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UFC 4-022-03
1 October 2013

UNIFIED FACILITIES CRITERIA (UFC)

SECURITY FENCES AND GATES

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SECURITY FENCES AND GATES

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U.S. ARMY CORPS OF ENGINEERS

NAVAL FACILITIES ENGINEERING COMMAND (Preparing Activity)

AIR FORCE CIVIL ENGINEER CENTER

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

Change No.	Date	Location

This UFC supersedes NAVFAC Military Handbook 1013/10, *Design Guidelines for Security Fencing, Gates, Barriers, and Guard Facilities.*

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FOREWORD

The Unified Facilities Criteria (UFC) system is prescribed by MIL-STD 3007 and provides planning, design, construction, sustainment, restoration, and modernization criteria, and applies to the Military Departments, the Defense Agencies, and the DoD Field Activities in accordance with USD (AT&L) Memorandum dated 29 May 2002. UFC will be used for all DoD projects and work for other customers where appropriate. All construction outside of the United States is also governed by Status of Forces Agreements (SOFA), Host Nation Funded Construction Agreements (HNFA), and in some instances, Bilateral Infrastructure Agreements (BIA.) Therefore, the acquisition team must ensure compliance with the most stringent of the UFC, the SOFA, the HNFA, and the BIA, as applicable.

UFC are living documents and will be periodically reviewed, updated, and made available to users as part of the Services' responsibility for providing technical criteria for military construction. Headquarters, U.S. Army Corps of Engineers (HQUSACE), Naval Facilities Engineering Command (NAVFAC), and Air Force Civil Engineer Center (AFCEC) are responsible for administration of the UFC system. Defense agencies should contact the preparing service for document interpretation and improvements. Technical content of UFC is the responsibility of the cognizant DoD working group. Recommended changes with supporting rationale should be sent to the respective service proponent office by the following electronic form: Criteria Change Request. The form is also accessible from the Internet sites listed below.

UFC are effective upon issuance and are distributed only in electronic media from the following source:

- Whole Building Design Guide web site http://dod.wbdg.org/.

Refer to UFC 1-200-01, *General Building Requirements*, for implementation of new issuances on projects.

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Unified Facilities Criteria (UFC)
New Document Summary Sheet

Document: UFC 4-022-03, *Security Fences and Gates.*

Superseding: NAVFAC Military Handbook 1013/10, *Design Guidelines for Security Fencing, Gates, Barriers, and Guard Facilities*.

Document Description and Need:

Purpose: This document is to provide a unified approach for the design, selection, and installation of security fences and gates. The examples provided in the UFC are for illustration only and must be modified and adapted to satisfy service and installation specific constraints. This document is not intended to address procedural issues such as threat level determination and security operations or to provide specific design criteria such as impact forces.

This UFC was developed by consolidating and refining criteria from USACE Protective Design Center, Naval Facilities Engineering Command (NAVFACENGCOM), and available military, government, and commercial sources that are listed in Appendix A of this document.

Application and Use: Commanders, security personnel, planners, designers, architects, and engineers must use this UFC when evaluating existing and providing new security fences and gates.

Need: Fences and gates are primarily used to define perimeters; however, Department of Defense (DoD) and Service regulations require fencing to be provided for certain protected/restricted areas. DoD and Service policies address certain fencing requirements. This UFC focuses on the requirements for security fences, however, the information and design details presented within may also be used for general or perimeter fencing. Modifications to existing fencing are not required to meet this new UFC.

Impact: The following direct benefits will result:

- This document does not set the requirement for security operations at the installation perimeter.
- No additional cost impacts are anticipated by the publication of this document.
- This document does not have any adverse impacts on environmental, sustainability, or constructability policies or practices.

Unification Issues

There are no unification issues.

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CHAPTER 1 INTRODUCTION

1-1 PURPOSE

This document provides a unified approach for the design, selection, and installation of security fences and gates for Department of Defense (DoD).

1-2 APPLICABILITY

This document applies to all construction, renovation, and repair projects including expeditionary or temporary construction that include security fencing and gates for DoD. Consult with current Service policies, location of facility, and threat level for specific requirements.

1-3 SECURITY FENCES AND GATES

Security fences and gates are installed and used primarily to define the perimeter of protected areas, such as restricted areas, controlled areas, entry control/access control points, installation perimeters, and to provide a physical and psychological deterrent to entry and preventing unauthorized personnel from entering a protected area.

1-4 SCOPE AND GUIDANCE

Commanders, security personnel, planners, designers, architects, and engineers must use this UFC when evaluating existing and providing new security fences and gates. Technical information considered generally known to security professionals and engineers, or readily available in technical references (Unified Facility Criteria, Military Handbooks, Technical Manuals, etc.) has not been included. This document is not intended to address procedural issues such as threat levels or to provide specific design criteria such as vehicle impact forces.

1-4.1 Drawings

The notional examples provided in the body of this UFC are for illustration and must be modified for the specific application, environmental conditions, and local constraints. The details and drawings identified in Appendix C provide the minimum mandatory requirements and must be modified for the specific application, environmental conditions, and local/project constraints. See paragraph titled ‘Integration With Other Requirements’ for additional direction.

1-5 GENERAL BUILDING REQUIREMENTS

Comply with UFC 1-200-01, *General Building Requirements*. UFC 1-200-01 provides applicability of model building codes and government unique criteria for typical design disciplines and building systems, as well as for accessibility, antiterrorism, security, high performance and sustainability requirements, and safety. Use this UFC in addition to UFC 1-200-01 and the UFCs and government criteria referenced therein.

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This UFC is one of a series of unified facilities criteria documents that cover minimum standards, planning, preliminary design, and detailed design for security and antiterrorism. The manuals in this series are designed to be used by a diverse audience to facilitate development of projects throughout the design cycle.

1-5.1 UFC Application

The application of the security and antiterrorism UFCs is illustrated in Figure 1-1. UFC 4-020-01 is intended to be the starting point for any project that is likely to have security or antiterrorism requirements. By beginning with UFC 4-020-01, *DoD Security Engineering Facilities Planning Manual*, the design criteria will be developed that establishes which of the other UFCs in the series will need to be applied. The design criteria may indicate that only the minimum standards need to be incorporated, or it may include additional requirements, resulting in the need for application of additional UFCs. Applying this series of UFCs in the manner illustrated in Figure 1-1 will result in the most efficient use of resources for protecting assets against security and antiterrorism related threats.

1-5.2 Requirements Determination

UFC 4-020-01 includes a process for defining the design criteria for a protective system that protects important assets associated with a permanent facility or one in an expeditionary environment. The design criteria will consist of the assets to be protected, the threats to those assets, the degree to which those assets will be protected against the threat, and any constraints that might be imposed on a design. The design criteria may be limited to that defined in minimum standards or it may go beyond those requirements.

Establishing the design criteria for security and antiterrorism is not something that can be done effectively by any one person. It requires a team of people to ensure that the varied interests relating to a project are considered appropriately. The specific membership of a planning team will be based on local considerations, but in general, the following functions should be represented - Facility User, Antiterrorism, Intelligence, Operations, Security, Logistics, Engineering, and Resource Management. Based on local considerations, there may be others who should be consulted for input into the design criteria. They might include Fire Marshals, communications people, environmental people, and historic preservation officers.

1-5.3 Integration With Other Requirements

Security and antiterrorism requirements will never be the only requirements associated with a project. Even where a project is specifically for security and antiterrorism upgrades, there will still be other requirements that must be considered. There will be times where one criterion is more stringent than another, in which case the more stringent one must be applied. In some cases, criteria may conflict. In those cases, those conflicts must be resolved, which may require compromise or adjustment to one or the other criteria. Many security regulations specify protective measures, policies, and operations related to security. This UFC is intended to complement those existing

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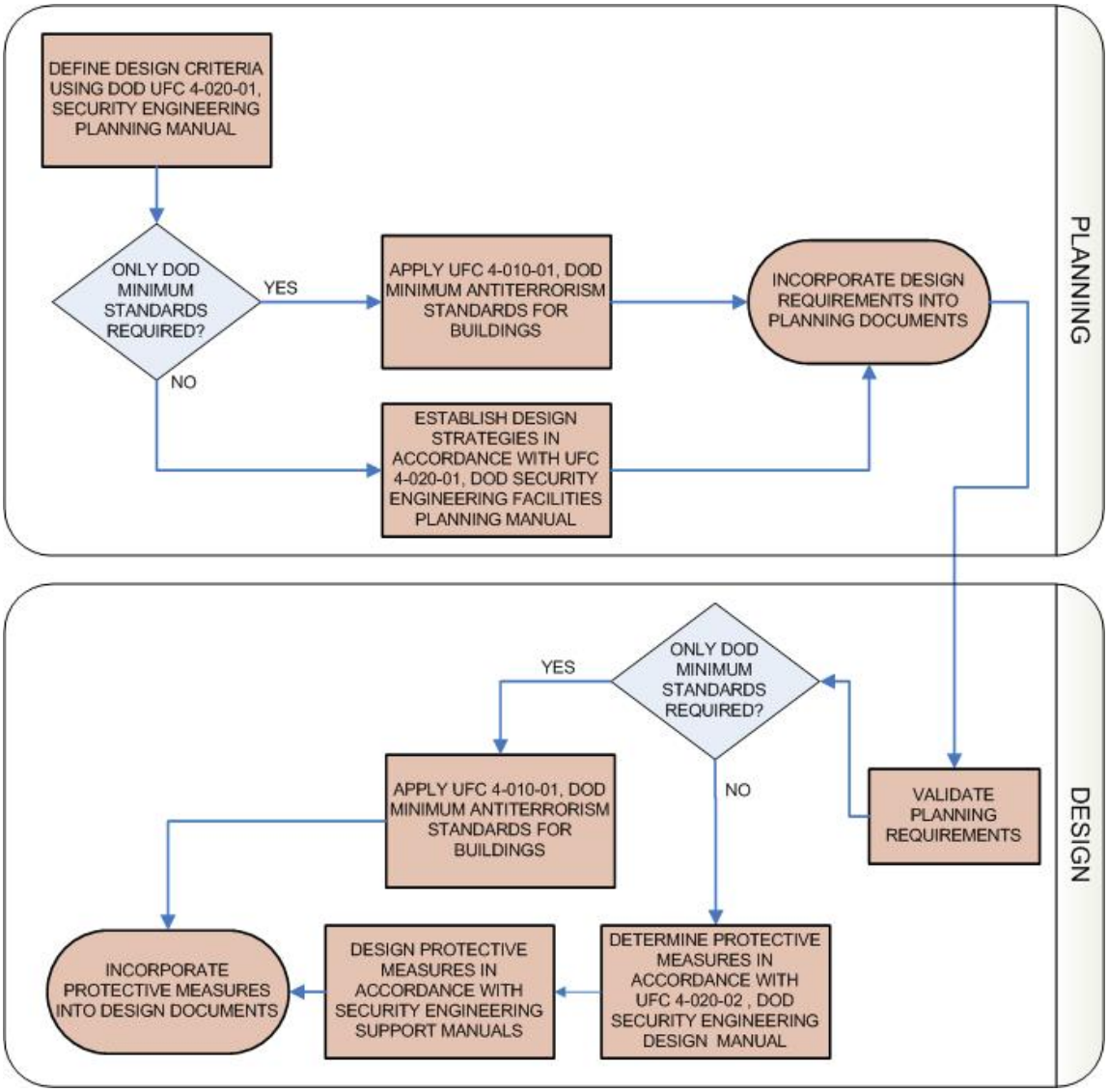
regulations, not to contradict or supersede them. Regulatory requirements must be accommodated and coordinated.

Figure 1-1 Security and Antiterrorism UFC Application



1-6 VULNERABILITY AND RISK ASSESSMENT

In accordance with DoD O-2000.12H Antiterrorism Handbook, a vulnerability and risk assessment must be conducted prior to beginning any security project. Upon identifying facility or asset vulnerabilities to threats, physical security measures such as security fences, gates, and Electronic Security Systems (ESS) may be deployed to reduce vulnerabilities. In summary, this UFC assumes the pre-design phases, including the risk analysis, are complete prior to beginning design. For information on Security

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Engineering Planning and Design process, refer to UFC 4-020-01 and UFC 4-020-02. The engineering risk analysis conducted as part of UFC 4-020-01 must be consistent with the terrorism risk analysis conducted by the installation security/AT staff.

1-7 POLICY REQUIREMENTS

The requirement to protect installation assets comes from DoD Instruction/Directives, Geographic Combatant Commander (GCC) Instructions, Service Instruction/Directives, and Regional or Installation requirements. Consult Headquarters, Major Command, Regional, and Installation personnel to established installation asset protection requirements.

1-7.1 Department of Defense (DoD)

There are several instructions and publications within the Department of Defense that establish requirements for access control and physical security for installation perimeter, restricted access areas and other secure areas.

1-7.1.1 DoD Physical Security Program

DoD 5200.8-R: Requires DOD Components to determine the necessary access control based on the requirements of a developed physical security program. Emergency planning is specified to include establishment of a system for positive identification of personnel and equipment authorized to enter and exit the installation and maintenance of adequate physical barriers (i.e. security fences and gates) that will be employed to control access to the installation.

1-7.1.2 Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives (AA&E)

DoD 5100.76-M prescribes minimum standards and criteria for the physical security of DoD sensitive conventional AA&E. This Manual establishes the requirements to protect sensitive AA&E including perimeters, openings, and security fences.

1-7.1.3 Nuclear Facilities

DoD S-5210.41-M Vols. 1-3, AFMAN 31-108, OPNAVINST 5210.16, and AR 190-54 prescribe policy, responsibilities, procedures, and minimum standards for the security and safeguarding of DoD nuclear reactors, special nuclear materials and weapons including perimeters, openings, and security fences.

1-7.1.4 DoD Antiterrorism Program

DoDI 2000.12: Provides DoD policies for ATFP and assigns responsibilities for implementing physical security systems as part of the DoD ATFP Program. It authorized the publication of DODI 2000.16 Antiterrorism Standards as the DoD standards for ATFP and DoD O-2000.12-H DoD Antiterrorism Handbook as guidance for the DoD standards.

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1-7.1.5 DoD Antiterrorism Handbook

DoD O-2000.12H: Defines the DoD Force Protection Condition (FPCON) System, which describes the potential threat levels and the applicable FPCON measures to be enacted for each level. FPCON measures in the 12-H were modified in DoDI 2000.16, Change 2 of 08 Dec 2006. DoD O-2000.12H also requires Commanders to develop and implement Random Antiterrorism Measures (RAM) as an integral part of their AT Program. This handbook provides a detailed discussion on physical security functional requirements of which physical barriers (security fences and gates) are integral.

1-7.1.6 DoD Antiterrorism Standards

DoD I 2000.16: This instruction requires the installation or activity Commanding Officer to define the access control measures at installations. Additionally, DoDI 2000.16 requires Commanders at all levels to develop as part of the physical security program and implement a comprehensive Antiterrorism (AT) Program, which must define the necessary action sets, including identification and inspection procedures, barrier requirements at each of the potential Force Protection Condition (FPCON) levels and lists the most current approved FPCONS.

1-7.2 Geographic Combatant Commander (GCC) Requirements

GCC issue requirements for Antiterrorism and physical security for installations within their area of responsibility. Ensure any such requirements are incorporated in addition to the requirements found in DoD and Service Directives/Instructions. Resolve any differences in the requirements for the design of perimeter security by applying the most stringent requirement.

1-7.3 Service Requirements

1-7.3.1 Department of Air Force

1-7.3.1.1 AFI 31-101 – Integrated Defense (ID)(FOUO)

This Instruction provides the tools to plan and execute ID. It guides personnel through a familiar 7-step risk assessment process. Furthermore, working groups that are focused on mutually-supporting components of ID, such as the antiterrorism (AT) program and resource protection program (RPP), may be combined and streamlined. This Instruction provides flexible planning and execution opportunities that allow owners/users of various Air Force assets to become actively involved in the defense of their areas; however, some assets must remain secured in accordance with higher headquarters (HHQ) directives, such as nuclear weapons; arms, ammunition and explosives (AA&E); classified information and Defense Critical Infrastructure Program (DCIP) assets.

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1-7.3.1.2 AFMAN 32-1084 Civil Engineering: Facility Requirements

This Manual is a tool to assist commanders, their management, and technical staff in programming the acquisition of facilities and in managing the inventory of real property facilities and provides additional guidance for fencing/barrier requirements.

1-7.3.2 Department of the Army

1-7.3.2.1 AR 190-13 The Army Physical Security Program

Implements DOD 5200.08–R. It prescribes policies, procedures, and guidance to plan and implement the Department of the Army Physical Security Program.

1-7.3.2.2 AR 190-16 Physical Security

Establishes standard policies on physical security systems planning, threat statements, control of access to installations, security of aircraft, bulk petroleum assets, and critical communications facilities.

1-7.3.2.3 AR 190-11 Physical Security of Arms, Ammunition and Explosives

Refer to AR 190-11 for physical security criteria for conventional arms, ammunition, and explosives (AA&E) for additional guidance on fencing requirements.

1-7.3.2.4 ATTP 3-39.32 Physical Security: Army Tactics, Techniques, and Procedures (ATTP)

Provides doctrinal guidance for personnel who are responsible for planning and executing physical security programs. It is the basic reference for training security personnel and is intended to be used in conjunction with the Army Regulation (AR) 190 series (Military Police), Security and Antiterrorism Unified Facilities Criteria (UFC) publications, Department of Defense (DOD) directives, and other Department of the Army (DA) publications.

1-7.3.3 Department of the Navy including Marine Corps

1-7.3.3.1 OPNAVINST 5530.14 Navy Physical Security and Law Enforcement

The intent of this instruction is to identify responsibilities and provide guidance for the protection of people and assets throughout the Navy.

1-7.3.3.2 Physical Security of Arms, Ammunition and Explosives

Refer to OPNAVINST 5530.13 for physical security criteria for conventional arms, ammunition, and explosives (AA&E) and additional fencing requirements.

1-7.3.3.3 NTTP 3-07.2.3 Law Enforcement and Physical Security

Provides guidance for the physical security for Naval Installations to include perimeter security and restricted areas.

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1-7.3.3.4 MCO 5530.14 Marine Corps Physical Security Program Manual

Provides requirements for physical security for Marine Corps installations and organizations including additional barrier/security fence requirements.

1-7.4 Installation Specific Requirements

As required by DODI 2000.16 and service directives, each installation must have an Antiterrorism Plan. The plan provides procedures and recommendations for reducing risk and vulnerability of DOD personnel, their family members, facilities, and assets from acts of terrorism. As such, the installation AT plan reflects the foundation for requirements determination. Installation specific requirements need to be factored into all capital improvement initiatives.

1-7.5 Airfield Requirements

For Air National Guard (ANG) and Air Force Reserve Command (AFRC) units that are co-located with civilian airports, the airfield side of the restricted areas does not require fencing installation as it is prohibited by the Federal Aviation Agency (FAA) safety requirements. Fencing requirements for airports and heliports are provided in UFC 4-141-10N and UFC 3-260-01.

1-8 PHYSICAL SECURITY

That part of security concerned with physical measures designed to safeguard personnel; to prevent or delay unauthorized access to equipment, installations, material, and documents; and to safeguard them against espionage, sabotage, damage, and theft.

1-8.1 Physical Security System

A system comprised of people, equipment, and operational procedures that control access to critical facilities or assets. Fences are but one of many elements that comprise the equipment component of a physical security system. Figure 1-2 diagrams some of the additional components of a physical security system.

From Figure 1-2, fencing is considered part of the delay function of the overall Physical Security System. However, standard chain-link fencing provides approximately 7- 15 seconds of delay.

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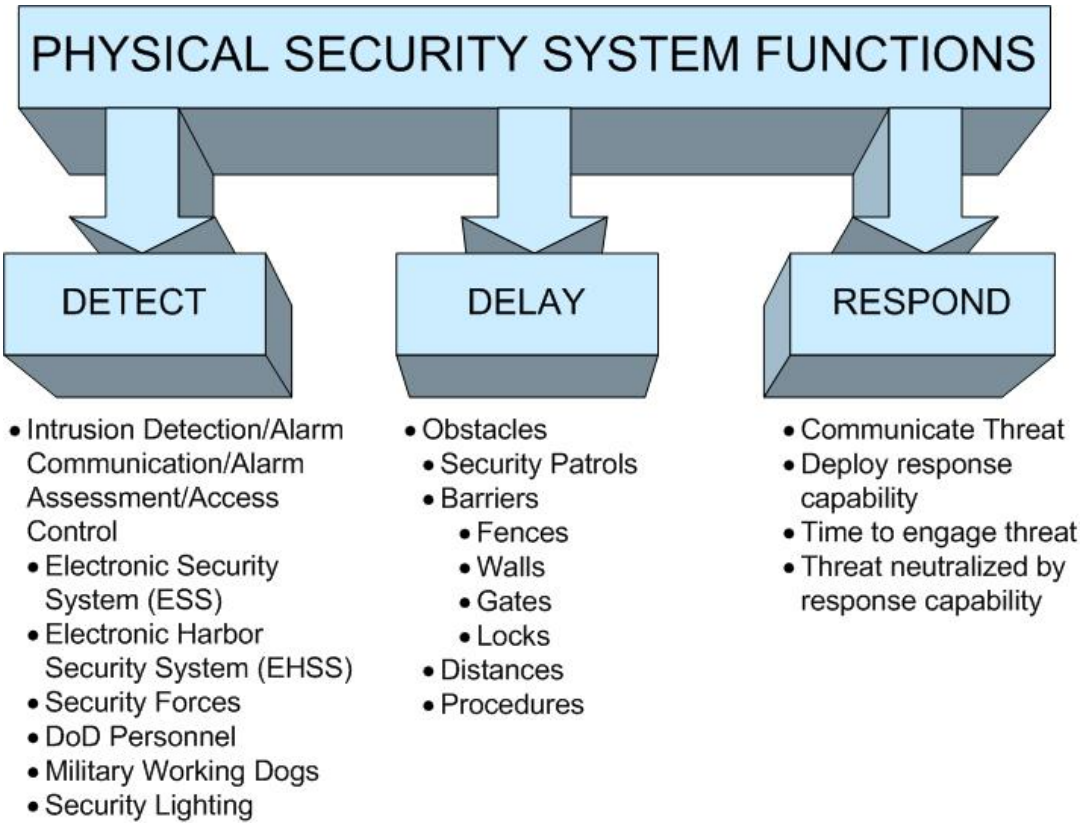
Figure 1-2 Diagram of Physical Security System Functions



1-9 EMERGENCY ACCESS

Locate security fence as to not impede emergency vehicle or emergency personnel access to fire hydrants or other fire protection features. Coordinate with installation fire department regarding security fence location as it applies to fire hydrants and other fire protection features. See UFC 3-600-01, Fire Protection Engineering for Facilities for additional information.

