table B-2 below shows distances (Dtv) and speeds at the ID Check Position (Vid) for various distances (Dei) from the ACP entrance to the ID Check Position. The table also shows the required length of the Response Zone (Drz) assuming the distance between the ID Check position and the beginning of the Response Zone (Dir) is Dir=90 feet (see

Dwg. C3.09). The table assumes that the Threat Vehicle's speed at the beginning of the attack is 35mph, i.e., just under the setting of the speed detector at the ACP entrance. Note, similar to Threat Scenario #1, if the ACP speed limit is higher or lower than the 25 mph assumed for this example, the values in Table B-2 must be recalculated. Generally, the required length of Drz will increase for higher speed limits and decrease for lower speed limits.

Dei(feet)	350	400	450	500	550	600	650	700
Dei(meters)	107	122	137	152	168	183	198	213
Vid(fps)	102.7	108.1	113.2	118.0	122.7	127.3	131.6	135.8
Vid(M/s)	31.3	32.9	34.5	36.0	37.4	38.8	40.1	41.4
Dtv(feet)	1,382	1,430	1,476	1,520	1,562	1,603	1,642	1,680
Dtv(meters)	421	436	450	463	476	489	501	512
Drz(feet)	1,292	1,340	1,386	1,430	1,472	1,513	1,552	1,590
Drz(meters)	394	408	422	436	449	461	473	485

Table B-2 Minimum Length of Response Zone to Defeat Threat Scenario #2

Step 3 – Evaluate Threat Scenario #3. In Threat Scenario #3, the driver of the Threat Vehicle begins the attack at the ID Check Position upon being rejected by the ID Check Area guard. The ID Check Area guard immediately detects the attack. The Threat Vehicle's initial speed (Vo) is zero. In the required 9 seconds of delay, the Threat Vehicle can travel Dtv=1/2*11.3*(9)^2=458 feet. The minimum length of the Response Zone is then Drz =Dtv-Dir= 458-90 = 368 feet for this Threat Scenario. This distance is significantly less than that required for Threat Scenario #2.

Step 4 – Evaluate Threat Scenario #4. In Threat Scenario #4, the driver of the rejected Threat Vehicle feigns compliance after being rejected by the ID Check Area guard and travels toward the Turn-around or Search Area entrance at the ACP speed limit of 25 mph. The driver then fails to turn and instead begins his attack when he reaches the beginning of the Response Zone traveling at 25 mph. In this scenario, the guards are watching the rejected Threat Vehicle to assure it makes the appropriate turn. Therefore, guard reaction time in this scenario is reduced from 3 seconds to 1 second and total delay time is reduced from 9 to 7 seconds (see

Criteria – Appendix B). From the time of detection, the Threat Vehicle can travel Dtv, which in this example is Drz=25*1.467*7+1/2*11.3*(7)^2=534 feet in 7 seconds. Although greater than the distance required in Threat Scenario #3, this distance is still significantly less than that required for Threat Scenario #2.

Step 5 – Select Worst Case for Response Zone Length. Even for short lengths of Dei, the Response Zone length required for Threat Scenario #2 is much greater than those required for Threat Scenarios #3 and 4. Threat Scenario #2, therefore, governs the minimum length of the Response Zone.

Step 6 – Determine Response Zone Length. To determine the required length of the Response Zone, the length of the Approach Zone (Daz) required to meet traffic sorting and queuing requirements must first be determined. For this and the following examples, assume Daz=535 feet for queuing and sorting. To Daz add Dai (which is 165 feet in this example) to determine Dei (Dei=165+535=700 feet). Use Table B-2 and Dei to determine Drz. For this example, Drz=1590 feet.

Step 7 – Determine Approach Zone Length. Determine the maximum speed that a Threat Vehicle can enter the ACP (Vo). For this example, assume Vo=60mph. From Table B-1 and Vo, Dacp=1250 feet. If Dacp from Table B-1 is greater than the sum of Daz+Dacz+Drz, then increase Daz by the difference. In this example, Daz+Dacz+Drz=535+255+1590 = 2380 feet, so no additional length to the Approach Zone is required for delay. Daz=535 feet.

Step 8 – Summarize Results.

Approach Zone length is Daz=535 feet.
Access Control Zone length is Dacz=255 feet.
Response Zone length is Drz=1590 feet.
Total ACP length is Dacp=2380 feet.

C. Conventional ACP with Continuous Speed Detection Example.

1. The required Response Zone length and overall ACP length for the Conventional ACP in this example are quite large (1590 feet and 2380 feet respectively). These lengths are required to defeat Threat Scenario #2. Deploying a speed detection system that will detect the Threat Vehicle in Threat Scenario #2 earlier in the attack can reduce these distances.
2. Since the Threat Vehicle in Threat Scenario #2 can begin an attack essentially anywhere in the Approach or Access Control Zones, the ideal speed detector would continuously detect vehicles in these zones and alarm when any vehicle exceeded the detector speed setting. Point type speed detectors, such as loop detectors, would not be suitable for this type of application. Video motion, radar, and laser type detectors, if properly applied, could be used.

3. Conventional ACP with one Speed Zone. In the above example, assume that a continuous speed detection zone is deployed from the ACP entrance to the ID Check Position to detect an attack using Threat Scenario #2. Also, assume that the detector alarm point is set at 35 mph.

   Step 1 – Determine Response Zone Length. With a continuous over-speed detection system in place, the aggressor in Threat Scenario #2 would attempt to stay near but just under the 35 mph setting of the over-speed detection system while approaching the ID Check Area. The aggressor would want to get as close as possible to the ID Check Area before beginning his attack. Assume the Threat Vehicle begins his attack just prior to the ID Check Position by accelerating past the checkpoint from an initial speed of 35mph. The Threat Vehicle would be detected at that point by ID Check Area guards. From this detection point, the Threat Vehicle can travel Dtv=35*1.467*9+1/2*11.3*(9)^2=920 feet in the 9 seconds of required delay time. The required length of the Response Zone would then be Drz=Dtv-Dir=920-90=830 feet. This is a significant improvement over Drz without continuous speed detection.

   Step 2 – Compare the Response Zone length determined in Step 1 above with the lengths determined in Steps 3 and 4 in the previous example for Threat Scenarios 3 and 4 and determine the worst case. (Note, the continuous speed zone detector does not affect

Response Zone lengths for Threat Scenarios 3 and 4, as these threat scenarios begin after the threat vehicle has passed the speed zone.) The required Response Zone length of 830 feet determined in step 1 above is greater than the lengths of 368 feet and 534 feet for Threat Scenarios 3 and 4, respectively, determined in the previous example. The worst case Response Zone length is, therefore, 830 feet for Threat Scenario #2.

Step 3. Determine Approach Zone Length. Using the required length of the Response Zone determine in Step 3 above, the total length of the ACP is Daz+Dacz+Drz=535+255+830=1620 feet. This length is still greater than the 1250 foot length determine in Step 7 in the previous example. Therefore, there are no additional delay requirements for the Access Control Zone. The minimum length of Daz is still 535 feet.

Step 4 – Summarize Results.
Approach Zone length is Daz=535 feet.
Access Control Zone length is Dacz=255 feet.
Response Zone length is Drz=830 feet.
Total ACP length is Dacp=1620 feet.

4. Conventional ACP with two Speed Zones. The required Response Zone length could be further reduced if a second speed zone were set up immediately in front of the ID Check Position with its speed detector set at 20 mph.

Step 1 - The aggressor would again begin the attack as close to the ID Check Position as possible. Assuming ID Check Area guards detect the Threat Vehicle as it passes them at 20 mph, the Threat Vehicle can travel Dtv=20*1.467*9+1/2*11.3*(9)^2=722 feet in the 9 seconds of required delay. The required length of the Response Zone would be Drz=Dtv-Dir=632 feet. This distance is 830-632=198 feet less than the distance required with one speed zone. The second speed zone, set at 20 mph, would need to cover the area 198 feet in front of the ID Check Area. The first speed zone, set at 35 mph, would cover the area from 198 feet in front of the ID Check Area to the ACP entrance.

Step 2 – Compare the Response Zone length determined in Step 1 above with the lengths determined in Steps 3 and 4 in the example without speed zones for Threat Scenarios 3 and 4 and determine the worst case. (Note, the continuous speed zone detectors do not affect Response Zone lengths for Threat Scenarios 3 and 4, as these threat scenarios begin after the threat vehicle has passed the speed zone.) The required Response Zone length of 632 feet determined in step 1 above is greater than the lengths of 368 feet and 534 feet for Threat Scenarios 3 and 4, respectively, determined above. The worst case Response Zone length is, therefore, 632 feet for Threat Scenario #2.

Step 3 – Determine Approach Zone Length. Using the required length of the Response Zone determined in Step 2 above, the total length of the ACP is Daz+Dacz+Drz=535+255+632=1422 feet. This length is still greater than the 1250 foot length determine in Step 7 of the Conventional ACP example. Therefore, there are no additional delay requirements for the Access Control Zone. The minimum length of Daz is still 535 feet.

Step 4 – Summarize Results.
Approach Zone length is Daz=535 feet.
Access Control Zone length is Dacz=255 feet.
Response Zone length is Drz=632 feet.
Total ACP length is Dacp=1422 feet.

5. Although speed zones reduce the required length of the Response Zone, they add a level of complexity to the protective system for both guard force operations and equipment maintenance. They should be utilized only when real estate for the ACP is limited and speed management features are not possible. If speed zones are to be utilized, care must be taken when selecting an over-speed detection system. Select system components including sensors, software, and head end equipment that have been proven for similar applications.

D. Speed Management.

1. General. Speed Management features such as curves and chicanes can be utilized to slow down the Threat Vehicle and to provide required

delay times. An example of a curve is shown on Drawing C3.11. Examples of chicanes are shown on Drawings C3.10 and C3.12. Curves and chicanes provide delay by forcing vehicles to slow down to the spinout speed of the curve or chicane. If a Threat Vehicle exceeds this speed, it will spin out and loose the race to the final barrier. The Response Zone is the most effective location for a curve or chicane, as a curve or chicane here will delay the Threat Vehicle in all of the Threat Scenarios.