1-10 CORROSION PREVENTION CONTROL

Design strategies for installation security structures and equipment must consider corrosion prevention and control (CPC) preservation techniques for long term maintainability throughout their life cycle. Trade-off decisions involving cost, useful service life, and effectiveness must address corrosion prevention and mitigation.

1-10.1 Material Selection and Coatings

Local environments must be considered during the selection of material for the fencing components as well as the required coatings to provide protection against corrosion. Color polymer and other coatings on fencing fabric, fittings, framework, and gates must

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be applied to enhance visibility and provide greater corrosion resistance, especially in corrosive or salt laden environment. Appendix B defines this environment.

Coating on any fasteners or ties must be electrolytically compatible with fencing fabric to inhibit corrosion. All security fence fittings must be electrolytically compatible with all fence components. Regarding drainage openings (ditches, culverts, vents, metal ducts/pipes, and other opening) consideration must be given to the materials used (smaller metal pipe, metal/steel grillage) in securing such openings. One of the most important corrosion issues is the chemical reaction between dissimilar metals. When dissimilar metals are in contact with one another in the presence of an electrolyte, galvanic action occurs, resulting in the deterioration. The electrolyte may be rain water running from one surface to another, or moisture from the air containing enough acid to cause it to act as an electrolyte. See Appendix A for material specifications.

1-11 REFERENCES

Appendix A contains a list of references used in this document. The publication date of the code or standard is not included in this document. In general, the latest available issuance of the reference is used.

1-12 GLOSSARY

Appendix B contains definitions of terms.

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CHAPTER 2 FENCING

2-1 FUNCTION

The physical security barrier provided by a security fence provides one or more of the following functions:

- Gives notice of legal boundary of the outermost limits of the protected area.
- Assists in controlling and screening authorized entries into secured/protected areas by channeling vehicles and personnel to access control points.
- Supports surveillance, detection, assessment, and other security functions by providing a platform for installing intrusion detection equipment.
- Deters casual intruders from penetrating a secured/protected area by presenting a barrier that requires an overt action to enter.
- Causes a delay to obtain access to a installation/facility, thereby increasing the probability of detection.

2-2 CHAIN LINK FENCING

Chain link fence is a fencing material made from wire helically wound and interwoven in such a manner as to provide a continuous mesh without knots or ties. See Figure 2-1 below for standard chain link fence details identifying all of the components.

Chain link fences and gates must comply with specification requirements in UFGS 32 31 13, *Chain Link Fences and Gates* and UFGS 32 31 13.53, *High-Security Chain Link Fences and Gates*. Consult with ASTM F2611 and ASTM F1712 for additional guidance (fabric, post, framework, fittings, and other accessories) regarding chain link fencing. Refer also to the Chain Link Manufacturers Institute's Security Fencing Recommendations (CLF-SFR0111) and Product Manual (CLF0PM0610) for additional information.

2-2.1 Chain Link Fencing Fabric

Fencing fabric must be minimum 9-gage wire mesh and mesh openings must be not be greater than 2-inches (51 mm) per side. Fence fabric material will be galvanized steel, PVC coated steel fabric (use PVC coated if located in corrosive environment or where aesthetics are of prime importance), or aluminum coated steel fabric (use aluminum coated if located in corrosive environment). See Corrosion Prevention Control for additional information regarding material selection.

2-2.1.1 Additional Fencing Fabric Requirements

The fencing fabric must be extended to within 2 inches (51 mm) of firm ground and anchored, if required by service requirements, using horizontal bottom rails, tension wires, concrete curbs, sills, sheet piling, piping, or other inexpensive materials. For additional security burying the fabric 12 inches (305 mm) may also be considered; however, corrosion of the buried fabric must be monitored. This anchoring will prevent

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the fencing fabric from being able to be lifted by hand more than 5 inches (125 mm) in height. Horizontal bottom rails, concrete curbs, or sills can assist in mitigating an intruder from lifting the fence fabric beyond the requirement above. Mesh openings in chain link fencing are intended to not be covered, blocked, or laced with material which would prevent a clear view of personnel, vehicles, or material in outer clear zones.

Locate all posts, rails, bracing and tension wires on the secure/protected side, i.e. inner side, of the fencing fabric. Select the framework components and material from ASTM F626, ASTM F1043, and ASTM F1083.

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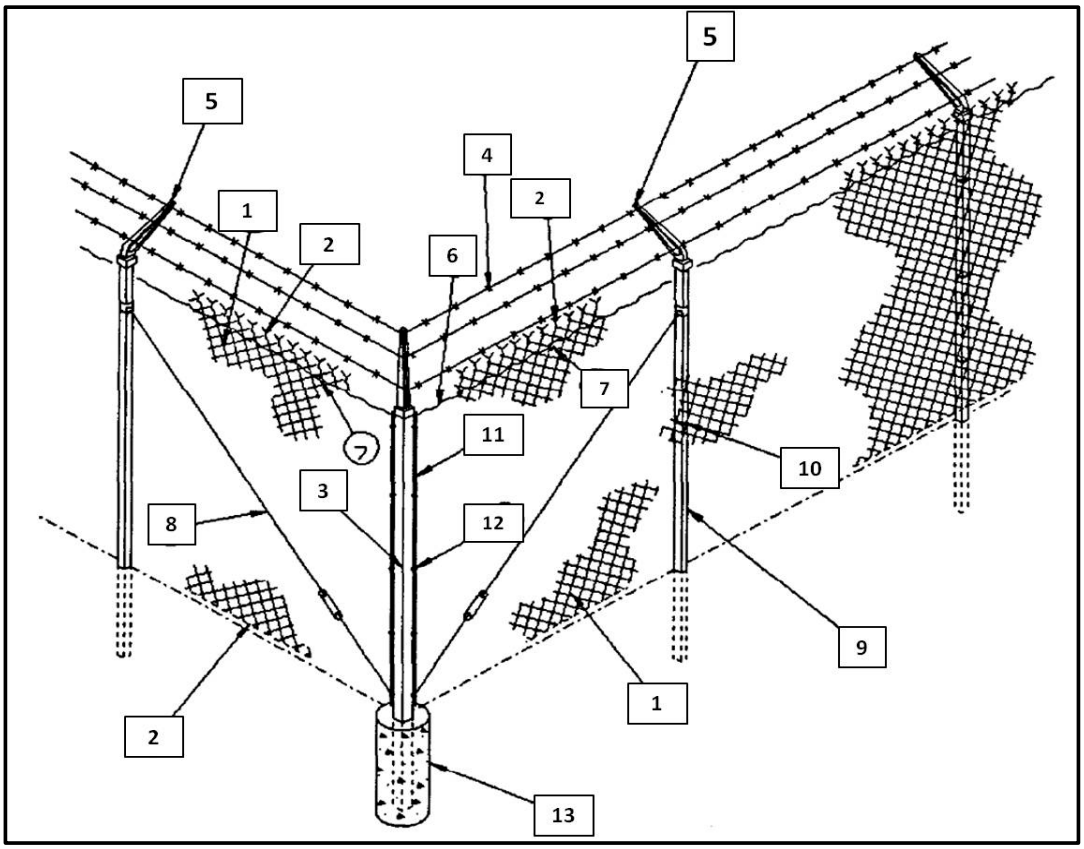
Figure 2-1: General Chain-Link Fence Components



1	Fabric
2	Selvage
3	Corner Post
4	Barbed Wire/Barbed Tape
5	Outrigger/Barbed Wire Arm
6	Tension Wire (Top and Bottom)
7	Hog Ring
8	Truss Rod
9	Line Post
10	Tie Wire
11	Tension Bar
12	Tension Clip
13	Concrete Footing

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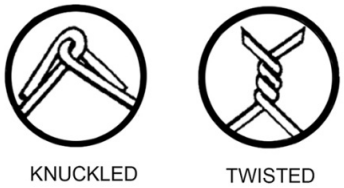
2-2.1.2 Top and Bottom Selvages

Selvage is the edge finish on woven chain link fabric joining pairs of pickets. The selvage may be knuckled or twisted depending on application. Knuckled selvage is defined as the type of selvage obtained by interlocking adjacent pairs of wire ends and bending the wire back into a loop. Twisted is obtained by twisting adjacent pairs of wire ends together in a close helix of 1⁄2 machine turns, which is equivalent to three full twists. See Figure 2-2 for selvage examples.

Twisted selvage must be provided on the top of the fence fabric to deter climbing. Twisted selvage must be provided at the bottom of the fence fabric to deter borrowing unless the fence has a bottom rail, is buried, or encased in concrete. In these applications the selvage may be knuckled.

Figure 2-2 Selvage



2-2.1.3 Fence Posts

Fencing fabric must be mounted on steel posts that are set in concrete with additional bracing at corners and gate openings, as necessary. If steel posts are not available, reinforced concrete posts will be used. Posts, bracing, and all other structural members must be placed on the secure-side of the fencing fabric.

Posts must be vertical within plus or minus 2 degrees in each direction. Determine the embedment depth of the fence posts and associated footings considering wind load, local soil conditions, and the potential for wind and water erosion. Posts for security fencing must be embedded and encased in concrete according to the design details in Appendix C.

2-2.1.4 Fence Bracing

Steel truss rods used for bracing must have a minimum nominal diameter of 5/16 inch (8 mm) and provided with turnbuckles for tensioning. Provide bracing for each gate, terminal and end post. Install truss rods diagonally from near ground level of the gate, terminal or end post to within 6 inches (152 mm) from the top of the fabric at the adjacent line post. Fencing fabric can be securely fastened to tension wires on the top and bottom with 9 gage (3.76 mm) galvanized tie wires incorporating at least three full twists, 9 gage (3.76 mm) round wire galvanized hog rings, or in a manner that provides a tensile strength equal to or greater than the strength of the fencing fabric. Consider securing all fastening and hinge hardware by peening or welding to prevent disassembly of fencing and gate components where warranted by the required level of protection.

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See Appendix C for design details of chain link fencing posts, rails, braces, and tension wires.

2-3 ORNAMENTAL FENCES

Ornamental (also known as tubular) fencing provides a greater resistance to climbing as well as providing aesthetic qualities in comparison to chain link fencing. Ornamental fencing systems are constructed of either steel or aluminum components. Install ornamental fence pickets plumb and provide a minimum of 2 inches (51 mm) or maximum of 6 inches (152 mm) between the fence and the ground. See ASTM F2408 for additional guidance for ornamental fence systems. See Appendix C for design details of ornamental fence.

2-4 WELDED WIRE MESH FABRIC FENCING

Welded wire mesh fabric fencing material is composed of a series of longitudinal and transverse steel wires arranged substantially at right angles to each other, and welded together. In comparison to chain link fencing has a greater deterrence to intrusion by climbing and cutting. Welded wire mesh fabric fence openings are relatively small to prevent toe or finger hold. Although the mesh sizes are small, visibility through the fence may be higher than chain link fencing even at sight angles near parallel to the fence line. See ASTM F2453/F2453M for material requirements. Maximum vertical/horizontal opening dimension must be 2 inches (51 mm). Minimum thickness – 9 gage (3.76 mm).

Welded wire mesh fabric fencing construction costs in non-urban environments may be approximately one half of ornamental security grade fencing. See Figure 2-3 for an example of a welded wire mesh fence.

2-4.1 Fence Components, Fittings, and Accessories

Provide welded wire mesh posts in accordance with ASTM F626, ASTM F1083, ASTM F1043, or ASTM A500/A500M. Posts and rails must be designed to resist specified loading and be spaced per manufacturer's guidance. Connect fencing fabric with a minimum of 9 gage (3.76 mm) tie wires or other connection per manufacturer providing equal or greater capacity and resistance to tampering. If using welded wire mesh fence panels, attach to line and terminal posts and gate frames with post brackets.

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Figure 2-3: Welded Wire Mesh Fence

2-5 EXPANDED METAL FENCING

Similar to welded wire mesh fabric fencing, expanded metal fencing is ideal for medium and high security applications. The diamond shaped mesh's small openings and wide strands deter climbing, cutting, and tunneling. Panels are constructed of steel sheets, simultaneously slit, and stretched into a rigid, open mesh design making continuous sheets that prohibit unraveling at the strands. Maximum vertical/horizontal opening dimension must be 2 inches (51 mm). Minimum strand width must be 0.150 inches (9 gage) (3.81 mm).

- In lieu of installing a fence topping, an expended metal fabric cap sheet can be installed at a 45-degree angle extending outside of the secured perimeter and terminating with a turned up vertical section. If additional protection measures are required, barbed tape can be applied to the back of the vertical portion of the cap sheet.

See ASTM F2548 and ASTM F2780 for design, construction, and application of expanded metal fencing systems. Available fence patterns can provide the architectural aesthetics of ornamental fencing. See Figure 2-4 for an example of an expanded metal fence.

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2-5.1 Retrofit Existing Fence

Expanded metal fencing can be applied as a retrofit to existing chain link fencing and gates to provide additional protection, strength, and durability. Expanded metal fencing should be installed directly to the existing fence utilizing the installed chain link fence fabric and framework.

2-5.2 Fence Components, Fittings, and Accessories

Line and terminal posts must be hot-dip galvanized in accordance with ASTM F626, ASTM F1043, and ASTM F1083. The manufacturer's recommendation must be considered when spacing line posts. Top, middle, and bottom rails must be hot-dip galvanized. Rails can be fastened to posts using clamps. Standard weight piping must be used for the posts and rails of expanded metal fencing. Fittings such as line rail clamps, post caps, tension bands, and panel clamps must be galvanized, heavy pressed steel or malleable iron.

Figure 2-4: Expanded Metal Fence

2-6 FARM STYLE FENCES

Farm style fences are constructed of wood and/or metal posts and wire. Farm style fences, barb wire, and woven wire must comply with specification requirements in UFGS 32 31 26, *Wire Fences and Gates* and the drawings in Appendix C. Pressure treat all wood posts and metal posts must be zinc coated and conform to ASTM A702. Steel post conforming to ASTM F1043 must be used in conjunction with T-section or U-section line post. The gates are constructed of 1 5/8 inch (41.3 mm) minimum diameter tubular steel, and secured with a chain and padlock.

See Appendix C for design details of farm-style fence.

2-7 EXPEDITIONARY PERIMETER FENCING

Refer to GTA 90-01-011, Joint Forward Operations Base (JFOB) Survivability and Protective Construction Handbook for perimeter security requirements.

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2-8 FENCE FABRIC HEIGHT

Unless otherwise directed all security and perimeter fencing must have a minimum fence fabric height of 7 feet (2.13m), excluding the top guard. Fence height including outriggers must be a minimum of 8 feet (2.44m). Modifications to existing fences are not required to meet this new UFC.

Consult with current Service policies on specific requirements regarding fence height and assets that may require a higher level of protection.

2-9 TOP GUARDS

When required, install outriggers (support arms) at 45-degree angles in a single arm (towards the threat side) or "Y"/"V" configuration, constructed of a single or double outrigger consisting of 18-inch (457 mm) arm(s), each having three strands of barbed wire at regular intervals along the top of the fence.

The outriggers must provide a minimum of an additional 12 inches (305 mm) to the fence height. The top guard fencing adjoining gates may range from a vertical height of 18 inches (457 mm) to the normal 45 degree outward protection, but for a limited distance along the fence line to adequately open the gates. Outriggers must be permanently affixed to the fence posts with screws or by spot welding. Screws used to affix outriggers to posts must be made tamper-proof either by design, peening, or welding.

2-9.1 Outrigger/Barbed Wire Arm Material Specifications

Top guards must be constructed of the same material as the other fencing components in accordance to ASTM F626. See Appendix C for details.

2-9.2 Barbed Wire and Barbed Tape Concertina

Barbed wire is a fabricated wire product consisting of two line wires twisted to form a two-wire strand, into which 2–point or 4–point barbs are tightly wrapped and locked into place at specific intervals.

Barbed tape concertina is a strip of metal, machined to produce clusters of sharp points. Provide three strands of barbed wire, equally spaced, on outrigger/support arms where barbed tape/concertina is mounted.

2-9.2.1 Barbed Wire

Fences requiring barbed wire must use a minimum of 3 strands of barbed wire equally spaced. Additional strands may be added as required. Barbed wire must consist of two 12.5 -gage /0.099-inch (2.5 mm) (+0. 005- inch (.127 mm)) twisted line wires with 15-gage /0.080- inch (2 mm)(+0, 005-inch (.127 mm)) round barbs. Barbed wire must be zinc-coated steel, aluminum coated steel, aluminum alloy, or PVC over zinc-coated steel as specified. All barbs must consist of four points and spacing of barbs must be at 5- inch (127 mm) (+1- inch (25.4 mm)) centers.

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2-9.2.1.1 Barbed Wire Material Specifications

Barbed wire must be in accordance to ASTM A121 and ASTM F1665. See Appendix C for barbed wire support configurations.

2-9.2.2 Barbed Tape/Concertina

Barbed-tape concertina is a commercially manufactured wire coil constructed of high-strength-steel barbed wire that is clipped together at intervals to form a single coil or double coil. The single coil must be a minimum of 2 feet (610 mm) in diameter and extend at least 50 feet (15.2 m) without permanent distortion. Double coil must be 24/30 inch (610 mm/762 mm) and extend at least 50 feet (15.2 m) without permanent distortion.

Barbed tape concertina may be added to the top and, in some cases, to the bottom to increase the level of protection. Barbed tape concertina must be secured at a minimum interval of 18 inches (457 mm) along the fence fabric to the top barbed wire strand and a maximum gap of 2 inches (51 mm) must be maintained between the bottom barbed wire and the top of the chain-link fabric. After use, barbed tape concertina may be recoiled and reused without distortion. For additional protection, barbed tape concertina may be installed between the “Y” configuration of the outriggers.

2-9.2.2.1 Barbed Tape/Concertina Material Specifications

Barbed tape concertina must be in accordance to ASTM F1911 and ASTM F1910. See Appendix C barbed tape configurations.

2-9.2.3 Specific Barb Requirements

2-9.2.3.1 Farm Style Fence

Any barbs used with farm fencing must be a minimum of 15.5 gage wire. Barbed clusters must have a minimum width of 1.2 inches (30.7 mm). The distance between these strands is intended not to exceed 6 inches (152 mm) and at least one wire must be interlaced vertically and midway between posts. The ends of the barbed wire strands may be staggered or fastened together, and the base wire may be picketed to the ground. See Appendix C for barbed wire details.

2-9.2.3.2 Barb Wire Fencing

3, 4, or 5-strand barbed wire fencing, 4 feet (1.2 m) high, should be used for extensions of flight-line area barriers, perimeter boundary for isolated portions of installations, livestock barrier, and area boundary for on-base bulk material storage areas. Barbed wire fastened on wooden posts may use a minimum of 1.5 inch (38 mm) staples made from the same metal as the wire for fastening. See Appendix C for barbed wire details.

2-9.2.3.3 Temporary Usage

When used for temporary purposes (not used as fence topper), concertina wire should be used in multiple stacked coils. Stacked concertina wire on perimeter barriers may be

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laid between poles with one roll on top of another or in a pyramid arrangement (minimum of 3 rolls). Concertina blades must have a minimum length of 1.2 inches (30.7 mm).

Barbed tape concertina as an expedient measure for short-term use, pending the erection of permanent fencing, can be non-reinforced. Reinforce all barbed tape concertina used for permanent security applications.

2-10 GROUNDING

Grounding and bonding of the perimeter systems must be in accordance with the National Electric Safety Code (NESC) - IEEE C2. Fences that are required to be grounded by NESC must be designed to limit touch, step, and transferred voltages in accordance with industry practices. IEEE Std 80™-2000 - IEEE Guide for Safety in AC Substation Grounding is one source that may be utilized to provide guidance in meeting these requirements.

The grounding connections must be made either to the grounding system of the enclosed equipment or to a separate ground.

1. Fences must be grounded at each side of a gate or other opening.
2. Gates must be bonded to the grounding conductor, jumper, or fence.
3. A buried bonding jumper must be used to bond across a gate or other opening in the fence, unless a nonconducting fence section is used.
4. If barbed wire strands are used above the fence fabric, the barbed wire strands must be bonded to the grounding conductor, jumper, or fence.
5. When fence posts are of conducting material, the grounding conductor must be connected to the fence post or posts, as required, with suitable connecting means
6. When fence posts are of nonconducting material, suitable bonding connection must be made to the fence mesh strands and the barbed wire strands at each grounding conductor point.

2-11 REINFORCEMENT FOR FENCING

Refer to UFC 4-022-01 and 4-022-02 for additional guidance and requirements (number and size of cables) on fence reinforcement for identified moving vehicle threat. For fabric type fences install fence reinforcement between fence fabric and fence post. For both fabric type and ornamental fences reinforcement must be installed on exterior side of fence post. If located in a corrosive environment, coated or sheathed cable may be used; however, the sheathing must be removed at the connections. See Figures 2-5/2-6 and Appendix C for design details of fence reinforcement. See Appendix A for material specifications.

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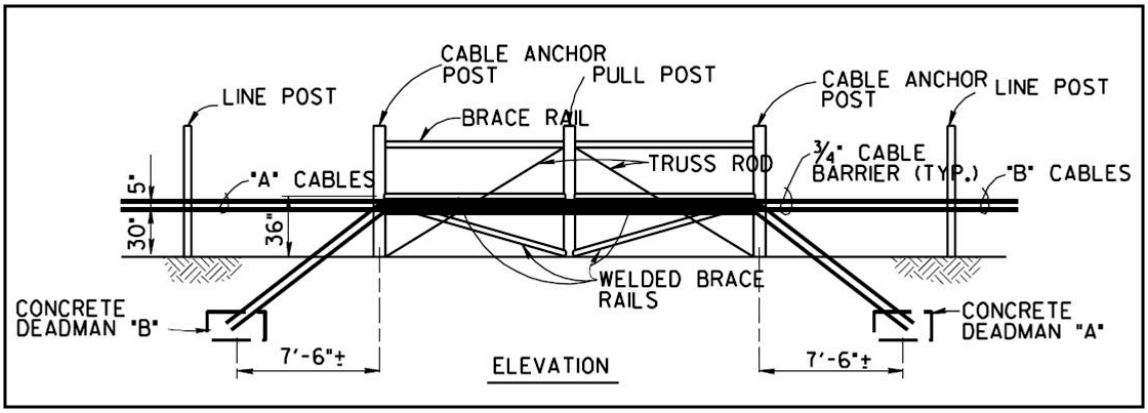
Figure 2-5 Steel Cable-Reinforced Chain Link Fence



2-11.1 Deadman Anchor

Reinforcing cables must be terminated to concrete deadman anchors. Anchors are to be placed at intervals of 200 feet (61 m) on the secure/protected side of the perimeter fencing. Offset deadman anchors from fence at the minimum distance required to avoid interference with post and to allow maintenance access to the turnbuckles, clamps, and other accessories.

The anchoring system: deadman dimensions or other anchoring systems and burial depth, eyebolt embedment depth, etc. must be designed for local soil conditions and the anticipated impact force established by the threat parameters defined in UFC 4-022-02. See Appendix C for design details of deadman anchors.

2-11.1.1 Cable Connection

Eyebolts embedded in the concrete deadman anchors may have either a welded “T” or “L” end. The eyebolt can either be in-line with the attached cable or flush against the deadman surface. When used, eyebolts should be welded and galvanized to the anchor rods. The top side of the deadman can either be placed flush with or below the ground surface with the eye of the eyebolt above ground. Threaded rods may also be used as an alternative to the eye bolt when securing the cables to the deadman anchor. When using threaded rods, the threaded rod and wire rope connection must be visible above ground like the eyebolt previously described.

Figure 2-6 and details in Appendix C show the deadman position using a cable clamp and turnbuckle to secure the cable rather than a swaged on clamp. This turnbuckle adds the advantage of being able to adjust the tension of the cable.

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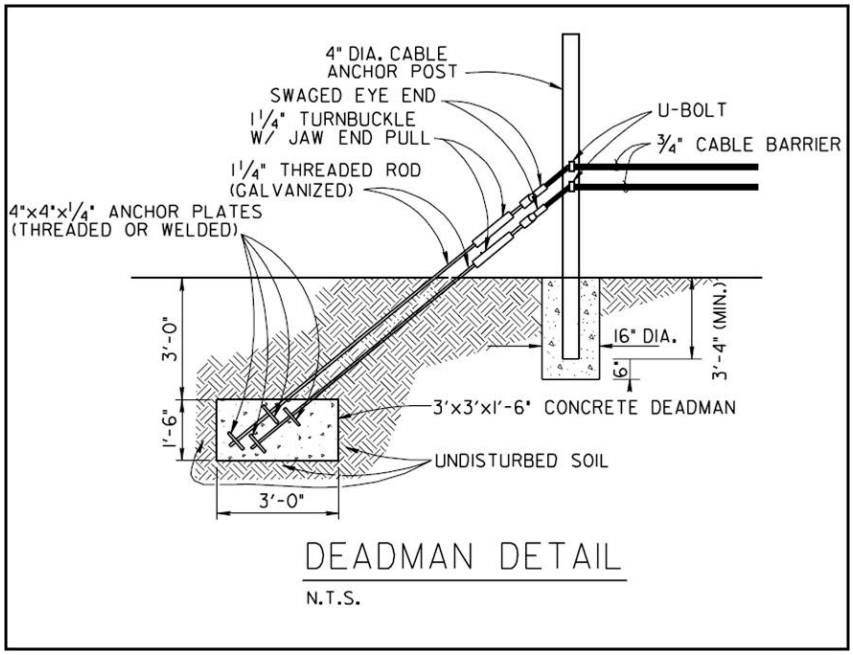
Figure 2-6: Deadman Anchor Detail



2-12 SPECIAL SECURITY FEATURES

2-12.1 Clear Zones

Clear zones are areas established around the fence to provide and unobstructed view to enhance detection and assessment around fences. When required, dimensions of clears zones vary depending on asset being protected and level of protection. For example, outer clear zones may be 30 feet (9 m) wide and inner clear zones may be 20 feet (6 m) wide. Consult with Service policies for assets being protected to determine if clear zones are required and what dimensions are required.

2-12.2 Double Fence Lines

Assets that require Electronic Security Systems (ESS) for perimeter security may require a double fence line. Perimeter ESS and double fence lines typically associated with assets that require a high level of protection for the force or covert entry tactic. This system is intended to increase the probability of detection, decrease nuisance alarms, and prevent access to ESS. The typical configuration is outer clear zone, outer fence, isolation zone, inner fence, and inner clear zone. See Figure 2-7a/b below.

2-12.2.1 Outer Fence Line

Outer fence line acts to reduce the Nuisance Alarm Rate (NAR) by keeping animals, people, vehicles, and windblown debris out of the isolation zone. No sensors should be placed on the outer fence of a double fence line system. In some instances the outer fence line may define a protected or restricted area boundary. In the case where the

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outer fence line defines a protected or restricted area boundary, the outer fence must meet the minimum requirements as set forth in this UFC.

2-12.2.2 Isolation Zone

The isolation zone is the area between the inner and outer fence lines sometimes referred to as the detection zone and must meet clear zone requirements indicated above. The area must be free of all vegetation and above ground obstructions except for the ESS and its supporting infrastructure. The isolation zone is typically light colored gravel or crushed stone bed sloped to prevent standing water. This reduces maintenance, increases probability of detection, and enhances the assessment capability within the fence lines.

2-12.2.3 Inner Fence Line

The Inner fence line provides the inner boundary for the isolation zone and defines the protected or restricted area boundary. It may be used for mounting of fence line detection systems such as taut wire, Time Domain Reflectometry (TDR), or fiber-optic strain-sensitive cable systems, refer to UFC 4-021-02 for sensor types and applications. When used as a foundation for fence line detection systems, the fence meet the following minimum requirements.

2-12.2.3.1 Inner Fence Fabric

Fence fabric material must be in accordance with ASTM A491 and must comply with minimum requirements set forth in this UFC.

2-12.2.3.2 Inner Fence Components, Fittings, and Accessories

Select the framework components and material from ASTM F626, ASTM F1043, ASTM F1083, and ASTM F1712 in addition to the following:

1. End, corner, and pull posts will be concrete filled.
2. Gateposts must be minimum of 4-inch (102 mm) outside diameter (O.D.) and be sized according to Table 2-1.
3. Three (3) tension bands must be used. Top tension wire must be 7.5-inches (191 mm) below top of fabric with the other two (2) bands located approximately 31(787) and 56.5 (1435) inches (mm) down respectively from the top of fence fabric.

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Table 2-1 Fence Type Components

PIPE	SIZE
Bottom or Brace Rails	1 5/8 in (41mm)
Line Posts	2 ½ in (63.5mm)
Corner, end and pull posts)	4 in (102mm)
Single Gate Posts – equal or less than 12ft (3.7m) Width	4 in (102mm)
Double Gate Posts – equal or less than 24ft (7.3m) Width	4 in (102mm)
Single Gate Posts – greater than 12ft (3.7m and less than 18ft (5.5m) Width	6 5/8 in (168 mm)
Double Gate Posts – greater than 24ft (7.3m) and less than 36ft (11m) Width	6 5/8 in (168 mm)
Single Gate Posts – over 18ft (5.5m) Width	8 5/8 in (219 mm)
Double Gate Posts – over 36ft (11m) Width	8 5/8 in (219 mm)

Figure 2-7a: Double Fence Line

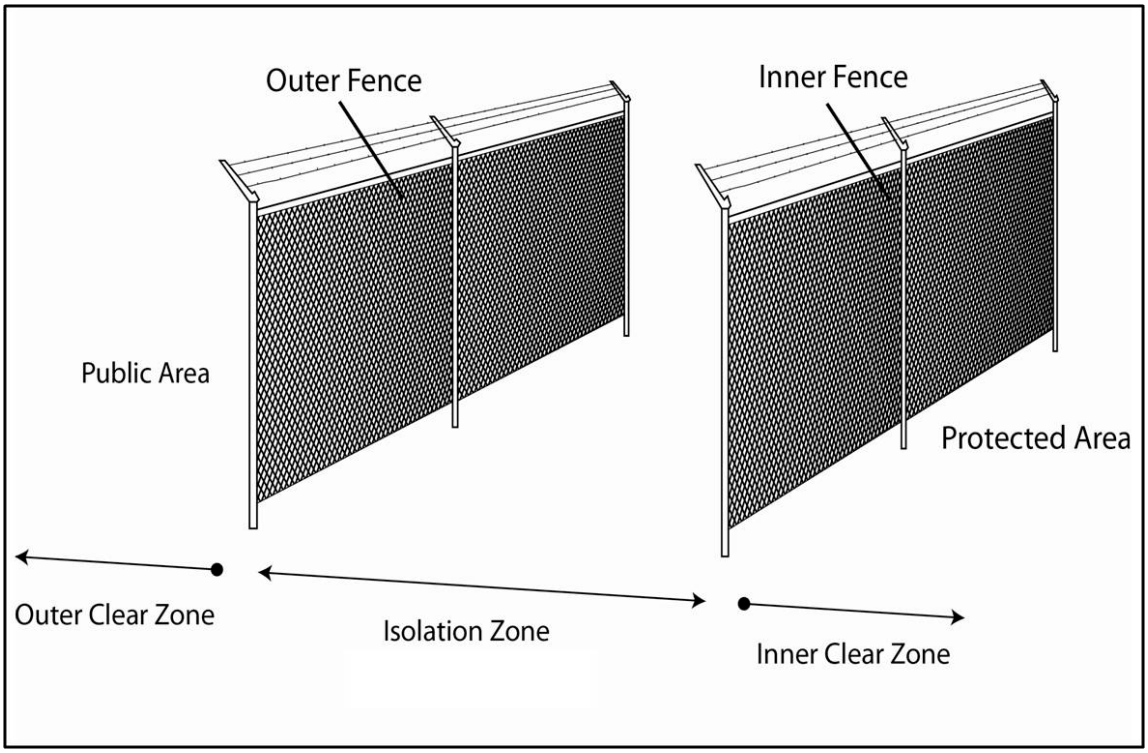

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Figure 2-7b: Double Fence Line

2-12.3 Fence Line Electronic Security Systems

Electronic Security Systems (ESS) may be used to increase the probability of detection and the assessment of intruders attempting to enter restricted areas. ESS includes Intrusion Detection Systems (IDS), Access Control Systems (ACS), and Closed Circuit Television (CCTV) for assessment of alarm conditions. The design of fences and gates must support the site specific design of the ESS as required. Further information on Electronic Security Systems can be found in UFC 4-021-02.

2-12.4 Security Lighting

Security lighting or protective lighting provides illumination during periods of darkness or in areas of low visibility to aid in the detection, delay, and respond functions of a physical security system. Coordinate security lighting requirements with security personnel. Refer to UFC 3-530-01 for lighting design criteria.

2-12.5 Patrol Roads

When required provide an interior, all-weather perimeter road in all areas not affected by impassable terrain features for security-patrol vehicles. Drainage ditches parallel to patrol roads should be designed to utilize shallow or low angle side slopes to prevent obscuring the observation from a 4-foot (1.2 m) high line of sight above the road surface. Where patrol roads pass through clear zones, precautions must be taken in roadway design to preclude concealment for intruders.

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2-12.6 Drainage Culverts and Utility Openings

Provide protective measures for culverts, storm drains, sewers, air intakes, exhaust tunnels, and utility openings, that have a cross-section area of 96 square inches (61,939 square mm) or greater, with the smallest dimension being more than 6 inches (152.4 mm) and :

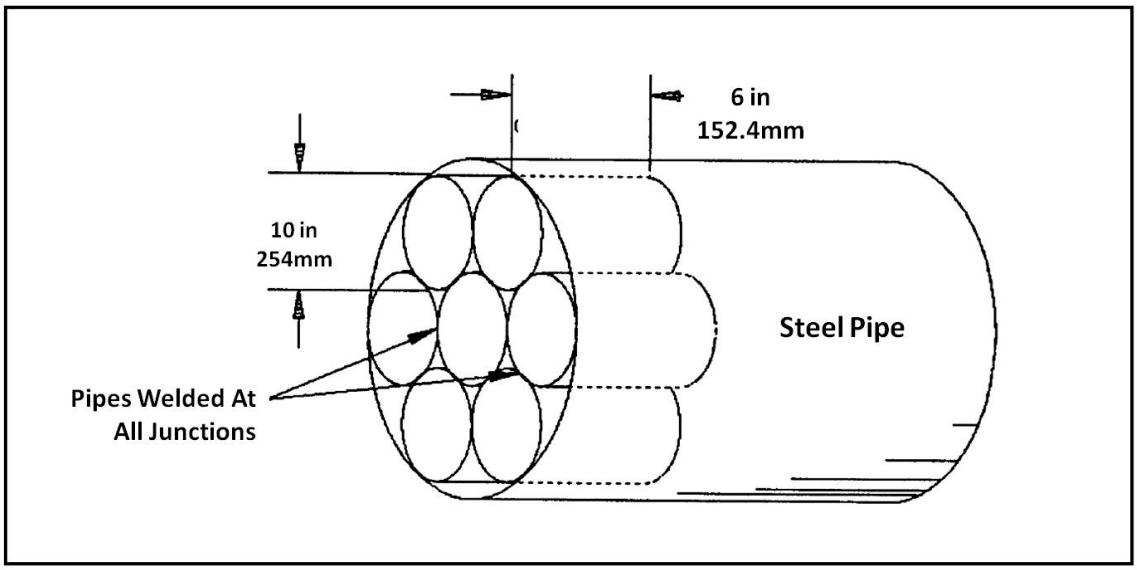
1. Pass through clear zones.
2. Traverse under or through security fences.

Such openings and barrier penetrations will be protected by securely fastened grills, locked manhole covers, or equivalent means to prevent entry or provide forced entry penetration resistance equal that of the fence. Regarding material selection for securing openings/penetrations see Material Selection and Coatings.

2-12.6.1 Large Diameter Pipes – Multiple Pipes

If drainage conditions require large diameter pipes, or if it is a more economical approach to provide security protection, drainage openings may be constructed of multiple pipes having individual diameters of 10 inches (250 mm) or less Extend multiple pipes through the entire conduit, secured to each other and to the large opening. As an economical alternative, reduce the pipe lengths to short segments approximately 6-inches (152 mm) long. Place the short segments at the attack side of the opening and secure them to the welded bar grill. See Figure 2-8.

Figure 2-8: Large Culvert with Short Pipes



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2-12.6.2 Large Diameter Pipes – Grilled Configuration

Steel pipes that pass under fences must have grills welded to the pipe as shown in Figure 2-9. For concrete pipes that pass under fences, the grill ends must be welded to a steel rim that fits snugly over the concrete pipe. The rim and grillwork will be fastened over the concrete pipe and bolted or pinned to the rim of the concrete pipe as shown in Figure 2-10. Grill ends may be embedded in a concrete headwall that encapsulates the concrete pipe. Grills must be placed on attack side of the fence. Care must be taken during design to assure that bars and grills across culverts are not susceptible to clogging. All utility openings are intended to be designed with a debris catcher to permit either rapid clearing or removal of grating for cleaning when required. Steel used for grill must be in accordance with ASTM A529 and the corrosion prevention control section of this UFC.

Figure 2-9: Steel Culvert Grill

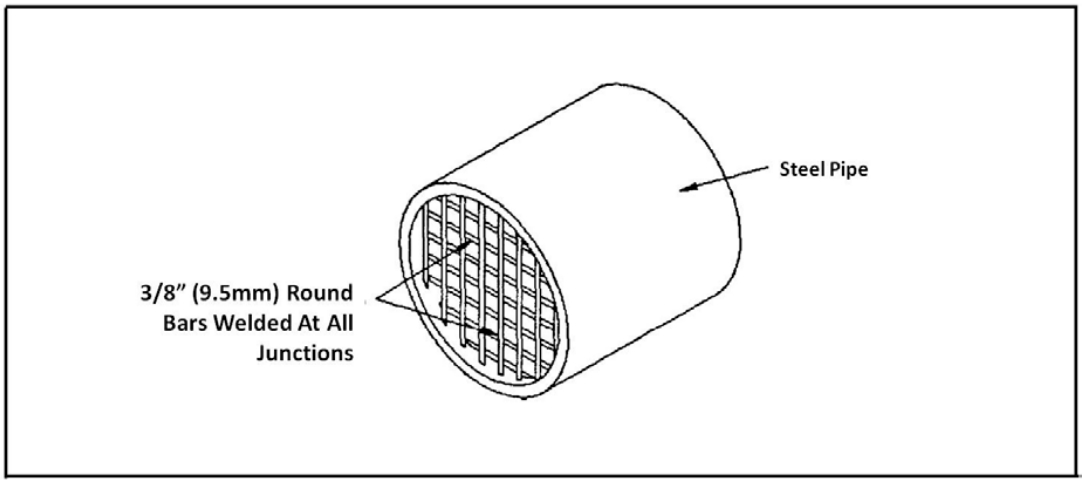
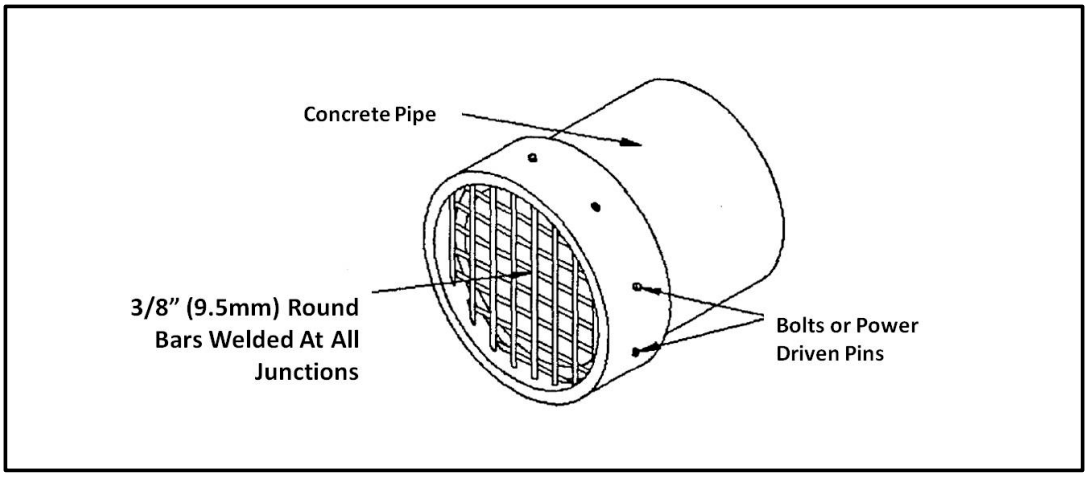


Figure 2-10: Concrete Culvert Grill



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2-12.6.3 Utility Openings

Inlets for utility openings that are outside of the fence line must have a debris catcher with grating. As shown in Figure 2-11a/b below, inlets for utility openings that are outside of fence line must have a debris catcher (i.e. chain link fabric) with the grating on the inlet side. Caution must be taken when using debris catchers to ensure that plugging and flooding of the area surrounding the headwall do not occur.

2-12.6.4 Additional Considerations

In lieu of installing a grill in the utility pipe itself, provide manhole covers, 10 inches (254 mm) or more in diameter, covering a utility which passes through security perimeter fencing of a restricted access area and secure with locks and hasps or by welding them shut or by bolting them to their frame, or by using keyed bolts. Hasps, locks, and bolts must all be made of materials that resist corrosion.