2. Threat Scenarios. To select an appropriate chicane or curve, the first step is to evaluate its effect on defeating the given Threat Scenarios. The following is an evaluation of the four Threat Scenarios given in the Design Criteria considering a curve is deployed in the Response Zone:

    a. Threat Scenarios #1 and #2. In both Threat Scenarios #1 and #2, the Threat Vehicle speeds through the ID Check Area at the maximum speed it can attain. However, in order to keep from spinning out when it reaches the curve in the Response Zone, it must decelerate at some point before the curve entrance so its speed when it reaches the curve is at or below the curve's spinout speed. In Threat Scenario #1, the Threat Vehicle is detected at the ACP entrance. However, in Threat Scenario #2, the Threat Vehicle isn't detected until it gets to the ID Check position. Considering the Threat Vehicle in either scenario must decelerate to the curve's spinout speed, Threat Scenario #2 is the worst case as the Threat Vehicle is closer to the final active barriers when it is detected. Threat Scenario #2 requires 9 seconds of delay, which must be achieved within the Response Zone curve plus the distance between the ID Check Position and the beginning of the curve (Dir).

    b. Threat Scenario #3. Threat Scenario #3 begins and is detected at the ID Check position. However, the Threat Vehicle's speed when it is detected is zero. The Threat Vehicle in Threat Scenario #2 is also detected at the ID Check position, but it is traveling much faster. Therefore, Threat Scenario #2 is a worse case than Threat Scenario #3.

c. Threat Scenario #4. Threat Scenario #4 begins and is detected at the beginning of the Response Zone. Per the Design Criteria, the required delay time for Threat Scenario #4 is 7 seconds. Therefore, the delay time required in the Response Zone curve must be a minimum of 7 seconds to defeat Threat Scenario #4.

d. Summary. The Response Zone curve plus the distance between the ID Check Area and the Response Zone must provide 9 seconds of delay to the threat vehicle in Threat Scenario #2. In addition, the Response Zone curve by itself must provide 7 seconds of delay to the threat vehicle in Threat Scenario #4.

3. Parameters of Chicanes and Curves. In order to determine delay times provided by chicanes and curves, the parameters of the chicane/curve must be defined. Parameters include inside turning radius, unobstructed roadway width, and turn angle.

a. Turning radius determines how fast the threat vehicle can turn without spinning out. The spinout speed of a passenger vehicle can be calculated from the following equation (see page 119 of "A Policy on Geometric Design of Highways and Streets 1990" from AASHTO):

Eq. 1) $Vm = ((f+s) * g * R)^{0.5}$

Where f=friction factor (assume 0.75 for good tires and dry pavement); s=super elevation rate (assume 0.03); g=acceleration of gravity (32.2 feet/second^2); and R=radius of turn in feet (the minimum turning radius for large trucks (WB-65) is 65 feet and the minimum turning radius for passenger vehicles is 35 feet).

b. The unobstructed roadway width is the width of the roadway between curbs. It includes the width of each lane plus the width of any shoulders. For a two-lane roadway, the unobstructed width would normally be 26 feet, that is two 12-foot wide lanes plus one 2-foot gutter.

c. For a chicane or curve that ends in the same direction and alignment as it started (see Drawings C3.10, 11, and 12), the chicane/curve is a series of four turns; one right turn, two

consecutive left turns, and one final right turn or vise-versa. The turn angle is the angle that each turn makes between its entrance and exit. The turn angle determines the total distance traveled. The larger the turn angle is, the longer the turn distance is and, therefore, the longer the delay time is. To provide sufficient delay, turn angles normally vary between 30 and 90 degrees. Care must be taken in selecting turn angles. For wide roadway widths, larger turn angles are required to preclude a threat vehicle from switching lanes to achieve a straight or large radius path through the chicane/curve. Use the following equations to calculate the total travel distance in the chicane/curve and the length and width of the chicane/curve given the inside radius of the chicane/curve, the turn angle, the roadway width, and the median width.

For Chicanes:

Eq. 2) CLR (Chicane C-L Radius) = IR+W+M/2

Eq. 3) CD (Chicane Distance) = 4*CLR*Theta

Eq. 4) CL (Chicane Length) = 4*CLR*Sin(Theta)

Eq. 5) CW (Chicane Width) = 2*CLR*(1-Cos(Theta))+2*W+M

Where IR is the inside radius of chicane; Theta is the turn angle; W is the roadway width, and M is the median width.

For Curves:

Eq. 2a) CLR (Curve C-L Radius) = IR+W/2

Eq. 3a) CD (Curve Distance) = 4*CLR*Theta

Eq. 4a) CL (Curve Length) = 4*CLR*Sin (Theta)

Eq. 5a) CW (Curve Width) = 2*(2*CLR*(1-Cos (Theta))+ W)+M

Where IR is the inside radius of curve; Theta is the turn angle; W is the roadway width, and M is the median width.

4. Time Delay through Chicanes and Curves.

   a. The ideal minimum time required to traverse a chicane/curve can be calculated using the chicane/curve distance (Eq. 3 or 3a) divided by the maximum speed in the chicane/curve (Eq. 1). However, the ideal time assumes the threat vehicle will follow the centerline radius through the chicane/curve. In reality, the threat vehicle will use the entire width of the roadway to

maximize the turning radii and thus maximize its spinout speeds. The practical traverse time can be calculated by analyzing the chicane/curve and determining the quickest path through it. This path will consist of several segments. Once the segments of the path are determined, calculate the radius, distance, maximum speed, and time to traverse each segment and add these times together to obtain the total traverse time.

b. The fastest path through a chicane/curve depends on the turn angle, the clear roadway width, and physical features at the entrance and exit. Two different paths were analyzed in this design procedure as follows:
    i. Tangent Method – This path consists of 3 curved sections and 2 straight sections. Considering the chicane/curve consists of 4 Turns as described above, the path through the chicane/curve follows:
        1. Approach Turn #1 on a path with a maximum possible radius and move toward the right hand curb of Turn #1. For a 6-foot wide vehicle, the centerline of the vehicle would travel toward a curve with a radius of 3 feet longer than the inside radius of Turn #1. Travel speed is limited by the radius of the curve.
        2. Follow this curve a certain distance and then turn straight toward the left curb of Turn #2. The straight section is a line tangent to the two circles defined by Turn #1 and Turn #2. These circles are separated by a distance s=RW-6, where RW is the unobstructed roadway width and the 6 feet is the width of the threat vehicle. Travel speed in the straight section is limited by how fast the vehicle can accelerate after exiting the first curve and how fast it must decelerate before entering the second curve.
        3. The vehicle would then follow the left curb of the rest of Turn #2 and part of Turn #3 and then turn straight again toward the right curb of Turn #4.
        4. The vehicle would finally travel along the right curb of Turn #4 and exit along a curve with the

maximum radius attainable through the active vehicle barriers at the end of the curve.

ii. Three Curve Method – This path consists of three circle segments, one segment entering the Chicane/Curve, one segment through the middle section of the Chicane/Curve, and one segment exiting the Chicane/Turn. The middle circle segment is tangent to both the entrance and exit circle segments. Travel speeds are limited by the radius of each circle segment.

iii. Both Methods –

1. In order to maximize the curve radius, the entrance curve actually begins before the Chicane/Curve. The distance that the entrance curve begins in front of the Chicane/Curve depends on the Chicane/Curve turn angle. For low turn angles, the entrance curve could begin at or even before the ID Check Area. For certain small turn angles, therefore, the physical features at the ID Check Area (e.g., lane spacing, traffic island lengths, turn-around lane configuration, etc.) will affect the maximum radius attainable for the entrance curve. For the speed tables described in paragraph "c" below, calculations for the entrance curve radius assume the entrance curve starts at some distance in front of the Chicane/Curve, but not further in front of the Chicane/Curve than the ID Check Area.
2. The maximum attainable radius of the exit curve depends on the distance that the active vehicle barriers are beyond the end of the Chicane/Curve and the physical features at the barriers (e.g., passive barriers, active barrier components, and infrastructure that would limit a vehicle's ability to switch lanes). For the speed tables described in paragraph "c" below, calculations for the exit curve assume that the active barriers are at the end of the Chicane/Curve and that the end of the exit curve is tangent to the left hand curb of the right most lane.

3. The assumptions described above at the entrance and exit to the Chicane/Curve effect the radii of both entrance and exit curves and, therefore, the threat vehicle's entry and exit speeds. If conditions at the entrance or exit to the Chicane/Curve are different than described above, calculations using the actual conditions must be performed.

c. Tables D-1-19 show data for various chicanes and curves given inside radii, turn angles, and roadway widths. The Tables list Curve Distance (CD), Curve Length (CL), Roadway Corridor Width (CW), Chicane/Curve Traverse Time (Trz), and the time to traverse the distance between the ID Check Area and the active barriers (Tidb). The tables list the best (least) traverse times between the two paths described above. Generally, for low turn angles, the Three Curve method is fastest, whereas, for higher turn angles, the Tangent method is fastest. Tables D-1-10 apply to chicanes where the inbound and outbound lanes follow the same path (see Drawings C3.10 and C3.12). Tables D-11-19 apply to curves where the inbound and outbound lanes follow opposite but mirror image paths (see Drawing C3.11). For all Tables, a median island width of 24 feet is assumed.

5. Design Procedure for a Chicane or Curve deployed in the Response Zone:

Step 1 – Select Parameters. Consider traffic volumes and types based on the Traffic Engineering Study and select appropriate parameters for the roadway width and the chicane/curve's inside radius.

Step 2 – Select Turn Angle of the Chicane/Turn. Select appropriate table from Tables D-1 through D19 with the parameters determined in Step 1 above. Find the appropriate turn angle in the selected table that provides Trz equal or greater than 7 seconds and a Tidb equal or greater than 9 seconds.

E. Speed Management Examples:

1. 50mph Chicane Example.
    a. Refer to Drawing C3.10 for the 50mph Chicane example. From the results of the Traffic Engineering Study, assume that the required chicane must have an inside radius of 205 feet and must have two traffic lanes with an overall, unobstructed roadway width of 26 feet.
    b. For chicanes with an inside radius of 205 feet and a roadway width of 26 feet, use Table D-9. Select a curve angle from Table D-9 that will provide a value of Trz greater than 7 seconds and Tidb greater than 9 seconds. Choose the chicane with a curve angle of 50 degrees, which will provide Trz= 9.75 seconds and Tidb=10.7 seconds. This chicane is 745 feet long with a roadway corridor width of 250 feet. Note, the next lower chicane in the Table has a 40-degree turn angle and provides a Trz of 7.45 seconds, which is greater than the required 7 seconds, but a Tidb of only 8.32, which is less than the required 9 seconds delay. A chicane with a 43-degree turn angle would provide a Trz=8.12 seconds, which is greater than the required 7 seconds, and Tidb=9.03 seconds, which is greater that the required 9 seconds of delay. This chicane would be 663 feet long with a roadway corridor width of 207 feet.