Figure 2-11a: Utility Openings

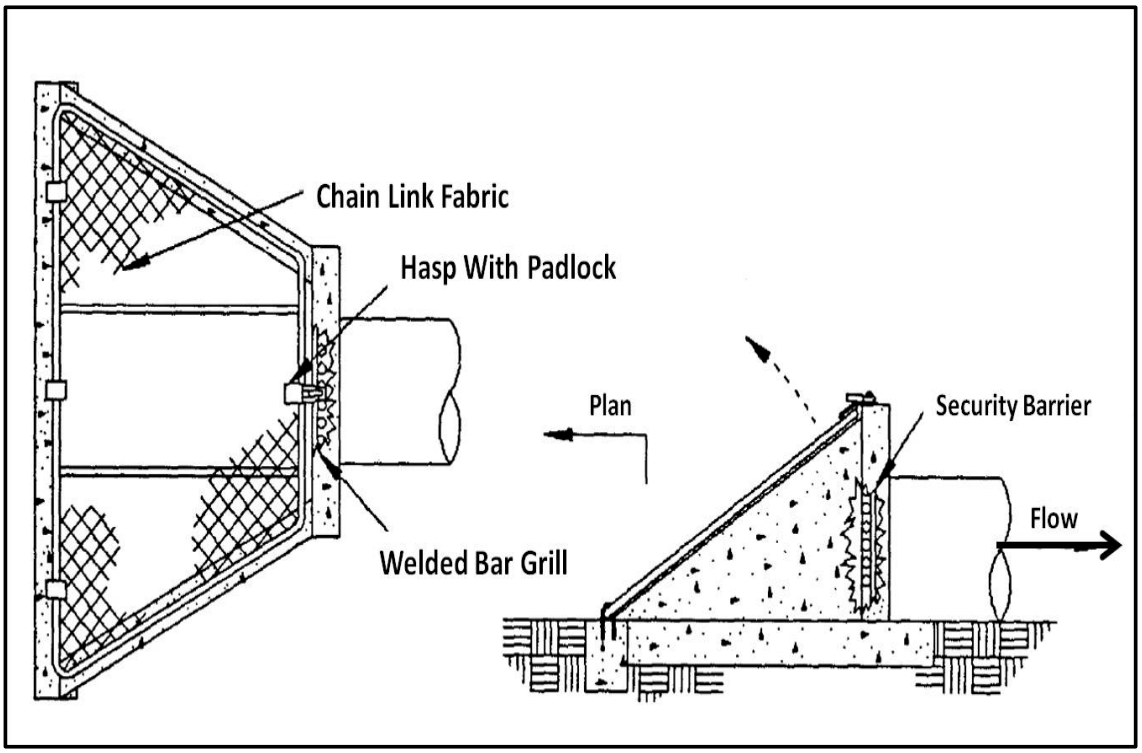

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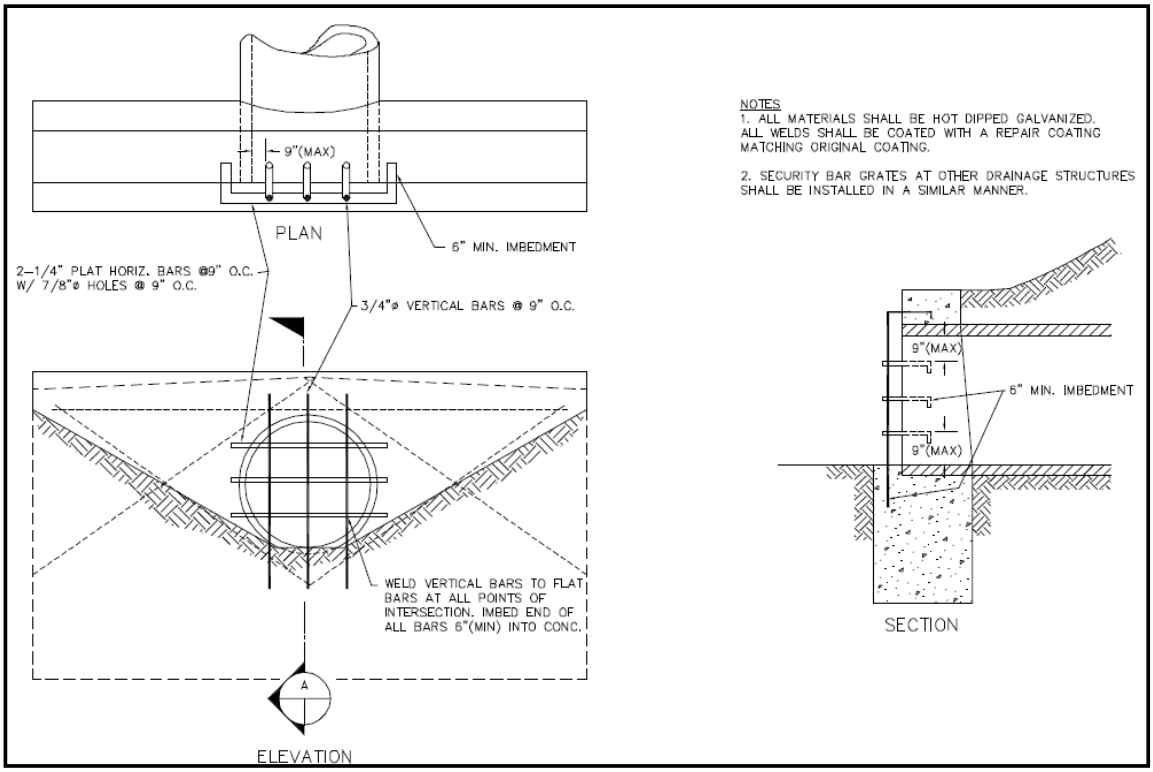
Figure 2-11b: Utility Openings



2-12.7 Drainage Crossing

Fencing passing over ditches or swales is intended to provide protection to prevent unauthorized entry. Ditches and swales that do not receive frequent water flow must provide additional fencing below, suspending from the lower rail of the main fence to the auxiliary frame and around the sides of the ditch. See Figure 2-15. The added fence must be attached every 2 inches (51 mm) along the intersection of the two fence sections and either attached to a series of ground stakes secured to the sides and bottom of the ditch, or embedded in a concrete sill in the ditch or swale as shown in Figures 2-12 and 2-13. Concrete curbing must be used to fill areas between fencing and ground surface.

Provide a screen arrangement below fencing using vertical and/or horizontal steel bars or pipes for ditches and swales receiving frequent water flow. Provide a maximum spacing of 9 inches (229 mm) between either vertical or horizontal bars. Possible debris must be considered when designing the spacing between bars. Crossing bars must be welded at each intersection, with bars embedded 6 inches (152 mm) into concrete and fastened to the bottom rail of the crossing fence. See Figures 2-14a/b/c/. Analyze the hydraulic capacity of ditches, swales, and culverts to verify the bar grills will not decrease the channel flow capacity below the maximum expected design flow.

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Steel used for grill must be in accordance with ASTM A529 and the corrosion prevention control section of this UFC.

2-12.8 Tunneling Prevention

Soil under fence must provide a minimum of 15 seconds of tunneling resistance using hand tools. Tunneling prevention must be used in areas containing “soft” soils. UFC 3-220-10N describes “very soft” and “soft” soils as those that can be extruded between fingers when squeezed and/or molded by light finger pressure. Classification of soils must be in accordance with ASTM D2487, Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System), and ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). Areas with a soil analysis indicating that “soft” soils are present must embed fencing in a continuous concrete curb. The recommended depth of the curb will be determined from the soil analysis and the frost depth at the facility. The frost depth for the subject areas must be considered to assure that heaving of posts and curb cannot occur during the winter. If the soil analysis does not indicate tunneling may occur quickly, continuous concrete curbing may still be considered as an added protective measure. Nuclear sites with very sandy terrain are directed to have a soils engineering analysis to determine the recommended depth of the concrete curb. Restricted access facilities with a risk of tunneling may provide IDS for tunneling protection. Welded wire mesh fence systems may incorporate additional fence panels for burial on the secure-side of the perimeter and tie-wired to the vertical panels to deter tunneling.

Figure 2-12: Swale Crossing with Ground Stakes

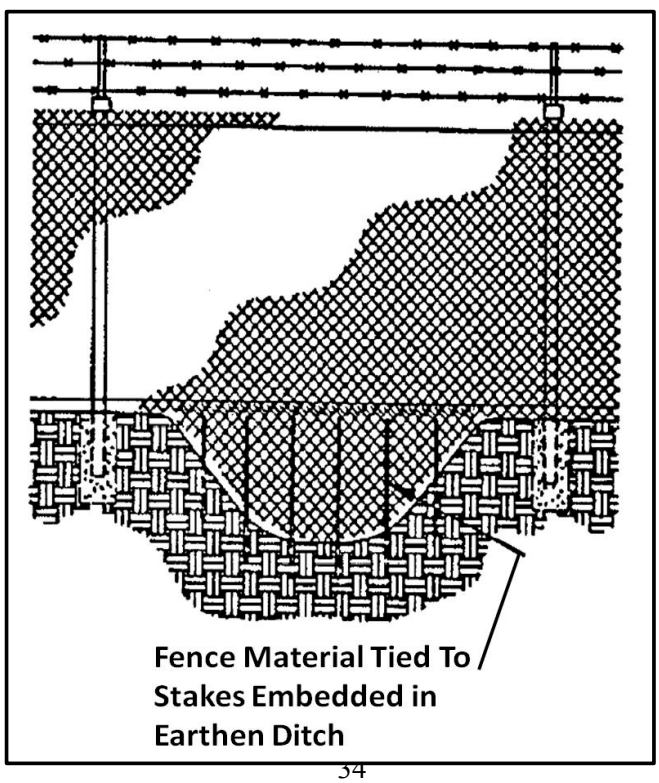

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Figure 2-13: Swale Crossing Embedded in Concrete

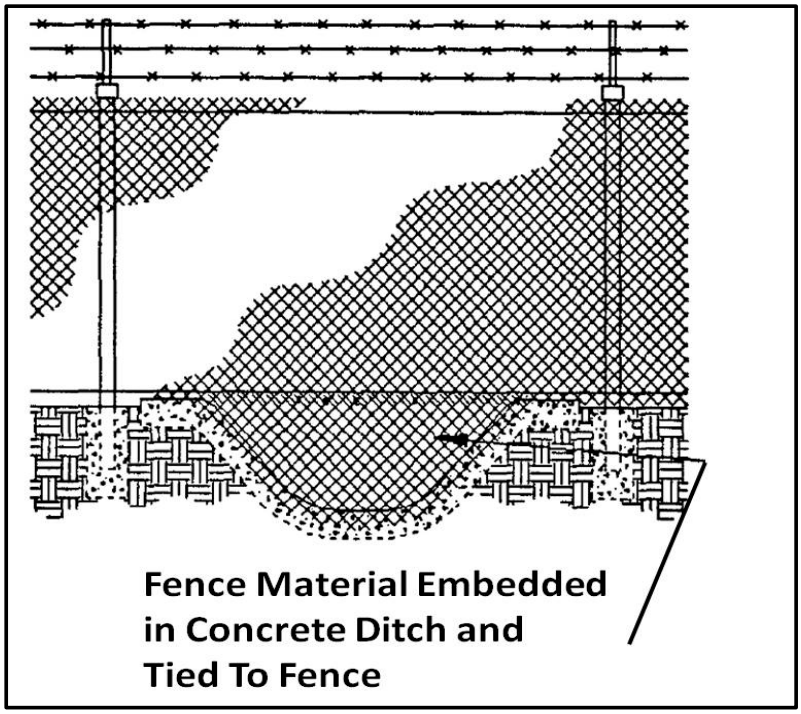

Figure 2-14a: Bar Grill Embedded in Concrete

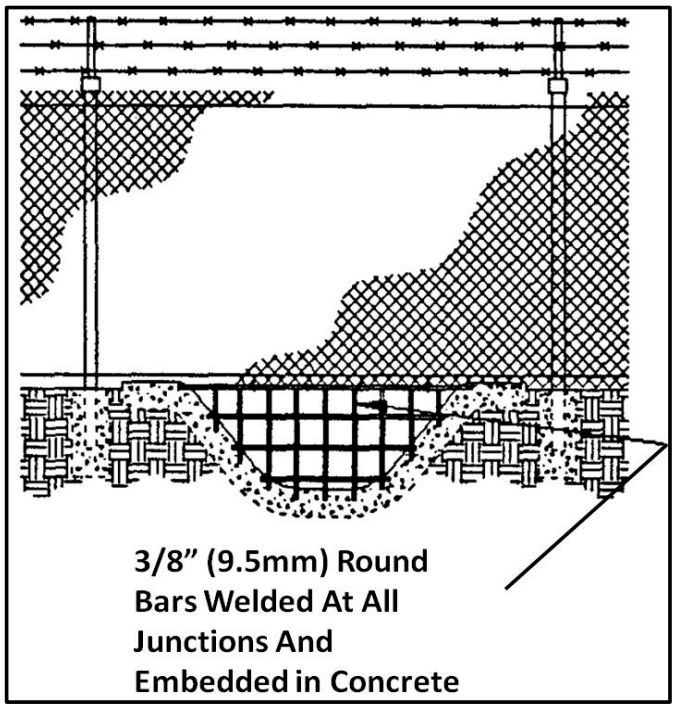

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Figure 2-14b: Bar Grill Embedded in Concrete

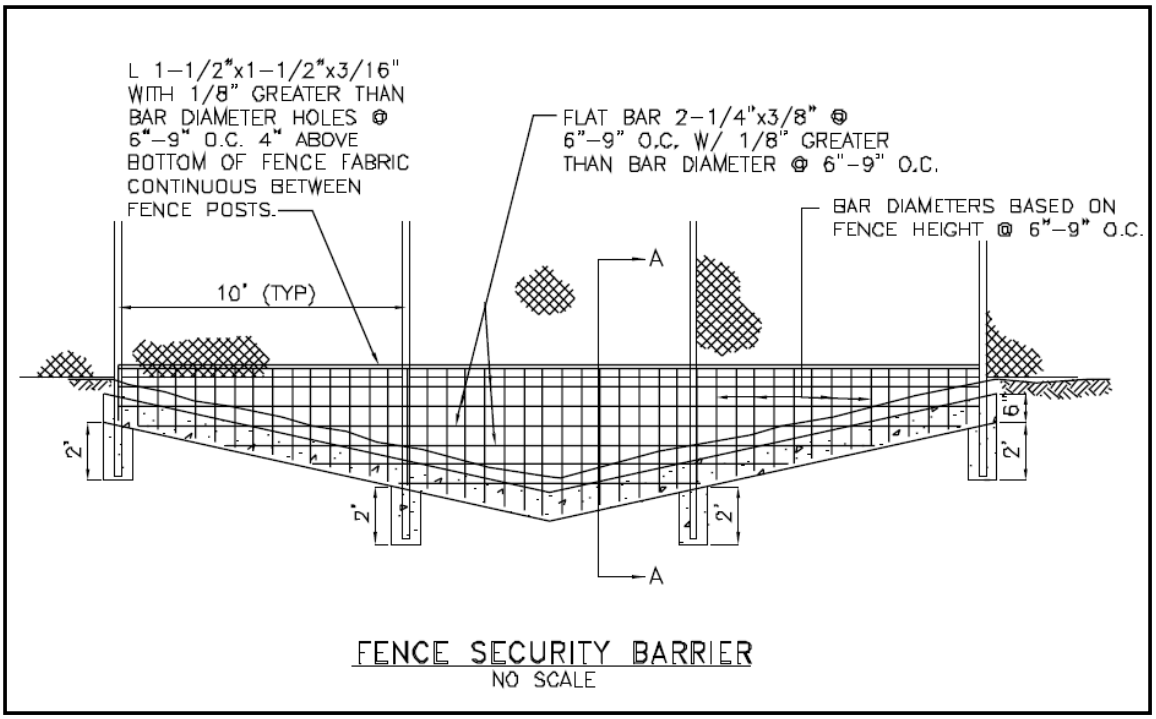

Figure 2-14c: Bar Grill Embedded in Concrete

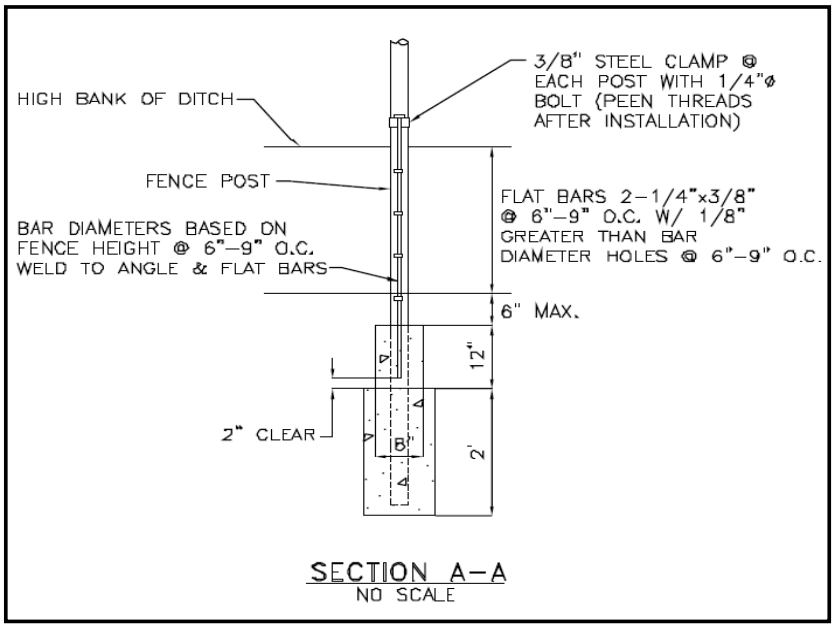

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Figure 2-15- Chain Link Fence over Ditch

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CHAPTER 3 GATES

3-1 GATES OVERVIEW

3-1.1 Access Control

Access Control is a primary design consideration for gate systems. The design of gates must consider and address the following items to ensure proper specification of power-operator accessories and controls. See Appendix C for details of standard gates.

- Pedestrian traffic
- Reversing devices to keep gates from closing on vehicles
- Traffic flow
- Number of open and close cycles
- Type of vehicles
- Operational site security plan
- Provide lighting in accordance with UFC 3-530-01, *Design: Interior and Exterior Lighting and Controls.*

Gates, as part of perimeter fences, must be as effective as their associated fence to provide an equivalent deterrent. Gates will normally require additional hardening features due to their location across entrance roads and the inherent vulnerability of their hinges and latches. Gates are known to be the weakest point in the perimeter security fence and as such, attention must be paid to their requirements when designing security fencing. Materials used in fabricating and erecting chain-link gates must be the same as the materials used for the associated chain-link fence. A primary concern for gate design associated with security fences is to assure that the bottom of the gate fabric extends within 2 inches (51mm) of the roadbed or firm soil when closed. Where possible, pedestrian and vehicular gates should be clearly separated and defined.

3-2 PERSONNEL GATES

Personnel gates are intended to be designed to permit only one person to approach the guard at any time. Turnstile gates may be considered to control personnel entry.

Gates must conform to the Architectural Barrier Act (ABA) Accessibility Standard for Department of Defense Facilities as adopted by the Deputy Secretary of Defense memorandum dated October 31, 2008.

3-2.1 Single Swing Gates

Design single swing gates to match fence fabric height, with an additional 1 ft (305 mm) of three strand barbed wire added to the height if barb wire is part of the fence structure. The gate opening should not exceed a width of 14 ft (4.3 m). See ASTM F900 for additional gate requirements.

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For pedestrian use, single swing gates may be considered as the second alternative to turnstile gates. See Figure 3-1 for a fixed and welded single swing gate example

3-2.2 Turnstile (Rotational) Gates

Turnstile gates are manufactured as single or tandem and are available for ABA access. Tandem turnstile gates should be considered where high volumes of pedestrian traffic are exchanged from both sides of the perimeter such as shift work. Only full height turnstile gates are permitted for access through security fencing. Automated access control systems such as card readers, push button, and wireless remote can be incorporated to access turnstile gates. Metal detectors and counters are also available as accessories. Movement of travel can be set for clockwise, counterclockwise, or bi-directional. Arms and barrier tubing are 1-3/4 in (44.5) diameter, 14 gage. Overall exterior height is 91 in (2.31 m) with a pedestrian walk through height of 84 in (2.13 m).

Provide canopy or barbed wire/barbed tape over top channel between adjacent fence posts. Provide Barbed wire/tape in accordance with Chapter 2. See Figure 3-2 for a turnstile gate example. See Appendix C for design details of turnstile (rotational) gates.

Figure 3-1: Single Swing Gate

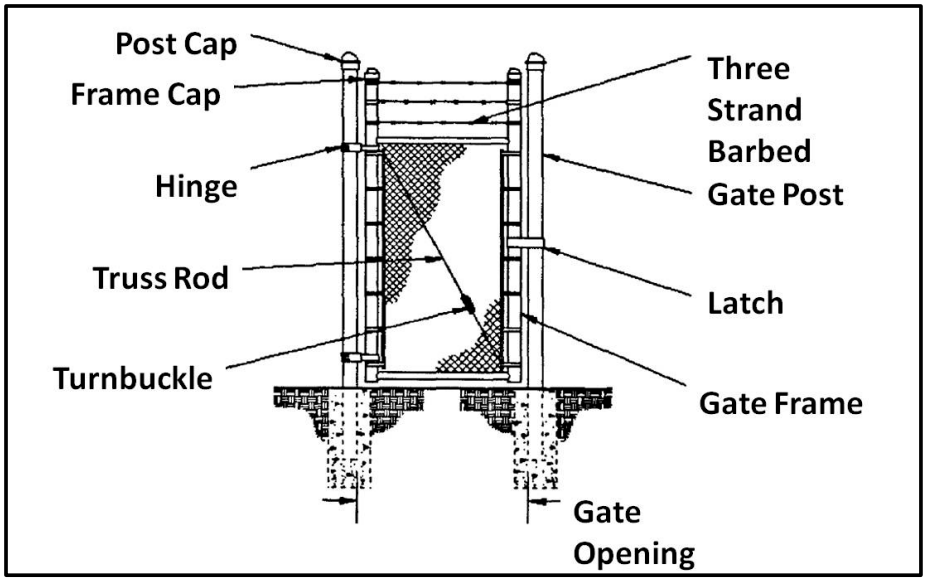

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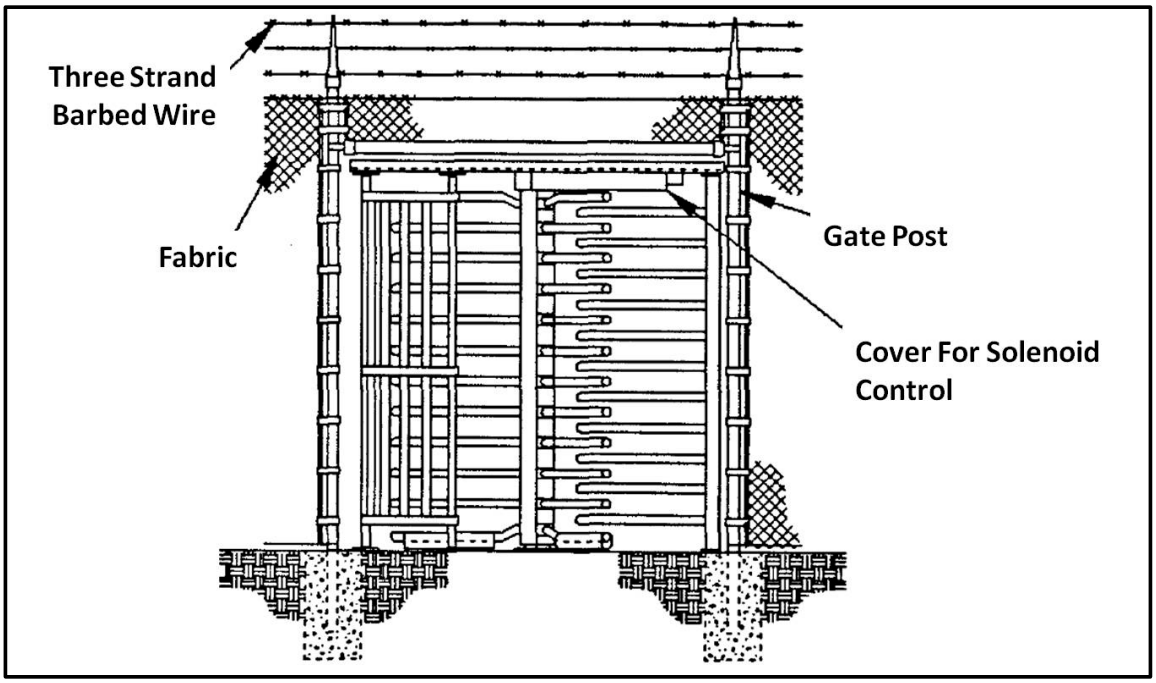
Figure 3-2: Turnstile/Turnstile with Barbed Wire



3-3 VEHICULAR GATES

Vehicular gates should limit opening sizes when possible to decrease open/close cycle time. There is no maximum height for vehicular gates. Coordinate gate height with surrounding/adjacent security fencing and the width will be at least as wide as the road entering the gate. The operational requirements for the gate must be evaluated to determine which gate type is most suitable. Analysis for all vehicular gates must consider daily peak of vehicular traffic and the operational access control requirements for the secured area to determine opening size, gate type, and whether an automatic operator is needed. Follow the requirements of ASTM F2200 for gates used for vehicular traffic that are to be automated. Cantilevered, sliding or wheel supported gates are considered the best selection for vehicle security gates followed by overhead sliding gates, swing gates, vertical tilt and overhead “guillotine” gates. Areas where snow and ice are prevalent may consider using cantilever or swing gates instead of tracked sliding gates. However, if sliding gates are used, consideration should be given to adding internal heating for gate mechanisms. Areas where real estate is tight vertical tilt gates are recommended.