2. 32mph Curve Example.
    a. Refer to Drawing C3.11 for the 32mph Curve example. From the results of the Traffic Engineering Study, assume that the required curve must have an inside radius of 65 feet and must have two traffic lanes with an overall, unobstructed roadway width of 26 feet.
    b. For curves with an inside radius of 65 feet and a roadway width of 26 feet, use Table D-12. Select a curve angle from Table D-12 that will provide a value of Trz greater than 7 seconds and Tidb greater than 9 seconds. Choose the curve with a curve angle of 80 degrees, which will provide Trz=8.37 seconds and Tidb=9.89 seconds. This curve is 307 feet long with a roadway corridor width of 334 feet. Note, the required Response Zone length in this example is significantly less than that required using 2 speed zones (632 feet) determined in paragraph C4 above.

3. 28mph Chicane Example.

a. Refer to Drawing C3.12 for the 28 mph Chicane example. From the results of the Traffic Engineering Study, assume that the required chicane must have an inside radius of 50 feet and must have one traffic lane with an overall, unobstructed roadway width of 14 feet.
b. For chicanes with an inside radius of 50 feet and a roadway width of 14 feet, use Table D-1. Select a curve angle from Table D-1 that will provide a value of Trz greater than 7 seconds and Tidb greater than 9 seconds. Choose the chicane with a curve angle of 70 degrees, which will provide Trz=7.70 seconds and Tidb-9.35 seconds. This chicane is 286 feet long with a roadway corridor width of 152 feet.
c. Note, chicanes with an inside radius of 50 feet can only be used at ACPs where truck traffic is excluded. Trucks inadvertently entering the ACP must be rejected at the Turn-around.

4. Presence Detection Example.
    a. Refer to Drawing C3.14 for the Vehicle Presence Detection example. In this protective system, the 4-second delay for the barrier warning signals to cycle is eliminated (assuming no vehicles are detected in front of the barriers). The total delay time required for this protective system is five seconds for Threat Scenarios #1, 2, and 3 and three seconds for Threat Scenario #4, where the guard reaction time is reduced to 1 second.
    b. As in the previous examples, Threat Scenario #2 is the worst case. Evaluate Threat Scenario #2 with the following additional protective measures:
        i. Speed Zone set at 35mph. With a Speed Zone set up between the ACP entrance and the ID Check position, guards will detect the Threat Vehicle when it arrives at the ID Check position. It will have a speed of 35mph and will begin accelerating. In the required time delay of 5 seconds, the Threat Vehicle can travel Dtv=35*1.467*5+1/2*11.3*(5)^2=398 feet. The required length of the Response Zone is then Drz=Dtv-Dir=398-90=308 feet.
        ii. Speed Zones at both 35mph and 20mph (see paragraph C4 above). With the second Speed Zone setup in front of ID Check position, the Threat vehicle will be detected

by guards when it arrives at the ID Check position. It will have a speed of 20mph and will begin accelerating. In the required time delay of 5 seconds, the Threat Vehicle can travel Dtv=20*1.467*5+1/2*11.3*(5)^2=288 feet. The required length of the Response Zone is then Drz=Dtv-Dir=288-90=198 feet.

iii. Chicane in the Response Zone with an inside radius of 50 feet and road width of 14 feet. The required time delay for the Chicane is Trz=3 seconds and the required delay from the ID Check Area to the active barriers is Tidb=5 seconds. Using Table D-1, select a chicane with these minimum time delays. Choose the 40 degree curve with a Trz=3.81 seconds and a Tidb=5.12 seconds. This curve has a length of 195 feet with a roadway corridor width of 88 feet.

iv. Chicane in the Response Zone with an inside radius of 65 feet and road width of 26 feet. The required time delay for the Chicane is then Trz=3 seconds and the required delay from the ID Check Area to the active barriers is Tidb=5 seconds. Use Table D-3 to select a chicane with these minimum delays. Choose the 50 degree curve with a Trz=5.39 seconds and Tidb=6.48 seconds. This curve has a length of 316 feet with a roadway corridor width of 150 feet.

F. Summary: Using properly designed Chicanes or Curves in the Response Zone can effectively delay the Threat Vehicle in all 4 of the Threat Scenarios defined in the criteria. When Turns or Chicanes cannot be utilized, large distances both in the Approach and Response Zones are required to defeat the Threat Scenarios defined in the criteria, especially Threat Scenario #2. Over-speed detection systems can be utilized to reduce Approach and Response Zone lengths, but these systems add complexity in ACP operations and equipment maintenance and are not as effective as speed management systems.

G. List of Parameters:

Dacp – Length of the ACP
Dacz – Length of the Access Control Zone

Dai – Distance between end of Approach Zone and the ID Check position

Daz – Length of the Approach Zone

Dei – Distance between the ACP entrance and the ID Check position

Didb – Distance between the ID Check position and the active barriers

Dir – Distance between ID Check position and beginning of Response Zone

Drz – Length of the Response Zone

Dtv – Distance the Threat Vehicle can travel in the given circumstances.

Tir – Time for Threat Vehicle to travel Dir distance

Trz – Time for Threat Vehicle to travel through the Response Zone.

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Table 1

Inside Radius	IR	50	feet						
Width of Roadway	RW	14	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	2.3	3.81	5.07	6.4	7.703	8.98	10.2	sec
ID Check to Barrier Traverse Time	Tidb	3.53	5.12	6.59	8.01	9.349	10.6	11.9	sec
Center Line Radius of Chicane	CLR	76	76	76	76	76	76	76	feet
Distance through the Chicane	CD	159	212	265	318	371.4	424	478	feet
Length of Chicane	CL	152	195	233	263	285.7	299	304	feet
Width of Chicane	CW	72.4	87.6	106	128	152	178	204	feet

Table 2

Inside Radius	IR	65	feet						
Width of Roadway	RW	14	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	2.74	4.32	5.74	7.18	8.593	9.98	11.3	sec
ID Check to Barrier Traverse Time	Tidb	3.99	5.62	7.2	8.7	10.14	11.5	12.9	sec
Center Line Radius of Chicane	CLR	91	91	91	91	91	91	91	feet
Distance through the Chicane	CD	191	254	318	381	444.7	508	572	feet
Length of Chicane	CL	182	234	279	315	342	358	364	feet
Width of Chicane	CW	76.4	94.6	117	143	171.8	202	234	feet

Table 3

Inside Radius	IR	65	feet						
Width of Roadway	RW	26	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	1.68	3.64	5.39	6.87	8.393	9.9	11.4	sec
ID Check to Barrier Traverse Time	Tidb	2.38	4.74	6.48	8.2	9.864	11.4	13	sec
Center Line Radius of Chicane	CLR	103	103	103	103	103	103	103	feet
Distance through the Chicane	CD	216	288	360	431	503.4	575	647	feet
Length of Chicane	CL	206	265	316	357	387.2	406	412	feet
Width of Chicane	CW	104	124	150	179	211.5	246	282	feet

Table 4

Inside Radius	IR	65	feet						
Width of Roadway	RW	38	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	Note	3.13	5.12	6.84	8.307	9.89	11.5	sec
ID Check to Barrier Traverse Time	Tidb	Note	4.08	6.34	8	9.592	11.3	13	sec
Center Line Radius of Chicane	CLR	115	115	115	115	115	115	115	feet
Distance through the Chicane	CD	241	321	401	482	562	642	723	feet
Length of Chicane	CL	230	296	352	398	432.3	453	460	feet
Width of Chicane	CW	131	154	182	215	251.3	290	330	feet

Note: This is a straight path.

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Table 5

Inside Radius	IR	130	feet						
Width of Roadway	RW	14	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	4.3	6.19	8.05	9.88	11.67	13.45	15.2	sec
ID Check to Barrier Traverse Time	Tidb	5.46	7.35	9.28	11.1	12.93	14.71	16.5	sec
Center Line Radius of Chicane	CLR	156	156	156	156	156	156	156	feet
Distance through the Chicane	CD	327	436	545	653	762.4	871.3	980	feet
Length of Chicane	CL	312	401	478	540	586.4	614.5	624	feet
Width of Chicane	CW	93.8	125	163	208	257.3	309.8	364	feet

Table 6

Inside Radius	IR	130	feet						
Width of Roadway	RW	26	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	3.43	5.72	7.67	9.61	11.52	13.4	15.2	sec
ID Check to Barrier Traverse Time	Tidb	4.30	6.82	8.75	10.80	12.77	14.67	16.5	sec
Center Line Radius of Chicane	CLR	168	168	168	168	168	168	168	feet
Distance through the Chicane	CD	352	469	586	704	821	938.3	1056	feet
Length of Chicane	CL	336	432	515	582	631	661.8	672	feet
Width of Chicane	CW	121	155	196	244	297	353.7	412	feet

Table 7

Inside Radius	IR	130	feet						
Width of Roadway	RW	38	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	2.68	5.32	7.54	9.46	11.41	13.37	15.3	sec
ID Check to Barrier Traverse Time	Tidb	3.41	6.32	8.66	10.5	12.58	14.6	16.6	sec
Center Line Radius of Chicane	CLR	180	180	180	180	180	180	180	feet
Distance through the Chicane	CD	377	503	628	754	879.6	1005	1131	feet
Length of Chicane	CL	360	463	552	624	676.6	709.1	720	feet
Width of Chicane	CW	148	184	229	280	336.9	397.5	460	feet

CHICANES

Table 8

Inside Radius	IR	205	feet						
Width of Roadway	RW	14	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	5.6	7.85	10.1	12.3	14.42	16.6	18.7	sec
ID Check to Barrier Traverse Time	Tidb	6.54	8.88	11.1	13.3	15.49	17.6	19.8	sec
Center Line Radius of Chicane	CLR	231	231	231	231	231	231	231	feet
Distance through the Chicane	CD	484	645	806	968	1129	1290	1451	feet
Length of Chicane	CL	462	594	708	800	868.3	910	924	feet
Width of Chicane	CW	114	160	217	283	356	434	514	feet

Table 9

Inside Radius	IR	205	feet						
Width of Roadway	RW	26	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	4.90	7.45	9.75	12.1	14.3	16.5	18.7	sec
ID Check to Barrier Traverse Time	Tidb	5.76	8.32	10.7	13.1	15.38	17.6	19.8	sec
Center Line Radius of Chicane	CLR	243	243	243	243	243	243	243	feet
Distance through the Chicane	CD	509	679	848	1018	1188	1357	1527	feet
Length of Chicane	CL	486	625	745	842	913.4	957	972	feet
Width of Chicane	CW	141	190	250	319	395.8	478	562	feet

Table 10

Inside Radius	IR	205	feet						
Width of Roadway	RW	38	feet						
Width of Median	Med	24	feet						
ID Check Point to Chicane	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Chicane Traverse Time	Trz	4.44	7.15	9.61	11.9	14.2	16.5	18.8	sec
ID Check to Barrier Traverse Time	Tidb	5.24	8.09	10.5	12.8	15.24	17.6	19.9	sec
Center Line Radius of Chicane	CLR	255	255	255	255	255	255	255	feet
Distance through the Chicane	CD	534	712	890	1068	1246	1424	1602	feet
Length of Chicane	CL	510	656	781	883	958.5	1005	1020	feet
Width of Chicane	CW	168	219	282	355	435.6	521	610	feet

CURVES

Table 11

Inside Radius	IR	65	feet						
Width of Roadway	RW	14	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	2.33	3.73	5.05	6.3	7.545	8.78	10	sec
ID Check to Barrier Traverse Time	Tidb	3.49	5.19	6.48	7.81	9.087	10.3	11.6	sec
Center Line Radius of Curve	CLR	72	72	72	72	72	72	72	feet
Distance through the Curve	CD	151	201	251	302	351.9	402	452	feet
Length of Curve	CL	144	185	221	249	270.6	284	288	feet
Width of Curve	CW	90.6	119	155	196	241.5	290	340	feet

Table 12

Inside Radius	IR	65	feet						
Width of Roadway	RW	26	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	Note	2.69	4.32	5.82	7.082	8.37	9.65	sec
ID Check to Barrier Traverse Time	Tidb	Note	3.68	5.65	7.07	8.509	9.89	11.2	sec
Center Line Radius of Curve	CLR	78	78	78	78	78	78	78	feet
Distance through the Curve	CD	163	218	272	327	381.2	436	490	feet
Length of Curve	CL	156	201	239	270	293.2	307	312	feet
Width of Curve	CW	118	149	187	232	281.3	334	388	feet

Note: This is essentially a straight path.

Table 13

Inside Radius	IR	65	feet						
Width of Roadway	RW	38	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	Note	1.56	3.64	5.31	6.848	8.08	9.39	sec
ID Check to Barrier Traverse Time	Tidb	Note	2.24	4.74	6.62	8.069	9.45	10.9	sec
Center Line Radius of Curve	CLR	84	84	84	84	84	84	84	feet
Distance through the Curve	CD	176	235	293	352	410.5	469	528	feet
Length of Curve	CL	168	216	257	291	315.7	331	336	feet
Width of Curve	CW	145	179	220	268	321.1	378	436	feet

Note: This is a straight path.

CURVES

Table 14

Inside Radius	IR	130	feet						
Width of Roadway	RW	14	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	3.94	5.79	7.51	9.22	10.9	12.6	14.2	sec
ID Check to Barrier Traverse Time	Tidb	5.09	6.95	8.74	10.5	12.16	13.8	15.5	sec
Center Line Radius of Curve	CLR	137	137	137	137	137	137	137	feet
Distance through the Curve	CD	287	383	478	574	669.5	765	861	feet
Length of Curve	CL	274	352	420	475	515	540	548	feet
Width of Curve	CW	125	180	248	326	412.6	505	600	feet

Table 15

Inside Radius	IR	130	feet						
Width of Roadway	RW	26	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	2.85	5.04	7.02	8.77	10.52	12.2	14	sec
ID Check to Barrier Traverse Time	Tidb	3.68	6.11	8.07	9.95	11.76	13.5	15.2	sec
Center Line Radius of Curve	CLR	143	143	143	143	143	143	143	feet
Distance through the Curve	CD	299	399	499	599	698.8	799	898	feet
Length of Curve	CL	286	368	438	495	537.5	563	572	feet
Width of Curve	CW	153	210	280	362	452.4	549	648	feet

Table 16

Inside Radius	IR	130	feet						
Width of Roadway	RW	38	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	1.83	4.38	6.53	8.48	10.2	12	13.7	sec
ID Check to Barrier Traverse Time	Tidb	2.42	5.34	7.63	9.54	11.35	13.2	15	sec
Center Line Radius of Curve	CLR	149	149	149	149	149	149	149	feet
Distance through the Curve	CD	312	416	520	624	728.2	832	936	feet
Length of Curve	CL	298	383	457	516	560.1	587	596	feet
Width of Curve	CW	180	239	313	398	492.2	593	696	feet

CURVES

Table 17

Inside Radius	IR	205	feet						
Width of Roadway	RW	14	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	5.35	7.52	9.63	11.7	13.79	15.8	17.9	sec
ID Check to Barrier Traverse Time	Tidb	6.38	8.54	10.7	12.8	14.87	16.9	19	sec
Center Line Radius of Curve	CLR	212	212	212	212	212	212	212	feet
Distance through the Curve	CD	444	592	740	888	1036	1184	1332	feet
Length of Curve	CL	424	545	650	734	796.9	835	848	feet
Width of Curve	CW	166	250	355	476	610	753	900	feet

Table 18

Inside Radius	IR	205	feet						
Width of Roadway	RW	26	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	4.47	6.98	9.2	11.4	13.49	15.6	17.7	sec
ID Check to Barrier Traverse Time	Tidb	5.32	7.98	10.2	12.4	14.56	16.7	18.8	sec
Center Line Radius of Curve	CLR	218	218	218	218	218	218	218	feet
Distance through the Curve	CD	457	609	761	913	1065	1218	1370	feet
Length of Curve	CL	436	561	668	755	819.4	859	872	feet
Width of Curve	CW	193	280	387	512	649.8	797	948	feet

Table 19

Inside Radius	IR	205	feet						
Width of Roadway	RW	38	feet						
Width of Median	Med	24	feet						
ID Check Point to Curve	dir	90	feet						
Curve Angle (deg)	Theta	30	40	50	60	70	80	90	deg
Curve Traverse Time	Trz	3.76	6.44	8.89	11	13.2	15.4	17.5	sec
ID Check to Barrier Traverse Time	Tidb	4.53	7.37	9.89	12	14.24	16.4	18.6	sec
Center Line Radius of Curve	CLR	224	224	224	224	224	224	224	feet
Distance through the Curve	CD	469	626	782	938	1095	1251	1407	feet
Length of Curve	CL	448	576	686	776	842	882	896	feet
Width of Curve	CW	220	310	420	548	689.5	840	996	feet

APPENDIX E

COST ESTIMATES

Appendix E
Sample Cost Estimates ($000)

	POV		Truck
	Note 1		Note 2
Site Work (Note 3)			
Paving	$416		$475
Landscaping	$12		$9
Passive Barriers	$354		$431
Subtotal	$782		$915
Miscellaneous			
Active Barriers (Note 4)	$360		$130
Traffic Control - Signs, Signals, Sensors, & Striping	$48		$48
Elec Pwr, Ltg, & Conduit	$362		$362
CCTV	$71		$71
Diesel Generator	$62		$62
Subtotal	$903		$673
Buildings			
VCC - Dwg A1.01	$234		
Gatehouse - Dwg A1.02	$220		$220
Guard Booth (2) - Dwg A1.03	$45		
Ped Guard Booth - Dwg A1.03	$65		
Overwatch Pos - Dwg A1.03	$32		$32
Search Office - (Note 5)	$270		$270
ID Check Canopy - Dwg A1.06	$177		
Pass Search Canopy - Dwg A1.07	$39		
Truck Search Canopy - Dwg A1.07			$56
Subtotal	$1,082		$578
Total Cost	**$2,767**		**$2,166**

Notes:

1 Reference Drawing C3.02 for POV Only Primary or Secondary ACP.

2 Reference Drawing C3.06 for Truck Only Primary or Secondary ACP.

3 Sitework for the POV Only ACP is based on an Approach Zone length of 230', an Access Control Zone length of 255', and a Response Zone length of 565'. Sitework for the Truck Only ACP is based on an Approach Zone of 580', an Access Control Zone of 560', and a Response Zone of 565'.

4 Barrier costs are for 4 barriers in the POV Only ACP and 2 barriers in the Truck Only ACP.

5 Reference Drawings A1.04 and A1.05. Search Office Costs shown here are for the "Search Office With Package Scanner and Metal Detector" option shown on Drawing A1.04. Costs for the Search Building options shown on Drawing A1.05 are $128,000 for the "Search Office W/O Package Scanner and Metal Detector" option and $6,000 for the "Search Area Shelter" option.

6 Cost estimate does not include cost growth, contingencies, SIOH, or contractor's mark-up.

APPENDIX F

ELECTRICAL LOADS

APPENDIX F

ELECTRICAL DATA

LOCATION	DESCRIPTION	SECTION OF "ACP CRITERIA FROM OPMG"	UTILITY	EMER GEN	UPS	QTY	VOLT AMPS	TOTAL VOLT AMPS	DEMAND
APPROACH ZONE	UPPER APPROACH ZONE LIGHTING FIXTURE	22.A	YES	YES		4	460	1,840	YES
APPROACH ZONE	UPPER APPROACH ZONE LIGHTING FIXTURE	22.A	YES	YES		10	288	2,880	YES
APPROACH ZONE	UPPER APPROACH ZONE SPEED DETECTION	28.F.4	YES	YES	YES	1	1,200	1,200	YES
APPROACH ZONE	UPPER APPROACH ZONE WRONG WAY DETECTION	28.F.4	YES	YES	YES	1	1,200	1,200	YES
SECONDARY ISLAND		X2.1	YES	YES	YES	1	1,200	1,200	YES
SECONDARY ISLAND	OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
SECONDARY ISLAND	LANE-2 LEFT OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
SECONDARY ISLAND	LANE-3 LEFT OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
SECONDARY ISLAND	LANE-4 LEFT OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
SECONDARY ISLAND	OVERHEIGHT DETECTION	29.D	YES	YES		1	240	240	YES
ACCESS CONTROL ZONE	CAMERA - LANE 1 DRIVER, VEHICLE, AND GUARD	23.A/B	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - LANE 1 LICENSE	22.D	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - LANE 2 DRIVER, VEHICLE, AND GUARD	23.A/B	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - LANE 2 LICENSE	22.D	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - LANE 3 DRIVER, VEHICLE, AND GUARD	23.A/B	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - LANE 3 LICENSE	22.D	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - LANE 4 DRIVER, VEHICLE, AND GUARD	23.A/B	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - LANE 4 LICENSE	22.D	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - PEDESTRIAN AND GUARD	X3.2	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	CAMERA - UPPER APPROACH ZONE	23.A	YES	YES	YES	1	70	70	YES
ACCESS CONTROL ZONE	GUARD BOOTH-1 COMPUTER	14.C	YES	YES	YES	1	816	816	YES
ACCESS CONTROL ZONE	GUARD BOOTH-1 EXTERIOR RECEPTACLE	14.B	YES			2	600	1,200	
ACCESS CONTROL ZONE	GUARD BOOTH-1 GENERAL RECEPTACLE	14.C	YES			2	180	360	
ACCESS CONTROL ZONE	GUARD BOOTH-1 HVAC	14.A	YES			1	93	93	YES