3-3.1 Sliding Gates

Sliding gates must have all entry-exit points secured with a heavy duty sliding steel, iron, or heavily braced chain link gate equipped with a heavy locking device. The cross-slope of the road surface must be sloped at a constant grade for the full length of the

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gate path to permit proper drainage while maintaining smooth operation of the gate opening and closing. Where a sliding gate is installed at an existing paved entrance, the pavement may be filled or leveled where the gate will be installed. Follow the requirement of ASTM F1184 for sliding gates.

3-3.1.1 Single Wheel-Supported (V-groove) Sliding Gate

A guide rail or trough across the roadbed is utilized by this type of gate. The trough provides a smoother surface for vehicular traffic, but is not recommended due to debris buildup. Single wheel supported sliding gates do not have an opening distance restriction, but are limited by the power requirements of the gate operator. Wheel supported gates require 1/3 less straight level storage space along adjacent fence than cantilevered.

3-3.2 Cantilevered Gates

3-3.2.1 Single Cantilevered Gate

All single cantilevered gates should use full support and suspension of gate frame by four rollers secured to two posts inside the restricted area. Single cantilevered gates are not recommended for openings exceeding 24 ft (7.3 m). When an opened gate rests parallel to existing fence, a straight and level fence line 1.5 times the size of the opening should be made to accommodate when the gate is fully open. See Figure 3-3 and Appendix C for an example of single cantilevered gates.

3-3.2.2 Double Cantilevered Gate

Double cantilevered gates are not recommended for openings greater than 48 feet (14.6 m) and should be constructed in a similar manner as described for single cantilevered gates as shown in Figure 3-4.

3-3.3 Double Swing Gates

All double swing vehicular gates must be designed to swing inward, toward secured area. A 2 inch (51 mm) maximum clearance must be maintained between the bottom of fence and the road surface when gate is in closed position. The road surface may be leveled or sloped downward in the direction the gate opens. Recommend gate openings for double swing gates are not greater than 28 feet (8.5 m). Table 3-1 provides recommended concrete foundation diameters for swing gate posts. A minimum of 3 feet (915 mm) deep concrete foundation must be used for swing gate posts. Gate swings greater than 90 degrees must be designed with a large arc space for proper operation. See Figure 3-5 for double swing gates.

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Table 3-1: Gate Post Foundations

Steel Post Diameter	Foundation Hole Diameter	Gate Leaf Length
2.875 in (73 mm)	18 in (450 mm)	0 - 6 ft (0 - 1.8 m)
4.000 in (101.6 mm)	24 in (609.6 mm)	6 - 12 ft (1.8 - 3.7 m)
6.625 in (168.3 mm)	36 in (914.4 mm)	12 - 18 ft (3.7 - 5.5 m)
8.625 in (219 mm)	40 in (1016 mm)	18 - 24 ft (5.5 - 7.3 m)

Figure 3-3: Single Cantilevered Gate

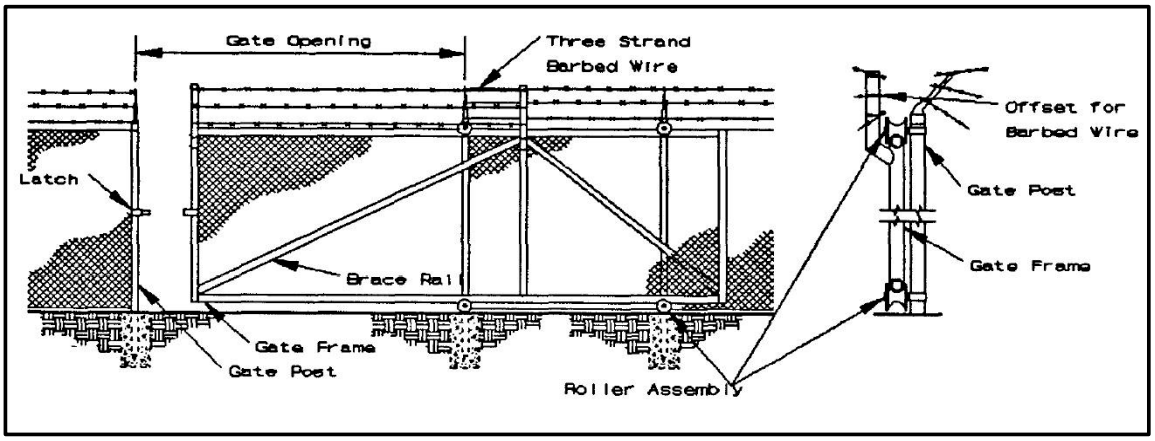

Figure 3-4: Double Cantilevered Gate

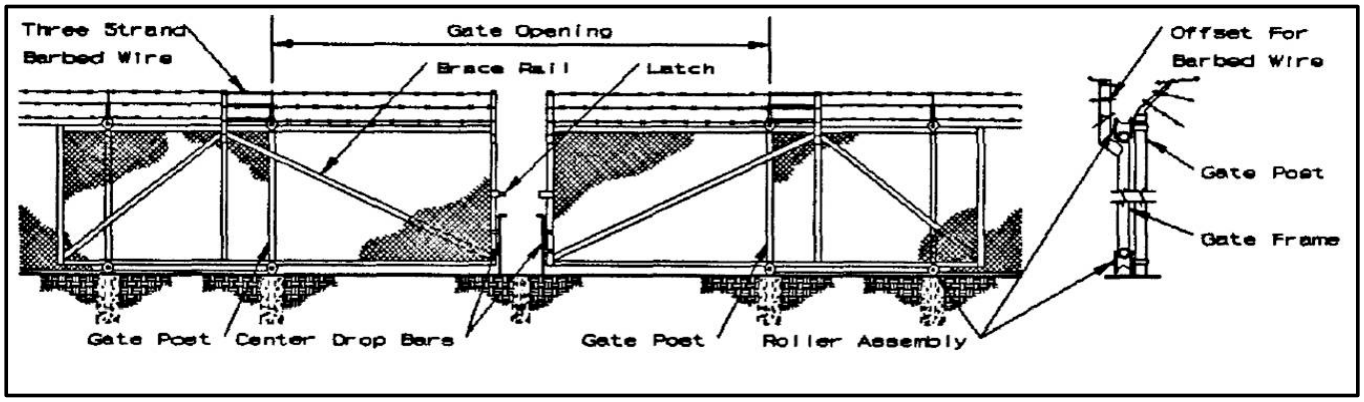

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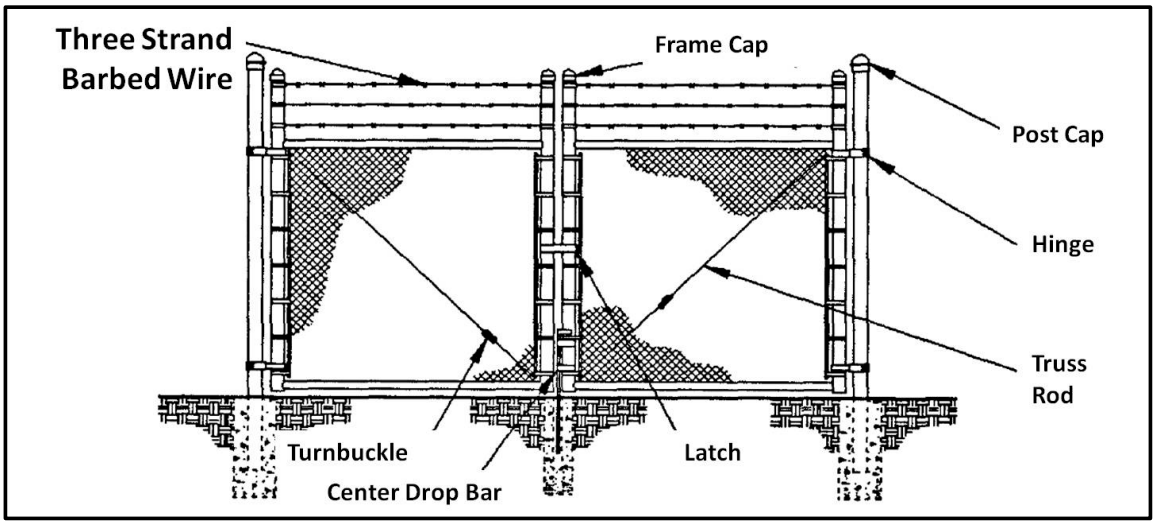
Figure 3-5: Double Swing Gate



3-3.4 Vertical Pivot Gate

Vertical pivot gates can be manufactured with chain link fabric, expanded metal, ornamental, or similar materials as indicated within this document. A 2 inch (51 mm) maximum clearance must be maintained between the bottom of fence and the road surface when gate is in closed position. Recommend gate openings are not greater than 24 feet (7.3 m). For openings greater than 24 feet (7.3 m), consult with the manufacturer. See specific manufacturer requirements for gate foundation.

3-3.5 Overhead (Sliding) Gates

An overhead gate is a horizontal slide gate supported by an I-beam or enclosed track that is suspended above the opening. The support must extend at least the full opening width on one side of the opening to support storing the gate parallel to the adjacent fence line when the gate is opened. The gate storage area must be in line with the gate opening and either be level or have a decreasing grade to accommodate the gate when it is fully opened. Gates may be suspended from the I-beam or enclosed track by rollers attached to posts extending upward from the leading and trailing edge of the gate. The overhead beam or track height is intended to allow room for the largest possible vehicle going through the gate. Gates should be suspended above ground from the overhead beam or track and supported laterally near the ground by vertical rollers. The I-beam may be applied to strengthen the gate for peak hour traffic, large opening sizes, and heavy gate construction. More posts extending upward from the center of the gate to the tracks may be added to carry heavier loads. Overhead gates must conform to ASTM F1184.

3-3.4.1 Single Overhead Supported Gate

See Appendix C for design details of single overhead supported gates.

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3-3.4.2 Double Overhead Supported Gate (Biparting) Gate

See Appendix C for design details of double overhead supported gates.

3-3.6 Vertical Lift Gate

The vertical lift gate, or “guillotine” gate, should be used where the topography does not provide enough room to store the gate adjacent to the fence line. Vertical lift gates should have a counterweight with a continuous drive chain on each side.

3-4 GATE REINFORCEMENT

The gates discussed under the ‘Vehicular Gates’ paragraph above are non-reinforced gates and not considered to resist impact by vehicles. Standard non-reinforced gates can be fitted with cables, chains, and anchors to increase their resistance to penetration by vehicles. In addition, there are proprietary, rated active vehicle barrier gate systems that are designed to resist penetration by vehicles. See UFC 4-022-02 for additional information on active and passive vehicle barriers. Provide cables at a minimum 3/4 inch (19 mm) wire rope in accordance with ASTM A1023/A1023M. Welded alloy steel chains must be minimum 1/2 inch (13 mm) diameter. These wire ropes must then be chained together and fastened with padlocks to create a continuous barrier. Padlocks used with this system must be medium security padlocks. The wire ropes must be positioned as to not interfere with gate operations when the chain is removed. Figures 3-6 through 3-8 and details in the drawings of Appendix C provide illustrations for reinforced gates.

Application of deadman anchors must be in accordance with the provisions of Chapter 2. See Appendix C for additional reinforcement details for gates.

3-4.1 Swing Gates

For swing gates, the cable must be looped around the gatepost, the gate frame upright, and through the fence cable loop. Cable must be strung across the inside of the gate leaf and fastened around the vertical gate frame upright and fabric tension bar midway above the road surface. The cable must be terminated with a swaged loop or wire rope clamp around the gatepost to interconnect with the gate cable barrier system. All cable ends must be looped and terminated with either four wire rope clamps or hydraulically swaged wire rope fittings. Remove sheathing on covered cables at connections so that the connections can be properly made and rated.

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Figure 3-6: Locking Assembly for Reinforced Swing Gate

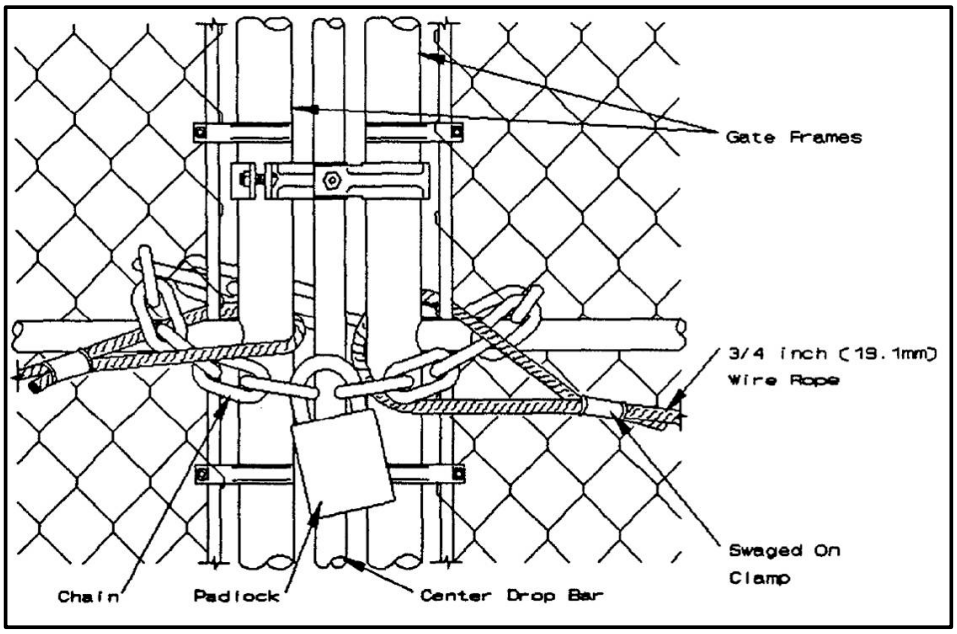

Figure 3-7: Locking Assembly for Reinforced Sliding Gate

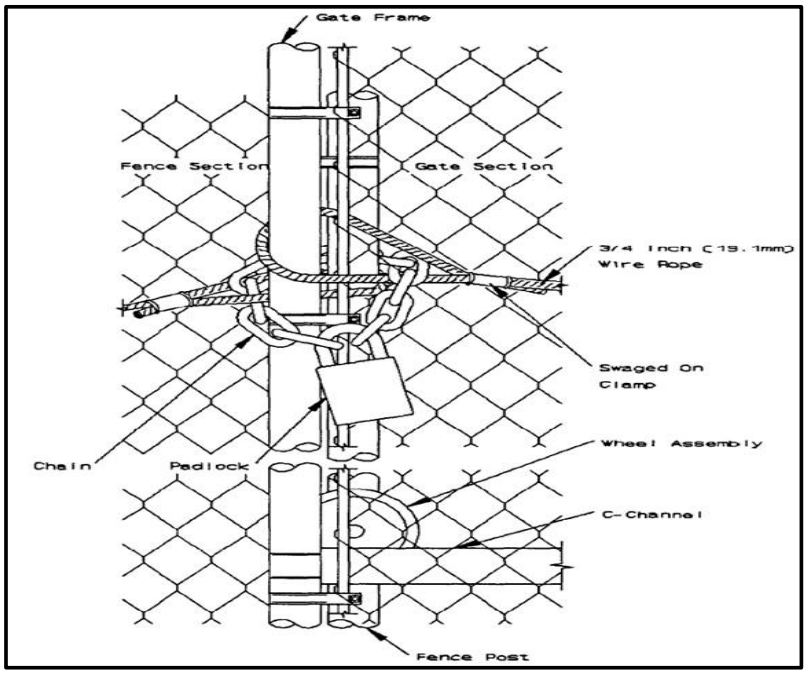

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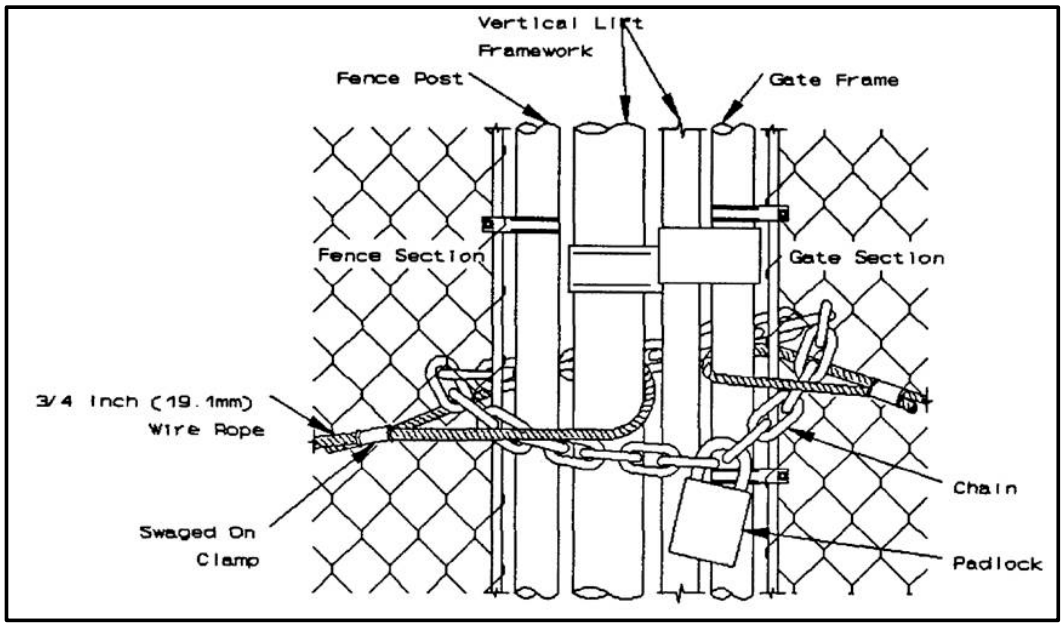
Figure 3-8: Locking Assembly for Reinforced Vertical Lift Gate



3-4.2 Sliding Gates

For sliding and vertical lift gates, the same materials must be used for reinforcement; however, the cable placement may vary. These gates must have the cable running along the length of the gate in the inside and looped around the frame in an appropriate place. The cable must be terminated and fastened as described previously in this section.

There are times when a gate reinforcement cable barrier system is desired but a cable reinforcement system for the adjoining fence is not necessary since terrain, natural barriers, structures, or other passive barrier features provide vehicle crash protection adjacent to the gate. In such cases, the gate cable system can be terminated directly on each side of the gate with the deadman anchors.

3-5 LATCHES AND HINGES

Hinge selection must consider size of the gate and frequency of use. Weld hinges to the gate post and gate frame if increased resistance against tampering is desirable. In addition, hinges may incorporate welded security top plates, reverse the direction of hinge pins, or have the hinge pins spot welded to provide increased tamper resistance and displacement during an incident.

3-6 LOCKING SYSTEM

As a minimum any locking system must provide penetration resistance equal to an approved general field service padlock. Where sally-port gates include automatic latches and the gate provides access for emergency vehicles or other special situations,

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the gatehouse must have an emergency override. The padlocked bolt or plunger arrangement must not be easily accessible from outside the barrier. Padlocks used must be medium security padlocks.

See Appendix C for design details of chain and wire rope locking systems.

3-7 GATE POWER OPERATORS

Locate all gate operators to prevent tampering from outside the fence. Coordinate design of gate operating systems with the Command Safety Officer to ensure consideration of site particular operating accessories, warning devices, and safety systems. Coordinate gate operation safety with guidance provided in UFC 4-022-01, *Security Engineering: Entry Control Facilities/Access Control Points.*

Provide powered gate operators for vertical lift gates unless use is infrequent and manual operation is reasonable. Powered gate operators with automatic latching systems must be provided at nuclear storage facilities.

3-7.1 Sliding Gate Power Operators

Automated sliding gates at restricted areas should use positive drive rail gate power-operators.

3-7.2 Swing Gate Power Operators

Swing gate power operators may be either positive drive or electromechanical swing.

3-7.3 Linear Induction Gate Operators

A linear induction gate operator incorporates electromagnetic Linear Induction Motor (LIM) technology, eliminating moving drive components, hydraulic fluids and lubricants and their environmental risks. This technology combines unprecedented speed and reliability and without moving drive components, making it efficient in operation and less costly to maintain. This technology is compatible with existing access control devices and can be specified for new construction or easily retro-fitted to accommodate existing gates. No requirement for any connecting mechanisms such as chains, gear boxes, or belts. Can work in the most rugged environment and has flexible settings that allow for variable and differentiate speeds for open and close mode. LIM technology can reach gate operating speeds of up to 8 feet (2.44m) per second – a significant improvement over existing designs that operate at approximately 1 foot (0.305 meter) per second.

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APPENDIX A REFERENCES

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http://www.e-publishing.af.mil/

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AFMAN 31-108, *The Air Force Nuclear Security Manual (FOUO)*

AFMAN 32-1084, *Civil Engineering: Facility Requirements*

DEPARTMENT OF ARMY

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AR 190-11, *Physical Security of Arms, Ammunition, and Explosives*

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AR 190-16, *Physical Security*

AR 190–54, *Security of Nuclear Reactors and Special Nuclear Materials*

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ASTM: SEE REFERENCE TABLE BELOW

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CHAIN LINK FENCE MANUFACTURERS INSTITUTE

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CLF-PM0610, *Product Manual*

DEPARTMENT OF DEFENSE

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DoD I 2000.12, *DoD Antiterrorism Program*

DoD I 2000.16, *DoD Antiterrorism Standards*

DoD O-2000.12H, *DoD Antiterrorism Handbook*

DoD 5100.76-M, *Physical Security of Sensitive Conventional Arms, Ammunition, and Explosives*

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DoD 5200.08-R, *Physical Security Program*

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GTA 90-01-011, *Joint Forward Operations Base (JFOB) Survivability and Protective Construction Handbook- (For Official Use Only [FOUO])*

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http://dod.wbdg.org/

UFC 1-200-01, *General Building Requirements*

UFC 3-220-10N, *Soil Mechanics*

UFC 3-260-01, *Airfield and Heliport Planning and Design*

UFC 3-530-01, *Design: Interior and Exterior Lighting and Controls*

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Accessibility Standard For Department of Defense Facilities, http://www.access-board.gov/guidelines-and-standards/buildings-and-sites/about-the-aba-standards/aba-standards

ASTM

http://www.astm.org/

ASTM FOR FENCING [1]		
DOCUMENT NUMBER	**TITLE**	**FENCE TYPE - COMPONENT**
ASTM F552	*Standard Terminology Relating to Chain Link Fencing*	Chain Link/All
ASTM F1553	*Standard Guide for Specifying Chain Link Fence*	Chain Link/All
***ASTM F2611**	***Standard Guide for Design and Construction of Chain Link Security Fencing***	**Chain Link/Design & Construction**
***ASTM F1712**	***Standard Specification for Steel Chain Link Fencing Materials Used for High Security Applications***	**Chain Link/All**
ASTM F567	*Standard Practice for Installation of Chain- Link Fence*	Chain Link/Installation of
ASTM A392	*Standard Specification for Zinc-Coated Steel Chain- Link Fence Fabric*	Chain Link/Fence Fabric
***ASTM A491**	***Standard Specification for Aluminum- Coated Steel Chain- Link Fence Fabric***	**Chain Link/Fence Fabric**

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ASTM FOR FENCING [1]		
DOCUMENT NUMBER	**TITLE**	**FENCE TYPE - COMPONENT**
ASTM F668	*Standard Specification for Polyvinyl Chloride(PVC), Polyolefin and Other Polymer Coated Steel Chain Link Fence Fabric*	Chain Link/Fence Fabric
ASTM F1345	*Standard Specification for Zinc-5% Aluminum-Mischmetal Alloy-Coated Steel Chain- Link Fence Fabric*	Chain Link/Fence Fabric
ASTM F1183	*Standard Specification for Aluminum Alloy Chain Link Fence Fabric*	Chain Link/Fence Fabric
***ASTM F626**	***Standard Specification for Fence Fittings***	**Chain Link/Post & Line Caps; Rail & Brace ends; Tie wires; Tension bars; Barbed Wire arms**
ASTM F2814	*Standard Guide for Design and Construction of Ornamental Steel Picket Fence Systems for Security Purposes*	Ornamental/Design & Construction
***ASTM F2408**	***Standard Specification for Ornamental Fences Employing Galvanized Steel Tubular Pickets***	**Ornamental/Pickets**
ASTM F2589	*Standard Specification for Ornamental Fences Employing Steel Tubular Pickets*	Ornamental/Pickets
ASTM B221	*Standard Specification for Aluminum and Aluminum- Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes*	Ornamental/All
***ASTM A121**	***Standard Specification for Metallic- Coated Carbon Steel Barbed Wire***	**All/Barbed Wire**
ASTM F1379	*Standard Terminology Relating to Barbed Tape*	All/Barbed Tape a.k.a Concertina
***ASTM F1910**	***Standard Specification for Long Barbed Tape Obstacles***	**All/Barbed Tape a.k.a Concertina**
***ASTM F1911**	***Standard Practice for Installation of Barbed Tape***	**All/Barbed Tape a.k.a Concertina**

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ASTM FOR FENCING [1]		
DOCUMENT NUMBER	**TITLE**	**FENCE TYPE - COMPONENT**
***ASTM F1665**	***Standard Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer- Coated Steel Barbed Wire Used with Chain-Link Fence***	**Chain Link/Barbed Wire**
***ASTM F1043**	***Standard Specification for Strength and Protective Coatings on Steel Industrial Fence Framework***	**Chain Link/Post; Rail**
***ASTM A702**	***Standard Specification for Steel Fence Posts and Assemblies, Hot Wrought***	**Taut Wire, Wood/Post**
***ASTM F1083**	***Standard Specification for Pipe, Steel, Hot Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures***	**Chain Link/Post; Rail**
***ASTM A500/A500M**	***Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes***	**Chain Link; Ornamental/Post; Rail**
ASTM A501	*Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing*	Chain Link; Ornamental/Post; Rail
ASTM B429/B429M	*Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube*	Chain Link; Ornamental/Post; Rail
***ASTM F2453/F2453M**	***Standard Specification for Welded Wire Mesh Fence Fabric (Metallic-Coated or Polymer Coated) for Meshes of 6 in^2 [3871mm^2] or Less, in Panels or Rolls, with Uniform Meshes***	**Welded Wire Mesh/Fabric**
ASTM F2919/F2919M	*Standard Specification for Welded Wire Mesh Fence Fabric (Metallic-Coated or Polymer Coated) with Variable Mesh Patterns or Meshes Greater than 6 in^2* ***[3871mm^2]*** *in Panels*	Welded Wire Mesh/Fabric
ASTM F1267	*Standard Specification for Metal, Expanded, Steel*	Expanded Metal/Design & Construction

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ASTM FOR FENCING [1]		
DOCUMENT NUMBER	**TITLE**	**FENCE TYPE - COMPONENT**
***ASTM F2780**	***Standard Guide for Design and Construction of Expanded Metal Security Fences and Barriers***	**Expanded Metal/Design & Construction**
***ASTM F2548**	***Standard Specification for Expanded Metal Fence Systems for Security Purposes***	**Expanded Metal/All**
***ASTM F900**	***Standard Specification for Industrial and Commercial Steel Swing Gates***	**All/Gate**
***ASTM F1184**	***Standard Specification for Industrial and Commercial Horizontal Slide Gates***	**All/Gate**
***ASTM F2200**	***Standard Specification for Automated Vehicular Gate Construction***	**All/Gate**
ASTM F537	*Standard Specification for Design Fabrication, and Installation of Fences Constructed of Wood and Related Materials*	Wood/All
***ASTM A1023/A1023M**	***Standard Specification for Stranded Carbon Steel Wire Ropes for General Purpose***	**All/Reinforcing**
ASTM F1145	*Standard Specification for Turnbuckles, Swaged, Welded, Forged*	All/Reinforcing

NOTES:

1. This portion of the table, ASTM FOR FENCING, provides the ASTM Standard Specification/Standard Design and Construction specifications and requirements for the different fence systems indicated in this UFC. Not all are specifically referenced in this UFC. These specifications are provided for information and reference. Those specifically referenced in this UFC are indicated with an asterisk (*) and are in **bold** type.

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MISCELLANEOUS ASTM		
DOCMENT NUMBER	**TITLE**	**FENCE TYPE - COMPONENT**
***ASTM A529**	***Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality***	**Steel, Grill**
***ASTM D2487**	***Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)***	**All/none**
***ASTM D2488**	***Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)***	**All/none**

Note: Those specifically referenced in this UFC are indicated with an asterisk (*) and are in **bold** type.

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APPENDIX B GLOSSARY

B-1 DEFINITION OF TERMS

Active Sensors: A sensor that can receive signals from either itself or other devices.

Attack Side: The outer side of the perimeter fence for a protected area. The side from which to expect attacks or forced entry.

Bollards: Reinforced concrete shapes or sleeves, or steel pipe filled with concrete, used to slow down vehicles and/or deny vehicle access.

Clear Zone: Area free of obstacles, topographical features and vegetation which reduce the effectiveness of the physical barrier, impede observation or provide cover and concealment of an intruder.

Color Polymer Coating: A coating on chain link fences to further protect and add color.

Concrete Sill or Curb: A concrete section to create a non-passable connection between a fence and the existing ground.

Corrosive or Salt Laden Environment/Atmosphere: Atmosphere which contains enough salt or corrosive elements to corrode a fence enough to decrease the intended strength. These areas are typically bordering oceans or other water bodies. For the application of coating requirements in this UFC, the corrosive atmosphere is considered 10 miles (16 kilometers) from coastal mean high water line.

Deadman Anchor : An anchor for fence or gate reinforcement cables which transfer the force from the fencing or gate fabric/surface to the ground. Deadman anchors are typically concrete blocks buried in the ground.

Electronic Security System (ESS): The integrated electronic system that encompasses interior and exterior Intrusion Detection Systems (IDS), Closed Circuit Television (CCTV) systems for assessment of alarm conditions, Automated Access Control Systems (ACS), Data Transmission Media (DTM) and alarm reporting systems for monitoring, control and display.

Eye Ends: Center space created when looping a wire for termination or reinforcement.

Fabric Diamonds: The opening formed by the woven wires in chain link fence fabric.

Fabric Tension Bar: A bar that the fencing fabric is attached to and it serves to hold the fabric tight to decrease ability to deform.

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Fencing Accessories: Any fasteners, ties, wires or other objects used to attaching the fencing fabric, posts or top guards.

Fence Fabric : As used in this document means (chain link, ornamental, welded wire mesh, expanded metal).

Gate Leaf: A panel of a gate (There is one gate leaf for single fences and two for double fences).

Gates Openings: In the barrier system to allow authorized entry and exit.

Intrusion Detection System (IDS): A system consisting of interior and exterior sensors, surveillance devices, and associated communication subsystems that collectively detect an intrusion of a specified site, facility or perimeter and annunciate an alarm.

Line Posts: intermediate posts spaced a maximum of 10 feet (3 m) apart and considered the backbone of the fence line.

Mesh Openings: The opening formed by the woven wires.

Moving Vehicle Bomb Tactic: A forced entry tactic to place an explosive or other damaging terrorist device in a moving vehicle to create a mobile vehicular weapon.

Natural Boundaries: Natural formations such as bodies of water, rough terrain, or densely wooded areas that may act as a barrier to define and protect the restricted area's perimeter.

Outriggers: Metal top guards which are placed on the top of the barrier and may consist of at least one vertical arm, angled arm facing inside, angles arm facing outside or two angles arms facing both inside and outside. In addition, there may be more than one arm on each side if desired. The number and direction of arms depends on the nature of the barrier.

Passive Barriers: A passive barrier has no moving parts. Passive barrier effectiveness relies on its ability to absorb energy and transmit the energy to its foundation. Highway medians (Jersey), bollards or posts, tires, guardrails, ditches and reinforced fences are examples of passive barriers.

Passive Sensors: A sensor that receives signals through light or radio waves.

Protected Side: The inside of the fence that is being protected through various security measures.

Sally Ports: Sally ports are used to control entry into highly protected and restricted areas and used as part of an entry control facility/access control point for vehicle inspection.

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Secure Side: The inside of the fence that is being protected through various security measures.

Special Nuclear Material (SNM): Nuclear material that requires extensive protection.

Swaged Loop: A loop created by looping a wire and fastening the loop with a swaged on clamp.

Swing Gates: Gates for entrance or exit that swing open either manually or automatically when controlled either electronically or manually.

Taut Wire: Wire that is continuously under tension through a series of spring connections.

Tension Bar: The bar that is threaded through the last vertical link of fabric. It attaches the fabric to the terminal post.

Top Guard: Additional protection of fences or other barriers that are placed on top of the barrier to prevent climbing or jumping. Possible top guards include, but are not limited to, outriggers with barbed wire, concertina wire, or barbed tape.

Truss Rods: A rod used in brace assemblies to draw and hold the line post firmly to the brace rail. The truss rod uses an adjustable turnbuckle to maintain proper tension. Truss rod details can be seen in the "Non Reinforced Chain-Link Fence" drawings in Appendix C.

Turnbuckles: A metal coupling device consisting of an oblong piece internally threaded at both ends into which the corresponding sections of two threaded rods are screwed in order to form a unit that can be adjusted for tension or length.

Turnstile Gates: Pedestrian gates which rotate around a central pole to allow only one entrance at a time.

Welded Bar Grill: A series of vertical and horizontal bars that are placed over an opening and welded at all bar crossing points.

Additional Terms relating to fences are found in:

- ASTM F552 - Standard Terminology Relating to Chain Link Fencing
- ASTM F2814 - Standard Guide for Design and Construction of Ornamental Steel Picket Fence Systems for Security Purposes
- ASTM F2780 - Standard Guide for Design and Construction of Expanded Metal Security Fences and Barriers
- ASTM F1379 - Standard Terminology Relating to Barbed Tape

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- ASTM F537 - Standard Specification for Design, Fabrication, and Installation of Fences Constructed of Wood and Related Materials

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APPENDIX C FENCE AND GATE DESIGN DETAILS

The details in this appendix illustrate general layouts for each type of fence or gate. These illustrations are not intended to depict the importance or size of each element. Sizes and dimensions indicated are the minimum requirement that must be modified per service policy and for the specific application, environmental conditions, and local constraints.

DRAWINGS FOR SECURITY FENCING, GATES AND CABLING	
DRAWING NUMBER	**DRAWING TITLE**
UFC-700	Chain Link Fencing and Details
UFC-701	Barbed Wire/Tape Arrangement Details
UFC-702	Chain Link Swing Gate and Details
UFC-703	Chain Link Cantilevered Gate Details
UFC-704	Chain Link Overhead Roller Gate
UFC-705	Typical Turnstile and Bollard Details
UFC-710	Typical Cable Reinforced Chain Link
UFC-711	Typical Cable Reinforced Chain Link Fence Deadman/Line Post
UFC-712	Typical Cable Reinforced Chain Link Fence – Gates
UFC-713	Cable Reinforcing Details
UFC-714	Cable Reinforcing Details (Cont'd)
UFC-720	Typical Cable Reinforced Ornamental Fence – End Post
UFC-721	Typical Cable Reinforced Ornamental Fence Deadman/Line Post
UFC-722	Ornamental Cantilevered and Swing Gates and Cabling Details
UFC-730	Farm Style Fences
UFC-731	Farm Style Gates
UFC-732	Farm Style Gate and Fence Details
UFC-733	Farm Style Fence Details

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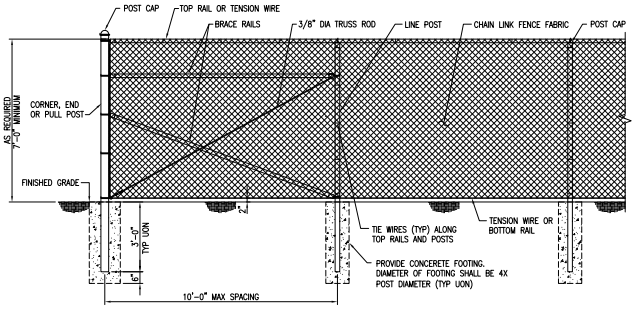
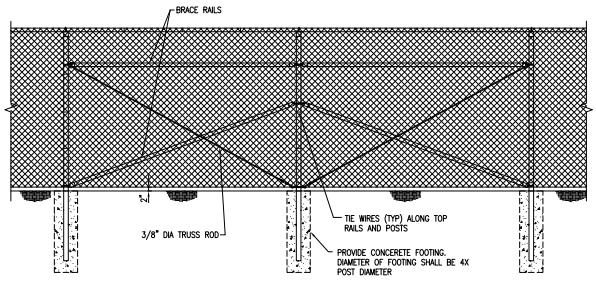


TYPICAL FENCE AND CORNER PANEL ELEVATION

SCALE: 1" = 1'-0"

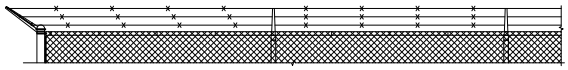


TYPICAL FENCE AND BRACED PANEL ELEVATION

SCALE: 1" = 1'-0"

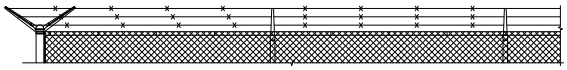
NOTE (1): A BOTTOM RAIL CAN BE ADDED FOR SECURITY. IT SHALL BE INSTALLED APPROX 3" ABOVE GRADE (A MINIMUM OF 2" AND A MAXIMUM OF 4"). HARDWARE SHALL BE WELDED OR SHOT NAILED TO POSTS AND RAILS IN ORDER TO SECURE IN PLACE. ATTACH FABRIC TO NEW BOTTOM RAIL TO ELIMINATE POSSIBILITY OF PEELING UP FABRIC.

NOTE (2): SOME LOCATIONS MAY REQUIRE 8' OF FABRIC.



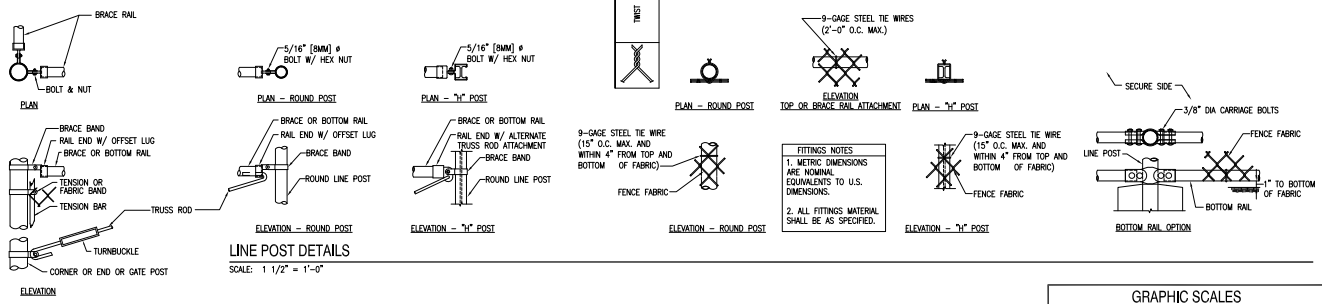
TYPICAL 3 STRAND BARBED WIRE AND SINGLE EXTENSION ARM CONFIGURATION

SCALE: 1" = 1'-0"



TYPICAL 6 STRAND BARBED WIRE AND DOUBLE EXTENSION ARM CONFIGURATION

SCALE: 1" = 1'-0"



FITTINGS NOTES

1. METRIC DIMENSIONS ARE NOMINAL EQUIVALENTS TO U.S. DIMENSIONS.

2. ALL FITTINGS MATERIAL SHALL BE AS SPECIFIED.

LINE POST DETAILS

SCALE: 1 1/2" = 1'-0"

CORNER OR END POSTS

SCALE: 1 1/2" = 1'-0"

GRAPHIC SCALES

1" = 1'-0" 0 6" 1' 2'

1 1/2" = 1'-0" 0 4" 8" 1'-4"

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

CHAIN LINK FENCE AND DETAILS

UFC-700

DRAFTING REVISION: 04 AUGUST 2007

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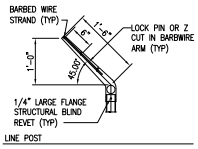
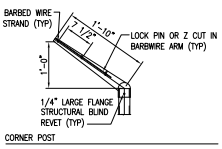
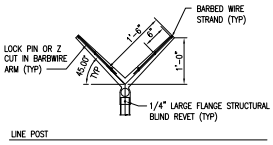




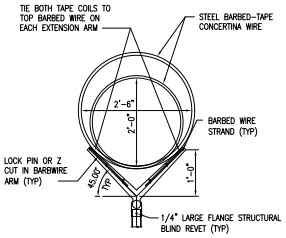
SINGLE EXTENSION ARM DETAILS

SCALE: 1" = 1'-0"



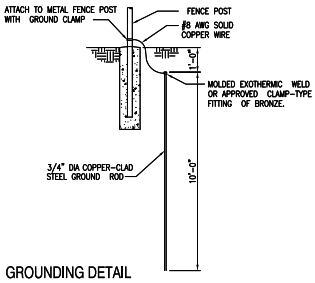
DOUBLE EXTENSION ARM DETAILS

SCALE: 1" = 1'-0"



CONCERTNA WIRE MOUNTING

SCALE: 1" = 1'-0"



GROUNDING DETAIL

NO SCALE

CHAIN LINK FENCING NOTES

1. FABRIC: THE STANDARD FENCE FABRIC SHALL BE VINYL, ZINC OR ALUMINUM-COATED STEEL WIRE CHAIN LINK WITH MESH OPENINGS NOT LARGER THAN TWO INCHES PER SIDE AND A TWISTED AND BARBED SELVAGE AT TOP AND BOTTOM IN ACCORDANCE WITH THE SPECIFICATIONS. UTILIZE 6-GAUGE FOR BASE PERIMETER OR HEIGHTENED SECURITY ZONES AND 9-GAUGE FOR BASE INTERIOR OR WHEN JOINING AN EXISTING FENCE WHICH IS ALREADY 9-GAUGE.
2. FABRIC TIES: ONLY 12-GAUGE STEEL TIES SHALL BE USED. COATING OR PLATING WILL BE ELECTROLYTICALLY COMPATIBLE WITH THE FENCE FABRIC TO INHIBIT CORROSION.
3. REINFORCEMENT: TENSION WIRES SHALL BE INSTALLED AND INTERWOVEN (OR AFFIXED WITH FABRIC TIES) ALONG THE TOP & BOTTOM OF THE FENCE FOR STABILIZATION OF THE FENCE FABRIC.
4. FENCE HEIGHT: CHAIN LINK FABRIC SHALL BE 7' HIGH WITH AN ADDITIONAL 1' IN HEIGHT COMPOSED OF 3 STRANDS OF BARBED WIRE AS REQUIRED. THE TOTAL FENCE HEIGHT SHALL BE 8'.
5. GROUND CLEARANCE: BOTTOM OF THE FENCE FABRIC SHALL BE WITHIN TWO INCHES OF FIRM SOIL.
6. TOP GUARDS: A TOP GUARD IS AN OVERHANG OF BARBED WIRED ALONG THE TOP OF A FENCE, FACING OUTWARD (AWAY FROM PROTECTED SITE) AND UPWARD AT APPROX. 45 ANGLE. TOP GUARD SUPPORTING ARMS WILL BE PERMANENTLY AFFIXED TO THE TOP OF FENCE POSTS TO INCREASE THE OVERALL HEIGHT OF THE FENCE AT LEAST 1 FOOT. THREE STRANDS OF 12-GAUGE BARBED WIRE, EQUALLY SPACED, SHALL BE INSTALLED ON THE SUPPORTING ARMS.
7. FENCE POSTS: SHALL BE ASTM F1043 OR F1083 ROUND PIPE OR SQUARE TUBE AND SHALL BE GALVANIZED IN ACCORDANCE WITH THE SPECIFICATIONS. FENCE POST SPACING AND SIZE (DIAMETER) SHALL BE DETERMINED IN ACCORDANCE WITH CHAIN LINK FENCE MANUFACTURERS' INSTITUTE (MLG 2445). SPACING SHALL NOT EXCEED 10'-0" OC. SIZE (DIAMETER) SHALL NOT BE LESS THAN THAT SPECIFIED.