ACCESS CONTROL ZONE	GUARD BOOTH-1 INTRUSION DETECTION PANEL	26.B	YES	YES	YES	1	240	240	YES
ACCESS CONTROL ZONE	GUARD BOOTH-1 LIGHTING FIXTURE	X3.1	YES	YES		1	73.6	74	YES
ACCESS CONTROL ZONE	GUARD BOOTH-2 COMPUTER	14.C	YES	YES	YES	1	816	816	YES
ACCESS CONTROL ZONE	GUARD BOOTH-2 EXTERIOR RECEPTACLE	14.B	YES			2	600	1,200	
ACCESS CONTROL ZONE	GUARD BOOTH-2 GENERAL RECEPTACLE	14.C	YES			2	180	360	
ACCESS CONTROL ZONE	GUARD BOOTH-2 HVAC	14.A	YES			1	93	93	YES
ACCESS CONTROL ZONE	GUARD BOOTH-2 INTRUSION DETECTION PANEL	26.B	YES	YES	YES	1	240	240	YES
ACCESS CONTROL ZONE	GUARD BOOTH-2 LIGHTING FIXTURE	X3.1	YES	YES		1	73.6	74	YES
ACCESS CONTROL ZONE	GUARD BOOTH-3 COMPUTER	14.C	YES	YES	YES	1	816	816	YES
ACCESS CONTROL ZONE	GUARD BOOTH-3 EXTERIOR RECEPTACLE	14.B	YES			2	600	1,200	
ACCESS CONTROL ZONE	GUARD BOOTH-3 GENERAL RECEPTACLE	14.C	YES			2	180	360	
ACCESS CONTROL ZONE	GUARD BOOTH-3 HVAC	14.A	YES			1	93	93	YES
ACCESS CONTROL ZONE	GUARD BOOTH-3 INTRUSION DETECTION PANEL	26.B	YES	YES	YES	1	240	240	YES
ACCESS CONTROL ZONE	GUARD BOOTH-3 LIGHTING FIXTURE	X3.1	YES	YES		1	73.6	74	YES
ACCESS CONTROL ZONE	GUARD BOOTH-4 COMPUTER	14.C	YES	YES	YES	1	816	816	YES
ACCESS CONTROL ZONE	GUARD BOOTH-4 EXTERIOR RECEPTACLE	14.B	YES			2	600	1,200	
ACCESS CONTROL ZONE	GUARD BOOTH-4 GENERAL RECEPTACLE	14.C	YES			2	180	360	
ACCESS CONTROL ZONE	GUARD BOOTH-4 HVAC	14.A	YES			1	93	93	YES
ACCESS CONTROL ZONE	GUARD BOOTH-4 INTRUSION DETECTION PANEL	26.B	YES	YES	YES	1	240	240	YES
ACCESS CONTROL ZONE	GUARD BOOTH-4 LIGHTING FIXTURE	X3.1	YES	YES		1	73.6	74	YES
ACCESS CONTROL ZONE	ID CHECK AREA CANOPY LIGHTING FIXTURE	22.B/C	YES	YES		22	250	5,500	YES
ACCESS CONTROL ZONE	LANE-1 RIGHT OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
ACCESS CONTROL ZONE	LANE-1 TRAFFIC ARM	X3.3	YES	YES	YES	1	760	760	
ACCESS CONTROL ZONE	LANE-2 RIGHT OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
ACCESS CONTROL ZONE	LANE-2 TRAFFIC ARM	X3.3	YES	YES	YES	1	760	760	
ACCESS CONTROL ZONE	LANE-3 RIGHT OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
ACCESS CONTROL ZONE	LANE-3 TRAFFIC ARM	X3.3	YES	YES	YES	1	760	760	
ACCESS CONTROL ZONE	LANE-4 RIGHT OVERHEIGHT SIGN	29.D	YES	YES		1	1,200	1,200	
ACCESS CONTROL ZONE	LANE-4 TRAFFIC ARM	X3.3	YES	YES	YES	1	760	760	
ACCESS CONTROL ZONE	PEDESTRIAN GUARD BOOTH COMPUTER	14.C	YES	YES	YES	1	816	816	YES

ACCESS CONTROL ZONE	PEDESTRIAN GUARD BOOTH EXTERIOR RECEPTACLE	14.B	YES			2	600	1,200	
ACCESS CONTROL ZONE	PEDESTRIAN GUARD BOOTH GENERAL RECEPTACLE	14.C	YES			2	180	360	
ACCESS CONTROL ZONE	PEDESTRIAN GUARD BOOTH HVAC	14.A	YES			1	541	541	YES
ACCESS CONTROL ZONE	PEDESTRIAN GUARD BOOTH INTRUSION DETECTION PANEL	26.B	YES	YES	YES	1	240	240	YES
ACCESS CONTROL ZONE	PEDESTRIAN GUARD BOOTH LIGHTING FIXTURE	X3.1	YES	YES		3	73.6	221	YES
ACCESS CONTROL ZONE	UPPER ACCESS CONTROL ZONE LIGHTING FIXTURES	22.B/C	YES	YES		7	460	3,220	YES
ACCESS CONTROL ZONE	UPPER ACCESS CONTROL ZONE LIGHTING FIXTURES	22.B/C	YES	YES		3	288	864	YES
GATEHOUSE	ACTIVE BARRIER CONTROL PANEL	20.F.1/2	YES	YES	YES	1	600	600	YES
GATEHOUSE	CAMERA - ID CHECK AREA	23.A	YES	YES	YES	1	70	70	YES
GATEHOUSE	GATEHOUSE CCTV DIGITAL VIDEO RECORDER	23.E/F	YES	YES	YES	1	600	600	YES
GATEHOUSE	GATEHOUSE CCTV MONITOR	23.E/F	YES	YES	YES	2	216	432	YES
GATEHOUSE	GATEHOUSE CCTV MULTIPLEXER	23.E/F	YES	YES	YES	1	600	600	YES
GATEHOUSE	GATEHOUSE CCTV SWITCH	23.E/F	YES	YES	YES	1	600	600	YES
GATEHOUSE	GATEHOUSE COMPUTER	13.H	YES	YES	YES	1	816	816	YES
GATEHOUSE	GATEHOUSE COMPUTER	13.H	YES	YES	YES	1	816	816	YES
GATEHOUSE	GATEHOUSE DURESS CONTROL PANEL		YES	YES	YES	1	600	600	YES
GATEHOUSE	GATEHOUSE EXTERIOR RECEPTACLES	13.G	YES			1	600	600	
GATEHOUSE	GATEHOUSE EXTERIOR RECEPTACLES	13.G	YES			1	600	600	
GATEHOUSE	GATEHOUSE EXTERIOR RECEPTACLES	13.G	YES			1	600	600	
GATEHOUSE	GATEHOUSE EXTERIOR RECEPTACLES	13.G	YES			1	600	600	
GATEHOUSE	GATEHOUSE GENERAL RECEPTACLES	13.H	YES			3	180	540	
GATEHOUSE	GATEHOUSE GENERAL RECEPTACLES	13.H	YES			3	180	540	
GATEHOUSE	GATEHOUSE HAND DRYER		YES			1	1,200	1,200	YES
GATEHOUSE	GATEHOUSE HVAC	13.B	YES			1	1836	1,836	YES
GATEHOUSE	GATEHOUSE INTRUSION DETECTION PANEL		YES	YES	YES	1	600	600	YES
GATEHOUSE	GATEHOUSE LIGHTING FIXTURE	X4.1	YES	YES		11	73.6	810	YES

GATEHOUSE	GATEHOUSE OVERHEIGHT CONTROL PANEL		YES	YES		1	600	600	YES
GATEHOUSE	GATEHOUSE SPEED CONTROL PANEL		YES	YES	YES	1	600	600	YES
GATEHOUSE	GATEHOUSE WATER COOLER	13.C	YES			1	325	325	YES
GATEHOUSE	GATEHOUSE WRONG WAY CONTROL PANEL		YES	YES	YES	1	600	600	YES
RESPONSE ZONE AND FINAL BARRIER	ACTIVE BARRIER-1	20.A	YES	YES	YES	1	3,640	3,640	
RESPONSE ZONE AND FINAL BARRIER	ACTIVE BARRIER-2	20.A	YES	YES	YES	1	3,640	3,640	
RESPONSE ZONE AND FINAL BARRIER	ACTIVE BARRIER-3	20.A	YES	YES	YES	1	3,640	3,640	
RESPONSE ZONE AND FINAL BARRIER	ACTIVE BARRIER-4	20.A	YES	YES	YES	1	3,640	3,640	
RESPONSE ZONE AND FINAL BARRIER	CAMERA - ACTIVE BARRIERS AND OVERWATCH	23.A	YES	YES	YES	1	70	70	YES
RESPONSE ZONE AND FINAL BARRIER	UPPER RESPONSE ZONE AND BARRIER LIGHTING FIXTURE	22.A	YES	YES		5	460	2,300	YES
RESPONSE ZONE AND FINAL BARRIER	UPPER RESPONSE ZONE AND BARRIER LIGHTING FIXTURE	22.A	YES	YES		6	288	1,728	YES
RESPONSE ZONE AND FINAL BARRIER	UPPER RESPONSE ZONE SIGN	20.E.1	YES	YES	YES	2	1200	2,400	
RESPONSE ZONE AND FINAL BARRIER	UPPER RESPONSE ZONE TRAFFIC ARM	20.E.1	YES	YES	YES	2	760	1,520	
OVERWATCH POSITION	OVERWATCH BUILDING COMPUTER	18.A.3	YES	YES	YES	1	816	816	YES
OVERWATCH POSITION	OVERWATCH BUILDING GENERAL RECEPTACLES	18.A.3	YES			4	180	720	
OVERWATCH POSITION	OVERWATCH BUILDING HVAC	18.A.2	YES			1	434	434	YES
OVERWATCH POSITION	OVERWATCH BUILDING INTRUSION DETECTION PANEL	26.B	YES	YES	YES	1	240	240	YES
OVERWATCH POSITION	OVERWATCH BUILDING LIGHTING FIXTURE	X6.2	YES	YES		3	73.6	221	YES
VISITOR CONTROL CENTER	LIGHTING FIXTURE	X7.4	YES	YES		3	288	864	YES
VISITOR CONTROL CENTER	LIGHTING FIXTURE	X7.4	YES	YES		4	460	1,840	YES
VISITOR CONTROL CENTER	VCC COFFEE MAKER		YES			1	1680	1,680	YES
VISITOR CONTROL CENTER	VCC COMPUTER	X7.3	YES	YES	YES	1	816	816	YES
VISITOR CONTROL CENTER	VCC COMPUTER	X7.3	YES	YES	YES	1	816	816	YES
VISITOR CONTROL CENTER	VCC COMPUTER	21.D	YES	YES	YES	1	816	816	YES
VISITOR CONTROL CENTER	VCC COMPUTER	21.D	YES	YES	YES	1	816	816	YES
VISITOR CONTROL CENTER	VCC EXTERIOR RECEPTACLE	X7.2	YES			1	600	600	