GRAPHIC SCALES

1" = 1'-0" 0 6" 1' 2'

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DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

BARBED WIRE ARRANGEMENT DETAILS

UFC-701

DRAWFORM REVISION: 04 AUGUST 2007

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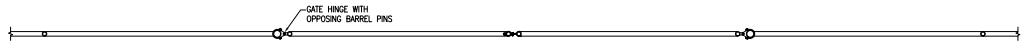
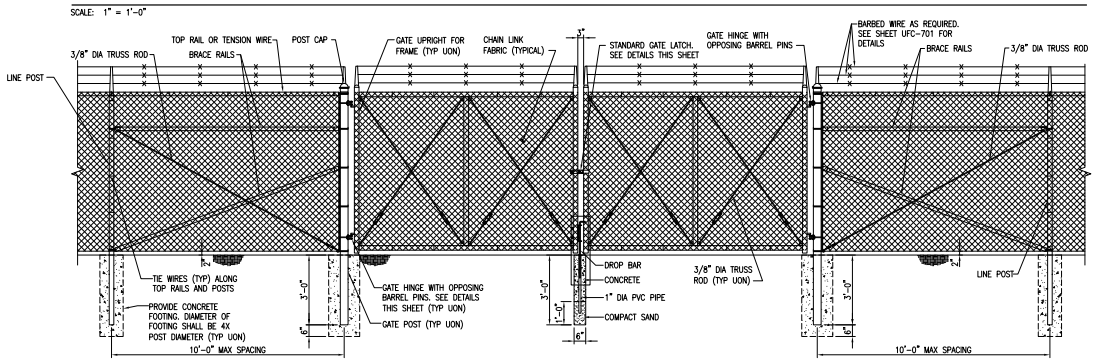


PLAN - DOUBLE SWING GATE

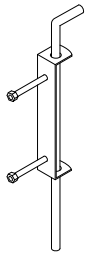
SCALE: 1" = 1'-0"



TYPICAL DOUBLE SWING GATE ELELVATION

SCALE: 1/2" = 1'-0"

NOTE: PROVIDE ONE DROP BAR FOR EACH LEAF (TYP). ASSOCIATED GALV SLEEVES TO BE INSTALLED FLUSH WILL GRADE AT FULLY OPEN AND CLOSED POSITIONS. CONTRACTOR SHALL PROVIDE 6" LAYER OF #10 STONE BELOW BOTTOM OF SLEEVE TO ALLOW FOR DRAINAGE.

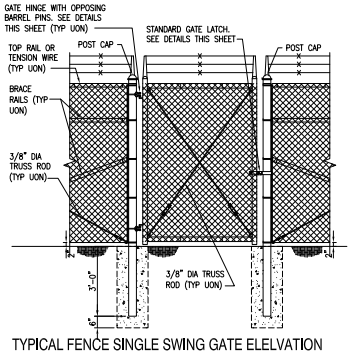


DETAIL: DROP BAR

NOT TO SCALE

PLAN SINGLE SWING GATE

SCALE: 1" = 1'-0"



TYPICAL FENCE SINGLE SWING GATE ELELVATION

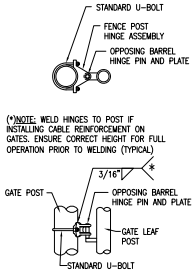
SCALE: 1/2" = 1'-0"

SINGLE OR DOUBLE LEAF GATES		
NOM HEIGHT (H)	UPRIGHT HT (U)	FRAME HT (F)
NOM HT INCLUDING BARBED WIRE	ACTUAL DIM	ACTUAL DIM
8'-0" [2438MM]	7'-10" [2388MM]	6'-8 1/2" [2045MM]

SINGLE LEAF GATES		
OPENING	GATE POSTS	HINGE SPACE (S)
FACE TO FACE	SQUARE & ROUND SIZES	POST TO UPRIGHT
3'-0" [914MM] THROUGH 6'-0" [1829MM]	2.5"[63.5MM]SQ x 3/16"TH OR 2.875" [73MM] OD	FOR SQUARE & ROUND GATE POSTS: 2 1/4" [57MM]
6'-0" [1829MM] THROUGH 12'-0" [3657MM]	4" [102MM] SQ x 3/16"TH OR 4" [102MM] OD	FOR SQUARE & ROUND GATE POSTS: 2 1/4" [57MM]
12'-0" [3657MM] THROUGH 19'-0" [5790MM]	6" [153MM] SQ x 3/16"TH OR 6.625" [168MM] OD	FOR SQUARE & ROUND GATE POSTS: 2 1/4" [57MM]
19'-0" [5790MM] THROUGH 23'-0" [7010MM]	8" [203MM] SQ x 1/4"TH OR 8.625" [219MM] OD	FOR SQUARE & ROUND GATE POSTS: 2 1/4" [57MM]

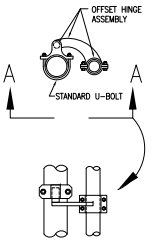
GATE POSTS & FOUNDATIONS: GATE POST SIZE AND ASSOCIATED FOOTING DIAMETER TO BE DETERMINED BY MANUFACTURER, BASED ON LEAF WEIGHT & DIMENSION, BUT NOT LESS THAN DIAMETER SHOWN ON THESE DRAWINGS. MINIMUM FOOTING DIAMETERS (TO BE FILLED W/4000 PSI CONC): 40" ø FOR 8" POST; 36" ø FOR 6" POST; 24" ø FOR 4" POST; OTHER SIZES TO BE DESIGNED BY MFR OR KTR. NO FOOTING WIDTH SHALL BE LESS THAN 4(X) THE POST WIDTH.

NOTE: IF GATE HINGES ARE NOT OPPOSING (AS SHOWN ABOVE) OR LEAF IS NOT LOCKED MECHANICALLY TO THE HINGES, WELD AN ANGLE, PLATE, OR BLOCK ABOVE HINGE TO RESTRICT LEAF FROM BEING REMOVED OR LIFTED OFF. RESTRICTION SHALL NOT HINDER OPERATION OF GATE.



GATE HINGE DETAIL

SCALE: 1 1/2" = 1'-0"

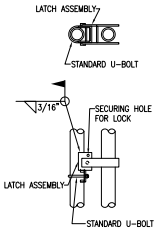


OFFSET HINGE DETAIL

SCALE: 1 1/2" = 1'-0"

GATE LATCH DETAIL

SCALE: 1 1/2" = 1'-0"



FULCRUM LATCH DETAIL

SCALE: 1 1/2" = 1'-0"

GRAPHIC SCALES

1/2" = 1'-0" (0, 1', 2', 4')

1 1/2" = 1'-0" (0, 4", 8", 1'-4")

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

CHAIN LINK SWING GATE AND DETAILS

UFC-702

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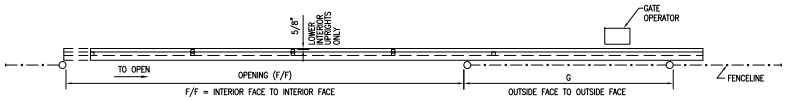


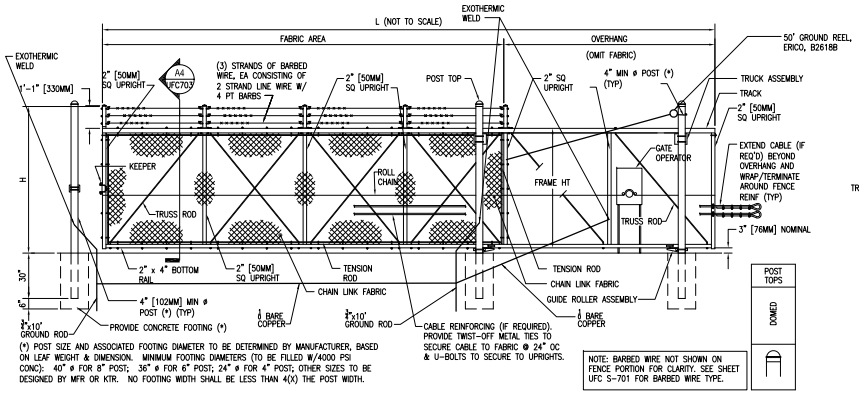
GATE PLAN

NOT TO SCALE

C1 CIVIL DWGS UFC-703

SAMPLING OF SIZES:

OPENING (F/F)	NOMINAL HEIGHT (H)	LENGTH (L)	GATE POSTS (G)	BAYS / OVERHANG
37'-0"	8'-0"	53'-3"	16'-0"	5 (FABRIC) / 2 (W/O)
30'-0"	8'-0"	42'-3"	12'-0"	4 (FABRIC) / 2 (W/O)
24'-0"	8'-0"	36'-3"	12'-0"	3 (FABRIC) / 2 (W/O)



(*) POST SIZE AND ASSOCIATED FOOTING DIAMETER TO BE DETERMINED BY MANUFACTURER, BASED ON LEAF WEIGHT & DIMENSION. MINIMUM FOOTING DIAMETERS (TO BE FILLED W/4000 PSI CONC): 40" ø FOR 8" POST; 36" ø FOR 6" POST; 24" ø FOR 4" POST; OTHER SIZES TO BE DESIGNED BY MFR OR KTR. NO FOOTING WIDTH SHALL BE LESS THAN 4(X) THE POST WIDTH.

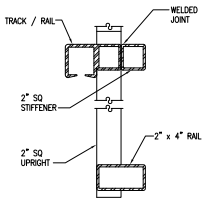
NOTE: BARBED WIRE NOT SHOWN ON FENCE PORTION FOR CLARITY. SEE SHEET UFC S-701 FOR BARBED WIRE TYPE.

TYPICAL SINGLE CANTILEVERED SLIDING GATE ELEVATION- (4) BAYS SHOWN

NOT TO SCALE

WITH ROUND POSTS & WITH BARBED WIRE

A1 UFC-703 UFC-703



SECTION (TYP)

NOT TO SCALE

A4 UFC-703 UFC-703

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

CHAIN LINK CANTILEVERED GATE DETAILS

UFC-703

FILE NAME: J:\UCF\FENCE DRAWINGS\UFC703.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, April 29, 2013 - 1:09pm

DRAWFORM REVISION: 04 AUGUST 2007

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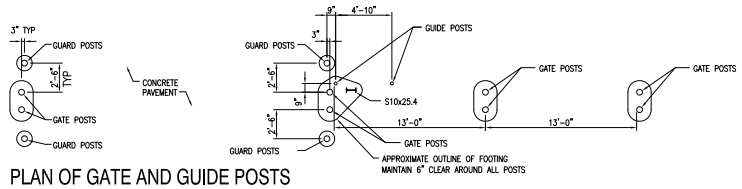
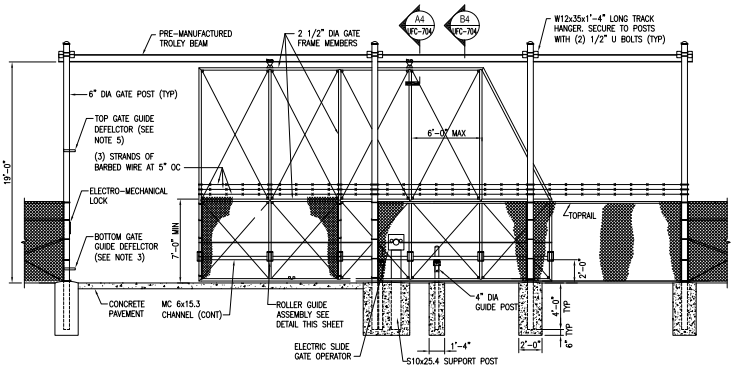


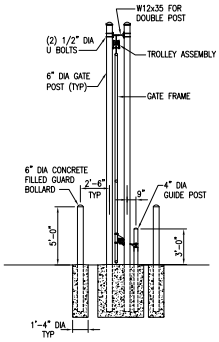
PLAN OF GATE AND GUIDE POSTS

SCALE: 3/16" = 1'-0"



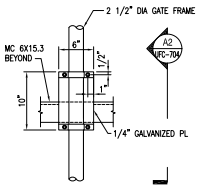
ELEVATION OF OVERHEAD ROLLER GATE

SCALE: 1/4" = 1'-0"



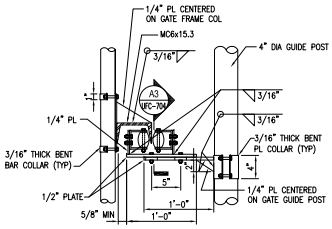
SECTION

SCALE: 1/4" = 1'-0" B4 UFC-704 | UFC-704



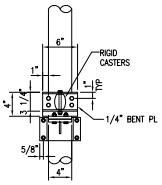
DETAIL - ROLLER GUIDE ASSEMBLY

SCALE: 1 1/2" = 1'-0" A1 UFC-704 | UFC-704



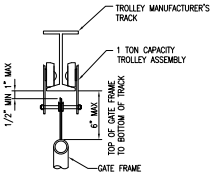
SECTION

SCALE: 1 1/2" = 1'-0" A2 UFC-704 | UFC-704



SECTION

SCALE: 1 1/2" = 1'-0" A3 UFC-704 | UFC-704



SECTION

SCALE: 1 1/2" = 1'-0" A4 UFC-704 | UFC-704

GENERAL NOTES

1. THE GATE SHOWN IS TYPICAL. ANY STANDARD COMMERCIAL GATE THAT VARIES ONLY IN NON-ESSENTIAL DETAILS SHALL BE ACCEPTABLE SUBJECT TO APPROVAL.

2. GATE SHALL CONFORM TO ASTM F 1184, TYPE 1, EXCEPT AS EXCEEDED BY THIS DRAWING.

3. GATES SHALL SLIDE ON THE SECURE SIDE.

4. GATES SHALL BE CONSTRUCTED WIT A TROLLEY SYSTEM THAT WILL PREVENT THE GATE FROM BEING ELEVATED OVER 2 INCHES ABOVE THE PAVEMENT.

5. ALL GATE GUIDE DEFLECTORS SHALL BE COMPATIBLE WITH THE MANUFACTURED ELECTRO-MECHANICAL LOCK. THE GUIDE DEFLECTOR SHALL BE DESIGNED FOR THE WIND CONDITIONS WITH 3/8" PLATE AND GALVANIZED.

6. GUARD POSTS SHALL BE NPS 6 STD WEIGHT, GRADE B, STEEL PIPE FILLED WITH CONCRTE. STEEL PIPE SHALL CONFORM TO ASTM A53/53M, TYPE E OR S, GALVANIZED, MINIMUM WALL THICKNESS .312 INCHES.

7. ALL STEEL PLATES, SHAPES AND ACCESSORIES SHLL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

8. ELECTRIC SLIDE GATE OPERATOR SHALL HAVE A MINIMUM 1 HP, PHASE MOTOR.

9. UNLESS OTHERWISE NOTED, ALL BOLTS SHALL BE 3/8" DIAMETER, ASTM A307, GALVANIZED BOLTS.

GRAPHIC SCALES

1/4" = 1'-0" 0 2' 4' 8'

1-1/2" = 1'-0" 0 3" 6" 9" 1' 2'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

CHAIN LINK OVERHEAD ROLLER GATE

UFC-704

DRAWFORM REVISION: 04 AUGUST 2007

FILE NAME: J:\VICKS\FORCE DRAWINGS\UG3005-UFC-704.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, April 29, 2013 - 1:11pm

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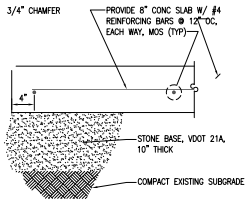


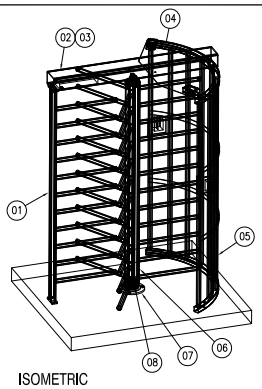
TURNSTILE MOUNTING SLAB (C2) — SCALE: 1-1/2" = 1'-0" — UFC-705 | UFC-705

1 1/2" = 1'-0" (0, 4", 8", 1'-4")

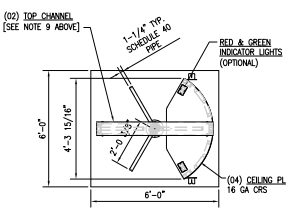
TURNSTILE NOTES:

1. TURNSTILE SHALL BE COMPOSED OF CARBON STEEL. ALL MATERIALS SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH ASTM A123.
2. TURNSTILE SHALL HAVE BI-DIRECTIONAL CONTROLS: IN THE CASE OF A POWER FAILURE, OUTBOUND TRAFFIC SHALL BE SET TO "FAIL SAFE"; THE INBOUND TRAFFIC WILL HAVE A "FAIL LOCK" MECHANISM (UNLESS OTHERWISE DIRECTED BY THE ACTIVITY VIA THE CONTRACTING OFFICER).
3. PROVIDE CARD READER MOUNTING PLATES FOR BOTH SIDES (INBOUND & OUTBOUND) OF TURNSTILE. CARD READER WILL BE INSTALLED BY THE ACTIVITY AT A LATER DATE.
4. BRACE BARRIER POST AT TOP TO ADJACENT VERTICAL SURFACE.
5. ALLOW 5 INCH CLEARANCE ABOVE TOP OF TURNSTILE TO REMOVE LIFT-OFF TYPE TOP COVER.
6. CONCRETE MOUNTING SLAB MUST BE LEVEL WITHIN 1/4". SEE DETAIL C2 THIS SHEET FOR CONC MOUNTING PAD.
7. CONTRACTOR SHALL PROVIDE AN ELECTRICAL 3-ROTOR FULL HEIGHT TURNSTILE AS MANUFACTURED BY TOMSED, MODEL THT-100ECP(3), OR APPROVED EQUAL.
8. TURNSTILE SHALL HAVE FINISH TO MATCH ADJACENT FENCEWORK: POWDER COATED BLACK FOR ORNAMENTAL FENCE AND GALVANIZED FOR CHAIN-LINK.
9. INSTALL 3 STRANDS BARBED WIRE OR CONCERTINA WIRE OVER TOP CHANNEL OF TURNSTILE (BETWEEN ADJACENT FENCE POSTS) TO HINDER SCALING UNIT.

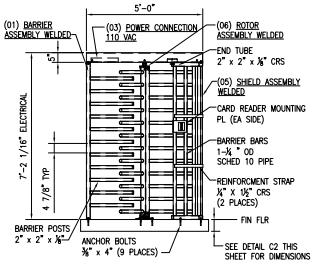
TURNSTILE SKETCHES:



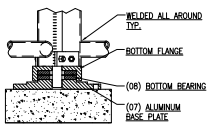
ISOMETRIC
NOT TO SCALE



PLAN VIEW
NOT TO SCALE

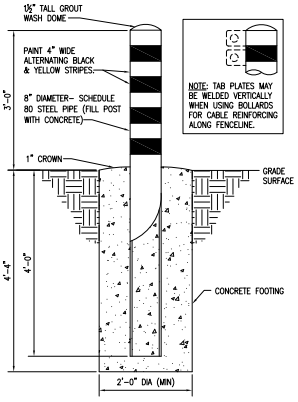


ELEVATION VIEW
NOT TO SCALE



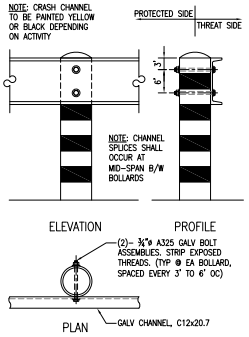
BOTTOM BEARING DETAIL
NOT TO SCALE

NOTE: STEEL PIPE FOR BOLLARDS SHALL CONFORM TO ASTM A53, TYPE E OR S, GALVANIZED.



NOTE: TAB PLATES MAY BE WELDED VERTICALLY WHEN USING BOLLARDS FOR CABLE REINFORCING ALONG FENCELINE.

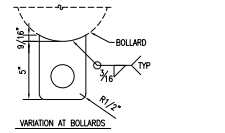
CONC FILLED BOLLARD ~ FOOTING (B3) — SCALE: 1" = 1'-0" — VARIOUS | UFC-705



CHANNEL FOR BOLLARDS (A3) — SCALE: 1" = 1'-0" — CIVIL DWGS | UFC-705

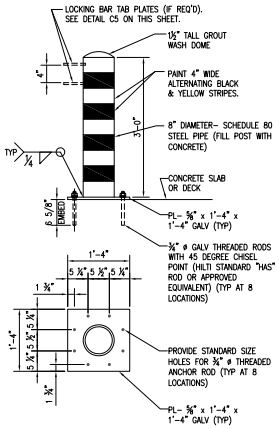
GRAPHIC SCALES

1" = 1'-0"	0	6"	1'	2'
1 1/2" = 1'-0"	0	4"	8"	1'-4"
3" = 1'-0"	0	3"	6"	9"



TAB PLATE DETAIL (C5) — SCALE: 3" = 1'-0" — UFC-705 | UFC-705

NOTE: CONTRACTOR SHALL HAVE PLATED BOLLARD CONNECTION ANALYZED AND STAMPED BY A REGISTERED ENGINEER FOR IT BE USED FOR ATFP PURPOSES.