VISITOR CONTROL CENTER	VCC GENERAL RECEPTACLES	X7.3	YES			3	180	540	
VISITOR CONTROL CENTER	VCC GENERAL RECEPTACLES	X7.3	YES			3	180	540	
VISITOR CONTROL CENTER	VCC GENERAL RECEPTACLES	X7.3	YES			3	180	540	
VISITOR CONTROL CENTER	VCC GENERAL RECEPTACLES	X7.3	YES			3	180	540	
VISITOR CONTROL CENTER	VCC GENERAL RECEPTACLES	X7.3	YES			3	180	540	
VISITOR CONTROL CENTER	VCC GENERAL RECEPTACLES	X7.3	YES			3	180	540	
VISITOR CONTROL CENTER	VCC HAND DRYER		YES			1	1,200	1,200	
VISITOR CONTROL CENTER	VCC HAND DRYER		YES			1	1,200	1,200	
VISITOR CONTROL CENTER	VCC HAND DRYER		YES			1	1,200	1,200	
VISITOR CONTROL CENTER	VCC HVAC	X7.1	YES			1	4652	4,652	YES
VISITOR CONTROL CENTER	VCC INTRUSION DETECTION PANEL		YES	YES	YES	1	600	600	YES
VISITOR CONTROL CENTER	VCC LIGHTING FIXTURE		YES	YES		27	73.6	1,987	YES
VISITOR CONTROL CENTER	VCC MICROWAVE OVEN		YES			1	1550	1,550	
VISITOR CONTROL CENTER	VCC REFRIGERATOR		YES			1	528	528	YES
VISITOR CONTROL CENTER	VCC WATER COOLER	21.G	YES			1	325	325	YES
SEARCH AREA AND OFFICE	CAMERA - GUARD, DRIVER, AND VEHICLE OF POV SEARCH	23.A/C	YES	YES	YES	1	70	70	YES
SEARCH AREA AND OFFICE	CAMERA - SEARCH	23.A	YES	YES	YES	1	70	70	YES
SEARCH AREA AND OFFICE	LIGHTING FIXTURE	22.B/C	YES	YES		16	288	4,608	YES
SEARCH AREA AND OFFICE	LIGHTING FIXTURE	22.B/C	YES	YES		1	460	460	YES
SEARCH AREA AND OFFICE	POV SEARCH TRAFFIC ARM	X8.3	YES	YES	YES	1	760	760	
SEARCH AREA AND OFFICE	SEARCH AREA CANOPY LIGHTING FIXTURE	22.B/C	YES	YES		45	250	11,250	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE ACCESS CONTROL CONTROL PANEL	26.B	YES	YES	YES	1	600	600	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE COFFEE MAKER		YES			1	1,680	1,680	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE COMPUTER	17.I	YES	YES	YES	1	816	816	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE COMPUTER	17.I	YES	YES	YES	1	816	816	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE COMPUTER	17.M	YES	YES	YES	1	816	816	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE COMPUTER	17.H	YES	YES	YES	1	816	816	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE COMPUTER	17.H	YES	YES	YES	1	816	816	YES

SEARCH AREA AND OFFICE	SEARCH OFFICE GENERAL RECEPTACLES	17.I	YES			3	180	540	
SEARCH AREA AND OFFICE	SEARCH OFFICE GENERAL RECEPTACLES	17.I	YES			3	180	540	
SEARCH AREA AND OFFICE	SEARCH OFFICE GENERAL RECEPTACLES	17.I	YES			3	180	540	
SEARCH AREA AND OFFICE	SEARCH OFFICE GENERAL RECEPTACLES	17.I	YES			3	180	540	
SEARCH AREA AND OFFICE	SEARCH OFFICE GENERAL RECEPTACLES	17.I	YES			3	180	540	
SEARCH AREA AND OFFICE	SEARCH OFFICE GENERAL RECEPTACLES	17.I	YES			3	180	540	
SEARCH AREA AND OFFICE	SEARCH OFFICE HAND DRYER		YES			1	1,200	1,200	
SEARCH AREA AND OFFICE	SEARCH OFFICE HVAC	17.A	YES			1	4,652	4,652	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE LIGHTING FIXTURE	X8.1	YES	YES		27	73.6	1,987	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE METAL DETECTOR	17.K	YES	YES		1	600	600	
SEARCH AREA AND OFFICE	SEARCH OFFICE MIRCOWAVE OVEN	17.G	YES			1	1550	1,550	
SEARCH AREA AND OFFICE	SEARCH OFFICE REFRIGERATOR	17.G	YES			1	528	528	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE TAMPER SWITCH CONTROL PANEL		YES	YES	YES	1	600	600	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE WATER COOLER	17.G	YES			1	325	325	YES
SEARCH AREA AND OFFICE	SEARCH OFFICE X RAY	17.K	YES	YES		1	600	600	
COMMERCIAL VEHICLE SEARCH AREA	CAMERA - GUARD, DRIVER, & VEHICLE OF TRUCK SEARCH	23.A/C	YES	YES	YES	1	70	70	YES
COMMERCIAL VEHICLE SEARCH AREA	LIGHTING FIXTURE	22.B/C	YES	YES		9	288	2,592	YES
COMMERCIAL VEHICLE SEARCH AREA	LIGHTING FIXTURE	22.B/C	YES	YES		11	460	5,060	YES
COMMERCIAL VEHICLE SEARCH AREA	TRUCK SEARCH TRAFFIC ARM	X9.1	YES	YES	YES	1	760	760	
CARGO AND VEHICLE INSPECTION SYSTEM AREA	CARGO AND VEHICLE INSPECTION SYSTEM		YES			1	100,000	100,000	YES

UTILITY/GENERATOR/UPS	**TOTAL CONNECTED VA**	**TOTAL DEMAND VA**
UTILITY	258,258	197,438
GENERATOR	112,200	78,360
UPS	50,034	26,994

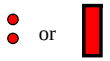
APPENDIX G

PRESENCE DETECTION SAFETY SCHEME

Symbols for Traffic Control Layouts

Note: Sheets show a typical 4-lane divided roadway on a straight section. Similar controls would exist for a two-lane, two-way roadway. In the 4-lane divided examples, median and shoulder guardrail or longitudinal barriers are assumed to be in place (not shown). The primary objective is to show traffic control devices on a conceptual layout.

In all situations, lane barrier curbs exist instead of pavement markings shown. The detailed sheet shows a 3 lane inbound roadway with the barrier islands. Roadway islands need to separate lanes for security, control, barrier signal operations, and placement of signs, signals, and beam sensors. Under roadway drainage must be designed with the roadway islands.



or — Symbol for barrier to deploy up from lane or across roadway.

— Red In-Roadway Lights that flash red when barrier is activated. For use when barriers do not contain lights at activation.

— Red zone quadrupole inductive loop detector (6’ X L’), with L being 6 feet beyond Stop line to 4 feet in advance of active barrier that provides input to the lane barrier signal operation.

— Queue quadrupole loop detector (6’ X 20’) about 80 feet inbound from checkpoint to provide lane barrier signal preemption capability for a preset time to clear the pocket of secured vehicles between the queue loop detector and signal Stop line.

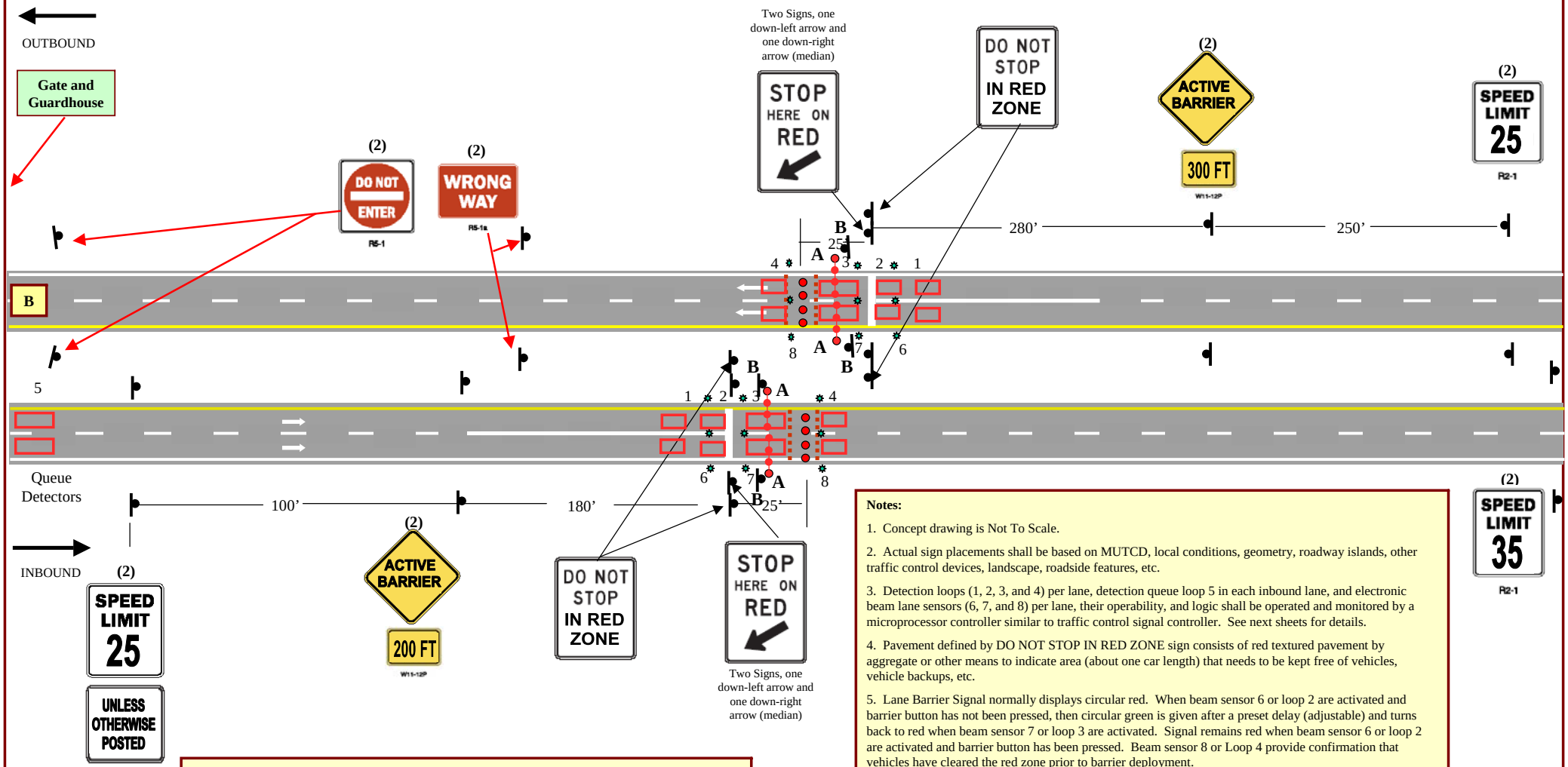
— One or more induction loop detectors that provide input to the microprocessor controller for lane barrier signal operations for the following functions: (1) One or more loops extending back from Stop line that detect presence of vehicles at or near Stop line, and (2) loop that provides input confirmation that vehicle has cleared the active barrier.

— Post mounted sign on shoulder, lane island, or in median.

— Traffic Gate Arm in the down horizontal position with flashing red lights when barrier deployment command has been initiated by guard pressing a button or by other automated means.

— Electronic beam lane sensors that provide input to the lane barrier signal operation for low metal-mass vehicles such as scooters, motorcycles, mopeds and bicycles.

SDDCTEA Recommended Concept Plan for Lane Barrier Signal Operation (Limited Real Estate Response Zone)



Notes:

1. Concept drawing is Not To Scale.
2. Actual sign placements shall be based on MUTCD, local conditions, geometry, roadway islands, other traffic control devices, landscape, roadside features, etc.
3. Detection loops (1, 2, 3, and 4) per lane, detection queue loop 5 in each inbound lane, and electronic beam lane sensors (6, 7, and 8) per lane, their operability, and logic shall be operated and monitored by a microprocessor controller similar to traffic control signal controller. See next sheets for details.
4. Pavement defined by DO NOT STOP IN RED ZONE sign consists of red textured pavement by aggregate or other means to indicate area (about one car length) that needs to be kept free of vehicles, vehicle backups, etc.
5. Lane Barrier Signal normally displays circular red. When beam sensor 6 or loop 2 are activated and barrier button has not been pressed, then circular green is given after a preset delay (adjustable) and turns back to red when beam sensor 7 or loop 3 are activated. Signal remains red when beam sensor 6 or loop 2 are activated and barrier button has been pressed. Beam sensor 8 or Loop 4 provide confirmation that vehicles have cleared the red zone prior to barrier deployment.
6. Detection loop 5 shall preempt the microprocessor controller for a preset time (adjustable) after it detects vehicle presence for 15 seconds (adjustable). The preset preemption time is the time required to clear the number of guard approved vehicles stopped between the Stop line and Queue loop detector 5.

B – Logic, Video, and other Detection methods and alarms are available to detect a vehicle traveling the wrong direction (in on out-bound side) with automatic traffic control devices response such as vertically aligned, red beacons (not shown above) start alternating flash on the DO NOT ENTER and WRONG WAY signs prior to outbound barriers being fully deployed from guard response.

SDDCTEA Recommended Concept Plan for Lane Barrier Signal Operation (Limited Real Estate Response Zone)

Basic Layout Operation:

1. Road users warned of **ACTIVE BARRIER** and distance (Advance Warning Sign).

2. Motorists come to complete stop at the **Lane Barrier Signal** that normally displays a circular red at 24" Thermoplastic Stop Line. Military Police shall periodically monitor motorists compliance with the lane barrier signal and stopping at Stop line on the circular red and prior to red zone. Red zone is red textured pavement or other acceptable means.

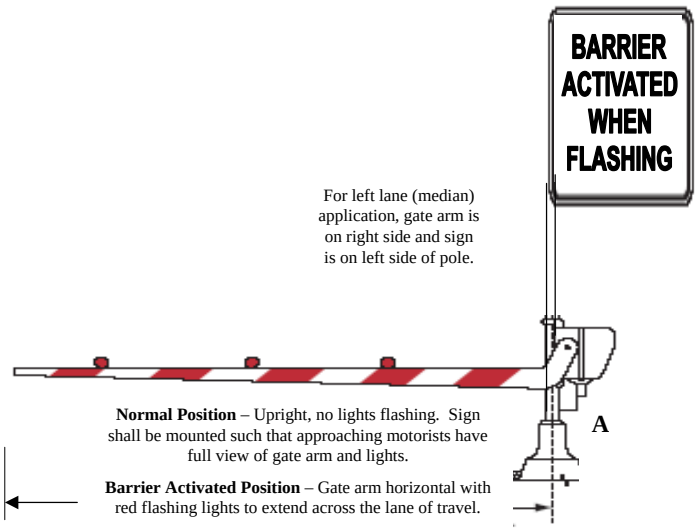
3. Motorists told **ONE VEHICLE PER GREEN** (Regulatory Sign below **Lane Barrier Signal**). If barrier button has not been pressed, the green signal is given when detection loops 1 or 2 detect presence for 2 seconds (adjustable) or lane sensor number 6 beam has been broken (with adjustable delay). Lane control signal reverts back to normally red after loop 3 is activated or after beam sensor 7 is broken. All times shall be adjustable.

4. Steady green LED lights at the guardhouse shall indicate the satisfactory operation of each individual loop detector and beam sensor. Similarly, LED light(s) shall flash red for the specific loop or beam sensor that fails or is offline with the microprocessor controller. The lane barrier signal operation shall safeguard innocent road users at the active barriers.

5. Upon guard activation of lane barrier, lane control signal shall "hold" circular red. Traffic Gate Arm is flashed and lowered after delay. Active barriers shall not deploy until after loops 3 and 4 are cleared of vehicles and after beam sensors 8 has cleared following an adjustable delay after beam sensor 7 activation. See beam sensor and loop table.

6. Use red color pavement (aggregate instead of paint) from 2 feet forward of the Stop line to 10 feet beyond the pop-up barrier. Install **DO NOT STOP IN RED ZONE** Sign (Regulatory).

7. The following controls prevent vehicles extending into red zone: (1) Normally **Red Lane Barrier Signal**, (2) Stop Line, (3) **DO NOT STOP IN RED ZONE**, and (4) Traffic Gate Arm location.



3-Section Programmed Visibility Signals to the applicable lane

B

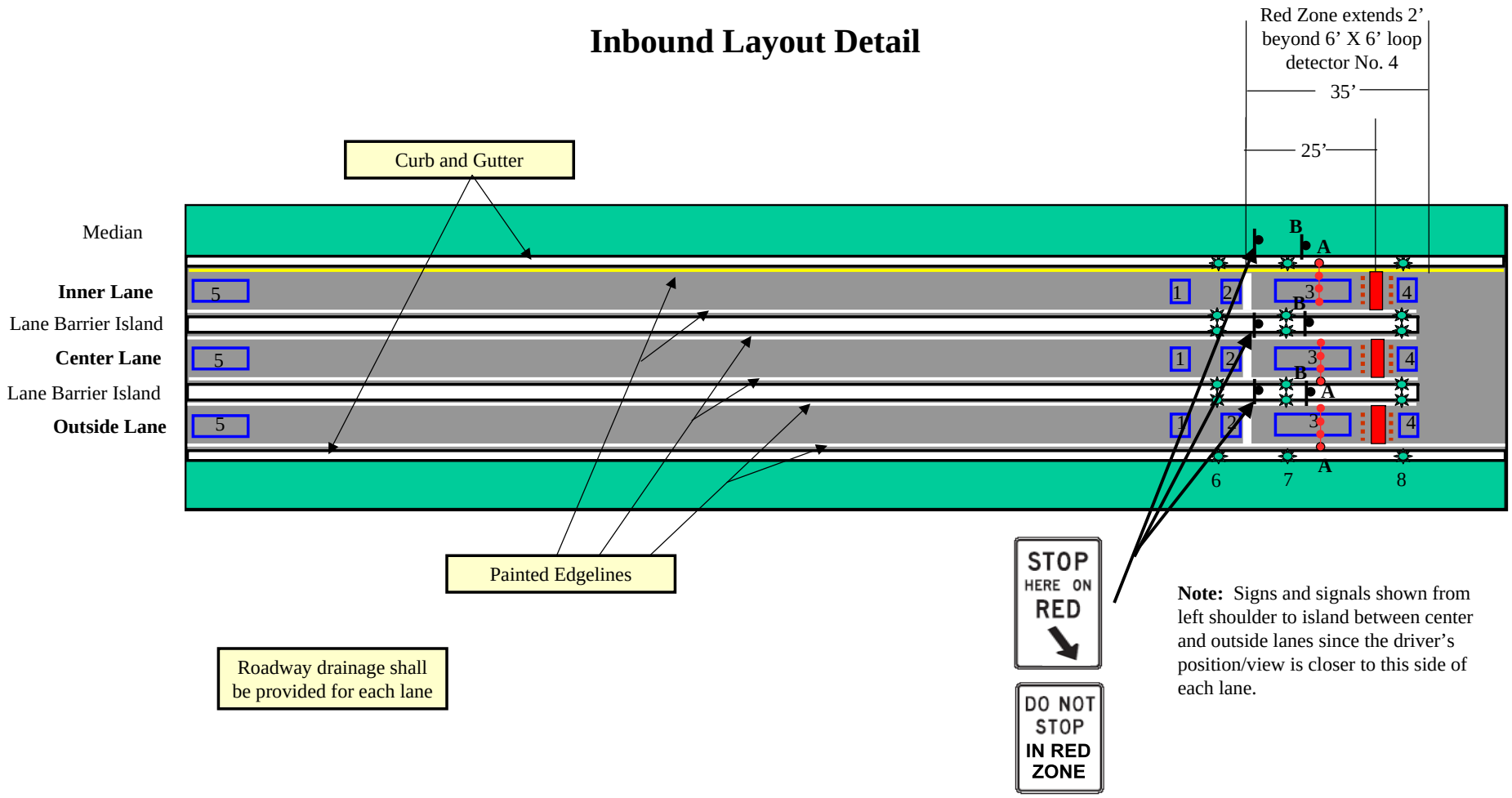
Static Signs – Signs below signal shall be black legend on white background.

3-Section Programmed Visibility Signals to the applicable lane

B

Electronic Blank-out Signs – If electronic blank-out signs are used, then legend shall be white on a black or opaque background. The ONE VEHICLE PER GREEN sign shall illuminate message only when the circular red and green operate in the "metering for security" mode. If blank-out, the PROCEED WITH CAUTION ON FLASHING YELLOW sign shall be modified to PROCEED WITH CAUTION. The latter message shall illuminate only when the circular yellow is flashing. Circular yellow is used for (1) Queue Preemption to clear approved vehicles in a backup, (2) system start-up, (3) low-threat conditions, and (4) other situations per the Commanding Officer.

SDDCTEA Recommended Concept Plan for Lane Barrier Signal Operation (Limited Real Estate Response Zone)



SDDCTEA Recommended Concept Plan for Lane Barrier Signal Operation (Limited Real Estate Response Zone)

Barrier Activated Regard-less of Reason T=0	Signal Color Time After Activation, T = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9	SAFETY CONTROLS (separately for each lane)							Barrier Status
		Vehicle Presence on Loop (L) or Beam Sensor Broken (BB)			Automatic Gate		Barrier Lights		
		L – 1 & 2 or BB – 6	L – 3 or BB – 7	L – 4 or BB – 8	Lights	Arm	Pavement or Barrier	Post Mounted	
	Normal State	-	-	-	Dark	Upright	Dark	Dark	Down
X	Red (hold), 0	N	N	N	FR	Start Down	FR	R	Start Up
	Red (hold), 1	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 2	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 3	Y or N	N	N	FR	Down	FR	R	Up
X	Red (hold), 0	N	N	Y	FR	Upright	FR	R	Down
	Red (hold), 1	Y or N	N	N	FR	Start Down	FR	R	Start Up
	Red (hold), 2	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 3	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 4	Y or N	N	N	FR	Down	FR	R	UP
X	Red (hold), 0	N	Y	Y	FR	Upright	Dark	Dark	Down
	Red (hold), 1	Y or N	N	Y	FR	Upright	FR	R	Down
	Red (hold), 2	Y or N	N	N	FR	Start Down	FR	R	Start Up
	Red (hold), 3	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 4	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 5	Y or N	N	N	FR	Down	FR	R	Up
X	Red (hold), 0	Y	Y	Y or N	Dark	Upright	Dark	Dark	Down
	Red (hold), 1	Y or N	Y	Y or N	Dark	Upright	Dark	Dark	Down
	Red (hold), 2	Y or N	Y or N	Y	FR	Upright	Dark	Dark	Down
	Red (hold), 3	Y or N	N	Y	FR	Upright	FR	R	Down
	Red (hold), 4	Y or N	N	N	FR	Start Down	FR	R	Start Up
	Red (hold), 5	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 6	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 7	Y or N	N	N	FR	Down	FR	R	Up

Loop Detector and Signal Operation:

1. Loops 1, 2, 3, 4, and 5 shall operate in the presence mode. Loop No. 5 operates as a queue detector.

2. Barrier Close Suppression Logic – When guards initiate a barrier "Emergency Fast Operate" command to close the barriers, each barrier's "close" circuit will be suppressed until the Lane Control Signal in that barrier's lane is circular red and loop detectors 3 and 4 and break beam sensors 7 and 8 in that barrier's lane do not detect a vehicle. In the case of break beam 7, the logic will include an adjustable time delay after break beam 7 drops out to hold the suppression circuit for the time delay. This time delay will allow a small vehicle (e.g., a bicycle), which may not have been detected by the loops, to proceed safely beyond the barrier if the barrier "Emergency Fast Operate" command was initiated right after the bicycle passed break beam 7. See "Loop Detection and Beam Sensor Priority Control During Preemption" table next sheet.

3. The microprocessor controller shall meet NEMA standards for timing, preemption, and detector capabilities. The basic operation is lane metering for threat response of each lane separately (having barrier island) with two preemption capabilities:

a.) Normal Operation – Normal operation is circular red signal in each lane with a circular green given after an adjustable delay on loops 1 and 2 (typically just enough for the vehicle to come to a complete stop) or beam sensor 6 is broken. The signal reverts back to red when loop 3 detects presence or beam sensor 7 is broken.

b.) Barrier Deployment Preemption – Barrier deployment preemption is initiated by gatehouse or checkpoint guards pressing a button. Lane barrier signals are preempted for lane barrier deployment according to the logic shown in the table.

c.) Queue Preemption during Peak Demand Periods – Queue detector preemption is initiated after loop 5 detects constant presence for a preset adjustable time (for example 15 seconds). Lane barrier signal shall go to flashing yellow for a preset time to clear vehicles between loop 5 and the Stop line. After the preset (adjustable) preemption time expires, the signal shall time 4 seconds of steady circular yellow before going to circular red, and then to standard lane barrier signal metering operation.

d.) Barrier Deployment During Queue Preemption – If guards initiate the "Emergency Fast Operate" command during queue preemption, the lane control signal shall change from flashing "Yellow" to solid "Yellow" for 3 seconds and then to solid "Red" for 2 second. When lane barrier signal is red (hold), the sequence shall follow "Clear to Barrier Preemption" shown in the chart. The barrier "close" circuit shall be suppressed in accordance with the table and clearance sequence chart.

SDDCTEA Recommended Concept Plan for Lane Barrier Signal Operation (Limited Real Estate Response Zone)

Cont.

Barrier Activated Regard-less of Reason T=0	Signal Color Time After Activation, T = 0, 1, 2, 3, 4, 5, 6, 7, 8, 9	SAFETY CONTROLS							Barrier Status
		Vehicle Presence on Loop (L) or Beam Sensor Broken (BB)			Automatic Gate		Barrier Lights		
		L – 1 & 2 or BB – 6	L – 3 or BB – 7	L – 4 or BB – 8	Lights	Arm	Pavement or Barrier	Post Mounted	
	Normal State	-	-	-	Dark	Upright	Dark	Dark	Down
X	Green, 0	Y	Y or N	Y or N	Dark	Upright	Dark	Dark	Down
	Red (hold), 1	Y or N	Y	Y or N	Dark	Upright	Dark	Dark	Down
	Red (hold), 2	Y or N	Y or N	Y	FR	Upright	Dark	Dark	Down
	Red (hold), 3	Y or N	N	Y	FR	Upright	FR	R	Down
	Red (hold), 4	Y or N	N	N	FR	Start Down	FR	R	Start Up
	Red (hold), 5	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 6	Y or N	N	N	FR	Going Down	FR	R	Going Up
	Red (hold), 7	Y or N	N	N	FR	Down	FR	R	Up

Cont.

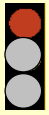
Loop Detector and Signal Operation:

4. System Safety Check prior to Barrier Deployment – The microprocessor controller shall check both operational status and detection status of L-3, L-4, BB-7, and BB-8 prior to its "Start Up" deployment. Under no circumstance will the lane barrier deploy when one or more detectors is (are) not operational, is (are) off line with system, or have a call.

Loop Detection and Beam Sensor Priority Control During Preemption

Loop	Break Beam Sensor	Likely Signature	Governs Microprocessor Timing/Clearance prior to Barrier Deployment
Presence on 3	Beam 7 broken	Motor vehicle	Loop Governs
No call on 3	Beam 7 broken	Bicycle, Moped, scooter, etc.	Beam Sensor 7 governs and times 3 seconds passage (adjustable) after beam 7 reconnects. Additional breaks of beam 7 resets passage time. If Beam 8 is not broken within 5 seconds (adjustable), the call is assumed false (bird, animal, leaf, weather, etc.) and the barrier deploys.
Presence on 4	Beam 8 broken	Motor Vehicle	Loop Governs
No call on 4	Beam 8 broken following Beam 7	Bicycle, Moped, scooter, etc.	Beam 8 Governs and times one second passage (adjustable) after each beam 8 reconnects. Additional breaks of beam 8 resets passage time.
No call on 4	Beam 8 broken following no breaks of Beam 7	False Call (bird, animal, leaf,weather, etc.)	Beam 8 Governs and times one second passage (adjustable) after each beam 8 reconnects. Additional breaks of beam 8 resets passage time of one second.

SDDCTEA Recommended Concept Plan for Lane Barrier Signal Operation (Limited Real Estate Response Zone)

Control	Normal Operation Signal Control by Detection System			Clear to Barrier Preemption	Clear 1 from Barrier Preemption	Clear 2 from Barrier Preemption	Clear to Queue Preemption	Clear 1 from Queue Preemption to Normal Ops	Clear 2 from Queue Preemption to Normal Ops	Clear 1 from Queue Preemption to Barrier Preempt	Clear 2 from Queue Preemption to Barrier Preempt
	No activation on Loops 1 and 2 or BB 6	Activation on Loops 1 and 2 or BB 6 and after set delay	Activation on Loop 3 or BB 7 regardless of activation on Loops 1 and 2 or BB6	Traffic held at Stop line. Activations on Loops 3 or 4 or BB 7 or 8 holds barrier from deployment.	Activation on Loops 1 and 2 or BB 6. Traffic held at Stop line.	Activation on Loops 1 and 2 or BB 6. Traffic held at Stop line.	Loop 5 activated by vehicle occupancy greater than preset time, say 15 seconds (adjustable)	Automatic 3 seconds yellow clearance	All red for 2 seconds before return to Normal Operation	Automatic 3 seconds yellow clearance	Traffic held at Stop line. Activations on Loops 3 or 4 or BB 7 or 8 holds barrier from deployment.
Signal				(Red Hold) 	(Red Hold) 	(Red Hold) 	Flashing Yellow 	Steady Yellow 		Steady Yellow 	(Red Hold) 
Signs	Static Signs or Electronic Blank-out    			Static Signs or Electronic Blank-out 	Static Signs or Electronic Blank-out 	Static Signs or Electronic Blank-out 	Static Signs or Electronic Blank-out 	Static Signs or Electronic Blank-out 	Static Signs or Electronic Blank-out 	Static Signs or Electronic Blank-out 	Static Signs or Electronic Blank-out 
Barrier Safety Controls	Gate Arm – Up Gate Lights – Dark Barrier Lights – Dark			Gate Arm – See Table Gate Lights – See Table Barrier Lights – See Table Barrier – See Table	Gate Arm – Down Gate Lights – FR Barrier Lights – FR Barrier – Going Down/retracting	Gate Arm – Going Up Gate Lights – FR Barrier Lights – Dark Barrier – Down/ retracted	Gate Arm – Up Gate Lights – Dark Barrier Lights – Dark Barrier – Down/ retracted	Gate Arm – Up Gate Lights – Dark Barrier Lights – Dark Barrier – Down/ retracted	Gate Arm – Up Gate Lights – Dark Barrier Lights – Dark Barrier – Down/ retracted	Gate Arm – Up Gate Lights – FR Barrier Lights – Dark Barrier – Down/ retracted	Gate Arm – Going Down Gate Lights – FR Barrier Lights – FR Barrier – See Table