CONC FILLED BOLLARD ~ PLATE (A4) — SCALE: 1" = 1'-0" — CIVIL DWGS | UFC-705

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

TYPICAL TURNSTILE AND BOLLARD DETAILS

UFC-705

FILE NAME: J:\UCF\UFC\DRAWINGS\UG005-UFC-705.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, April 29, 2013 - 1:14pm

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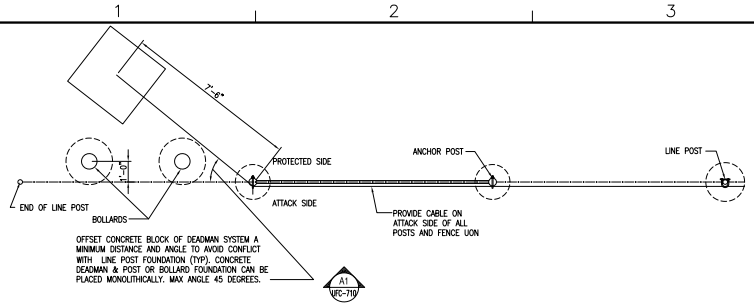
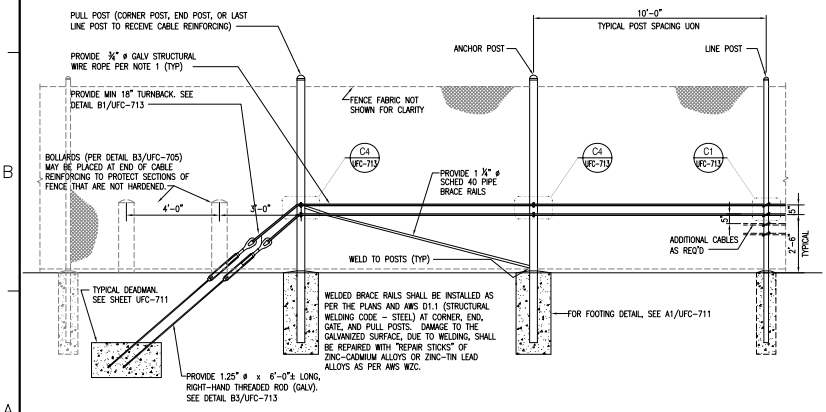


TYPICAL PLAN OF END POST DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

C1 CIVIL DWGS UFC-710

NOTE: FOR RETROFITTING OF EXIST CLF, CABLE CAN BE PLACED ON THE ATTACK SIDE OF THE FENCE FABRIC. FOR NEW CONSTRUCTION, CABLE SHALL BE INSTALLED ON ATTACK SIDE OF POST, BETWEEN POST AND FABRIC.



TYPICAL ELEVATION OF END POST DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

A1 UFC-710 UFC-710

LAYOUT OF REINFORCING

DESIGNER OF RECORD TO LOCATE DEADMEN ON SITE PLANS, SATISFYING SPACING CRITERIA, OVERLAPS, AND FENCE CORNERS / TURNING POINTS. AT GATES IT IS DESIRABLE TO HAVE TRAFFIC ON EITHER SIDE OF A MEDIAN TO OPERATE AND PROTECT INDEPENDENTLY (NOT UTILIZING THE SAME DEADMAN SYSTEMS). THEREFORE DEADMEN SHOULD BE PLACED IN THE MEDIAN TO ANCHOR THE GATE REINFORCING FOR EACH SIDE OF THE ROAD. IF THERE IS NO PHYSICAL MEDIAN (MERELY PAINTED LINES), LIMITED ROOM, OR UTILITY CONFLICTS THAT DO NOT ALLOW FOR DEADMEN PLACEMENT BETWEEN THE GATES, ENSURE THAT THE CABLING FOR BOTH GATES ARE CONNECTED–– EITHER DIRECTLY OR VIA AN INTERMEDIATE CABLE WHICH CREATES AN INTEGRAL CABLE SYSTEM ACROSS THE ENTIRE GATE AREA.

MODIFICATIONS TO TYPICAL DESIGN

NOTE FOR CONTRACTOR: IF LARGER DESIGN THREATS OR CUSTOMER REQUESTS INDICATE A NEED FOR GREATER SECURITY, MORE 3/4" ø CABLES CAN BE UTILIZED OR THE CABLES CAN BE UPGRADED TO 1" ø. BOTH SCENARIOS REQUIRE THE DEADMAN (WHICH WILL NEED TO BE LARGER) TO BE DESIGNED BY A PROFESSIONAL ENGINEER TO SATISFY THE CRITERIA OUTLINED IN REINF NOTE 18 ON THIS SHEET. FOR BIDDING PURPOSES, ESTABLISH A UNIT COST FOR ADDITIONAL EXCAVATION AND NEW CONCRETE PER CUBIC FOOT.

IF 1" ø CABLE IS USED, SPECIFICATIONS SHALL MATCH REINF NOTE 1 ON THIS SHEET, EXCEPT THE CABLE SHALL HAVE A MINIMUM BREAKING STRENGTH OF 70,000 POUNDS (35 TONS). OTHER COMPONENTS, SUCH AS EYEBOLTS, U–BOLTS, ROPE CLIPS, THIMBLES, AND OTHER ASSOCIATED HARDWARE SHALL BE SIZED ACCORDINGLY.

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

REINFORCING NOTES

1. REINFORCING CABLES SHALL BE U.S. DOMESTIC MINIMUM 3/4" ø 6x19 CLASS WIRE ROPE, REGULAR LAY, EXTRA IMPROVED PLOW STEEL (EIP), INDEPENDENT WIRE ROPE CORE (IWRC), CONFORMING TO ASTM A1023 AND GALVANIZED IN ACCORDANCE WITH ASTM A475 CLASS A, & HAVE A MINIMUM BREAKING STRENGTH OF 40,000 POUNDS (20 TONS). CABLES WITH A BLACK VINYL COATING, SHALL NOT BE IMPREGNATED.
2. CABLES SHALL BE CONTINUOUS FROM DEADMAN TO DEADMAN. NO SPLICES IN CABLE SHALL BE ALLOWED. CABLE BARRIER SHALL BE INSTALLED BETWEEN FENCE POST AND FENCE FABRIC AS PER PLANS. U–BOLTS SHALL BE INSTALLED PERPENDICULAR TO THE LAY OF THE STRANDS OF THE WIRE ROPE AND SHALL BE TIGHTENED AFTER SAG IN CABLE BARRIER HAS BEEN REMOVED. UNLESS INDICATED OTHERWISE, CONCRETE DEADMAN SPACING SHALL BE AT MAXIMUM 200' INTERVALS & TURNING POINTS (EXTERNAL CORNERS).
3. WIRE ROPE ENDS SHALL TERMINATE AROUND TURNBUCKLES, GATE POSTS OR EXTRA HEAVY–DUTY WIRE ROPE THIMBLES (AT GATES). THESE TERMINATIONS REQUIRE 18" MINIMUM OF ROPE FOR TURN BACK AND A MINIMUM OF (4)– CLIPS EACH (EQUAL SPACING).
4. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS.
5. DEADMEN SHALL BE INSTALLED ON THE SECURED SIDE (INTERIOR) OF THE FENCE; WHILE CABLES SHALL BE INSTALLED ON THE EXTERIOR SIDE OF POST.
6. PROVIDE NECESSARY SLACK IN CABLES (GATES ONLY) TO ALLOW FOR FULL SWING OF ALL GATE LEAVES.
7. OFFSET DEADMAN SYSTEMS FROM FENCELINE (PLAN VIEW) TO AVOID CONFLICT WITH EXISTING FENCE POSTS.
8. ALLOW EPOXY ANCHOR BOLTS (MIN 2 DAYS) & CONCRETE DEADMEN (MIN 7 DAYS) TO CURE, PRIOR TO APPLYING LOADS (INSTALLING TURNBUCKLES & STRAIGHTENING CABLES).
9. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH AWS D1.1. ALL WELD MATERIAL SHALL BE E70XX ELECTRODES.
10. STRUCTURAL STEEL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NINTH EDITION OF THE AISC "MANUAL OF STEEL CONSTRUCTION FOR ALLOWABLE STRESS DESIGN.
11. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 AND SHALL HAVE A MINIMUM YIELD STRESS OF 36,000 PSI.
12. ALL STRUCTURAL STEEL MEMBERS AND HARDWARE USED IN CABLE ANCHORING SYSTEM SHALL BE HOT–DIPPED GALVANIZED. ANY AREAS WHERE COATING IS DAMAGED OR REMOVED SHALL BE COVERED WITH A ZINC RICH COMPOUND.
13. TURNBUCKLES SHALL BE ¼"x18", TYPE I, GALVANIZED IN ACCORDANCE WITH ASTM F1145.
14. WIRE ROPE CLAMPS SHALL BE TYPE I, GALVANIZED, AND CONFORM TO FS FF–C–450.
15. ALL THREADED RODS, U–BOLTS, AND BOLTS SHALL CONFORM TO ASTM A307 AND SHALL BE INSTALLED WITH F844 WASHERS AND A563 NUTS. ENTIRE BOLT ASSEMBLY SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A153. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
16. ZINC RICH COMPOUND FOR REPAIRS SHALL BE 95% METALLIC ZINC, BY WEIGHT IN DRIED FILM; INSTALL AT LEAST TWO COATS, 4 MILS MIN TOTAL THICKNESS.
17. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ACI 318. CONCRETE SHALL HAVE A MINIMUM 28–DAY COMPRESSIVE STRENGTH OF 4000 PSI. THE MINIMUM CONCRETE COVER SHALL BE 3", UNLESS OTHERWISE NOTED.
18. DESIGN CRITERIA:
    UFC 4-022-03 "Security Engineering: Fences and Gates

    UFC 4–022–02 "SELECTION AND APPLICATION OF VEHICLE BARRIERS"
19. AT CABLE REINFORCING GATES, PROVIDE TWIST–OFF METAL TIES TO SECURE CABLE TO GATE FABRIC @ 24" OC & U–BOLTS TO SECURE TO GATE UPRIGHTS. MODIFY AS NEEDED TO FACILITATE OPERATION OF GATE.

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

TYPICAL CABLE REINFORCED CHAIN LINK

UFC-710

FILE NAME: J:\VOICE\FENCE DRAWINGS\UFC-710.dwg LAYOUT NAME: F-HH PLOTTED: Monday, April 29, 2013 - 1:17pm

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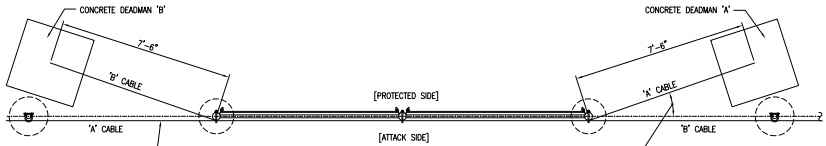
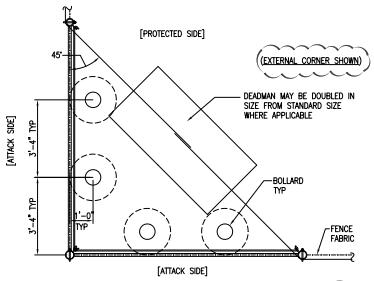


NOTE: FOR RETROFITTING OF EXIST CLF, CABLE CAN BE PLACED ON THE ATTACK SIDE OF THE FENCE FABRIC. FOR NEW CONSTRUCTION, CABLE SHALL BE INSTALLED ON ATTACK SIDE OF POST, BETWEEN POST AND FABRIC.

TYPICAL PLAN OF DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

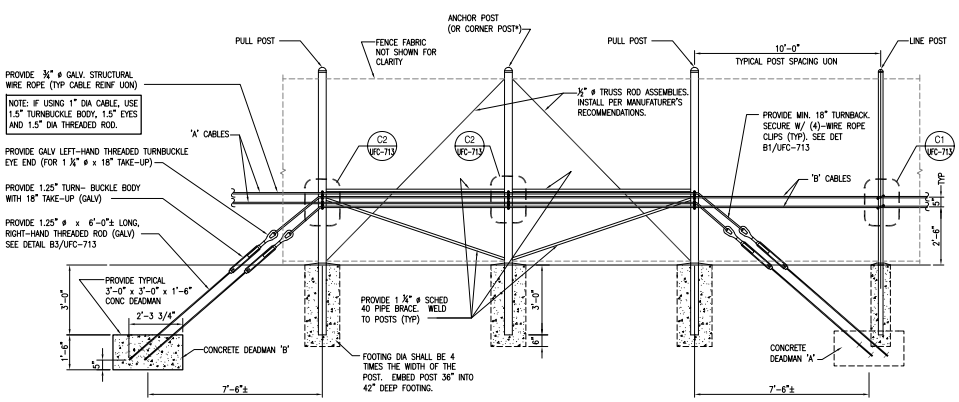
C1 CIVIL DWGS UFC-711



TYPICAL PLAN OF TURNING POINT POST LAYOUT

SCALE: 1/2" = 1'-0"

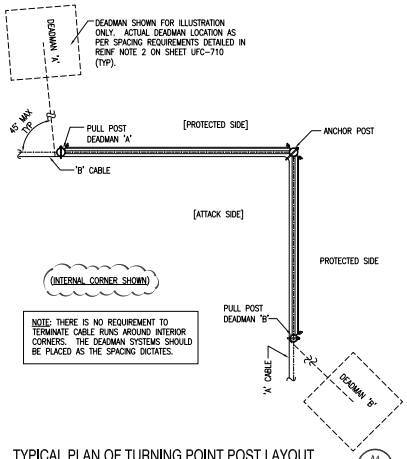
C4 CIVIL DWGS UFC-711



TYPICAL ELEVATION OF DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

A1 CIVIL DWGS UFC-711



NOTE: THERE IS NO REQUIREMENT TO TERMINATE CABLE RUNS AROUND INTERIOR CORNERS. THE DEADMAN SYSTEMS SHOULD BE PLACED AS THE SPACING DICTATES.

TYPICAL PLAN OF TURNING POINT POST LAYOUT

NOT TO SCALE

A4 CIVIL DWGS UFC-711

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

TYPICAL CABLE REINF CHAIN LINK FENCE-DEADMAN AND LINE POST

UFC-711

FILE NAME: J:\UCS\STRUCT DRAWINGS\050505-UFC-711.dwg LAYOUT NAME: F-HH PLOTTED: Monday, April 29, 2013 - 1:19pm

DRAFTING REVISION: 04 AUGUST 2007

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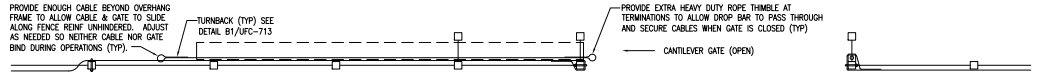
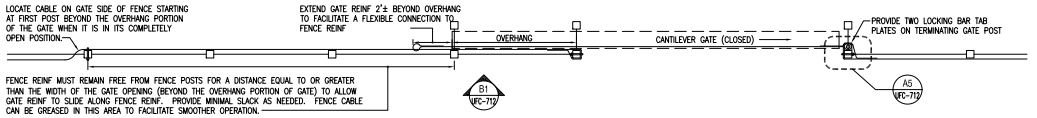


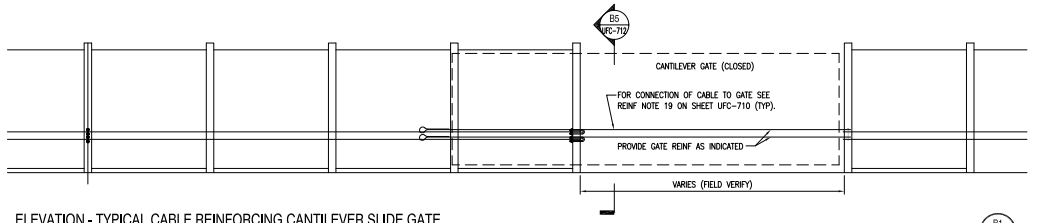
PLAN VIEW (GATE OPEN)



PLAN VIEW (GATE CLOSED)

SCALE: 1/2" = 1'-0"

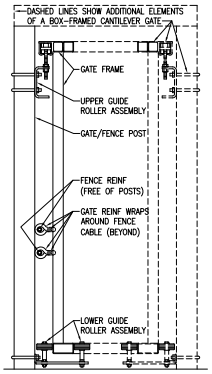
C1 CIVIL DWGS UFC-712



ELEVATION - TYPICAL CABLE REINFORCING CANTILEVER SLIDE GATE

SCALE: 1/2" = 1'-0"

B1 UFC-712 UFC-712

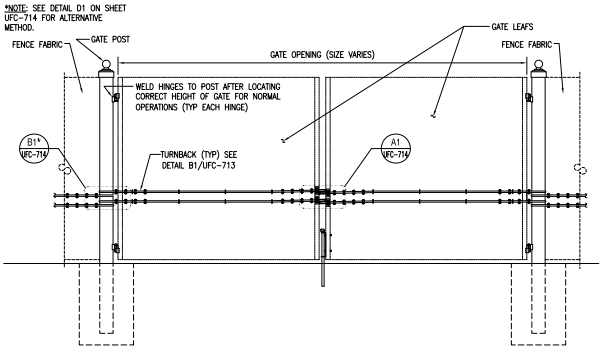


GATE SECTION

SCALE: 1/2" = 1'-0"

B5 UFC-712 UFC-712

*NOTE: SEE DETAIL D1 ON SHEET UFC-714 FOR ALTERNATIVE METHOD.

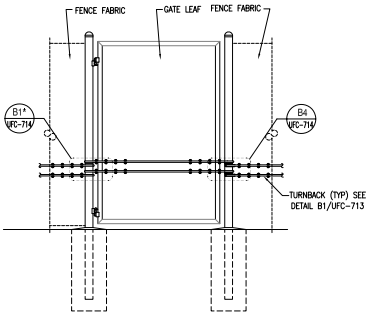


ELEVATION - TYP CABLE REINFORCING DOUBLE FOR SWING GATE

SCALE: 1/2" = 1'-0"

A1 CIVIL DWGS UFC-712

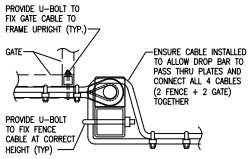
*NOTE: SEE DETAIL D1 ON SHEET UFC-714 FOR ALTERNATIVE METHOD.



ELEVATION - TYP CABLE REINF SINGLE SWING GATE

SCALE: 1/2" = 1'-0"

A3 CIVIL DWGS UFC-712



GATE SECTION

NOT TO SCALE

A5 UFC-712 UFC-712

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

TYPICAL CABLE REINFORCED CHAIN LINK FENCE - GATES

UFC-712

DRAFTING REVISION: 04 AUGUST 2007

FILE NAME: J:\UGS\FENCE DRAWINGS\UG3005-UFC-712.dwg LAYOUT NAME: F-HH PLOTTED: Monday, April 29, 2013 - 1:22pm

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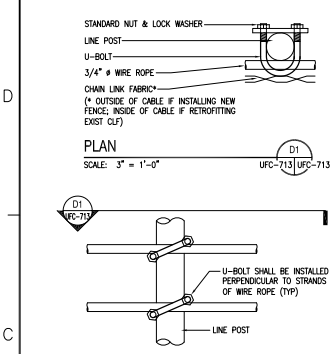
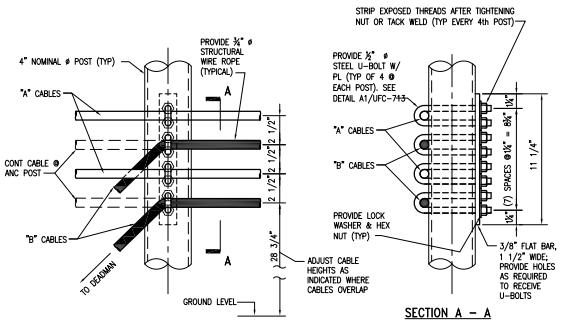
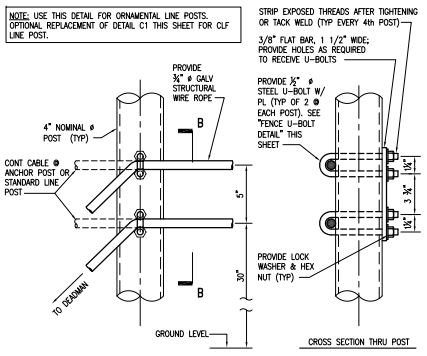


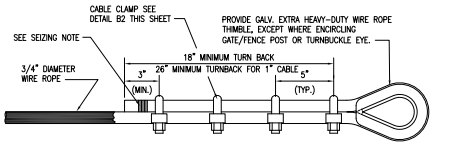
LINE POST DETAIL (CLF ONLY)
SCALE: 3" = 1'-0"
C1
UFC-711,UFC-710 UFC-713



CABLE ANCHORAGE DETAIL @ PULL & ANCHOR POST W/ OVERLAPPING CABLES
SCALE: 3"= 1'-0"
C2
UFC-710 UFC-713



CABLE ANCHORAGE DETAIL @ PULL & ANCHOR POST
SCALE: 3" = 1'-0"
C4
UFC-711 UFC-713

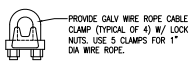


ORNAMENTAL FENCE NOTE: STRIP VINYL COATING OFF WIRE ROPE IN AREA OF CLIPS AND THIMBLE (APPROX. LAST 4'-6").

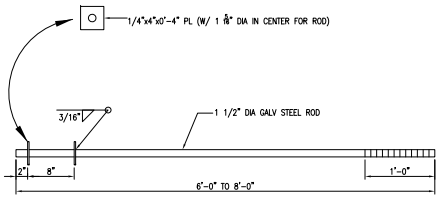
NOTE (ALL FENCE TYPES): INSTALL SADDLE OF CLIPS ON LIVE SIDE (AS SHOWN), SEIZE CUT END OF WIRE ROPE, AND TORQUE NUTS PER MANUFACTURER'S RECOMMENDATIONS (TYP).

SEIZING NOTE: WIND SEIZING WIRE IN A TIGHT SPIRAL AROUND THE ROPE END TO A 1" LENGTH OF SEIZING. TWIST THE TWO ENDS OF THE SEIZING WIRE AT THE CENTER OF THE SEIZING LENGTH. USE ZINC COATED STEEL WIRE.

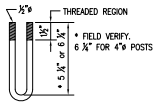
TYPICAL TURNBACK AND CLAMP DETAIL
SCALE: 3" = 1'-0"
B1
UFC-710, UFC-711, UFC-712, UFC-720, UFC-721, UFC-722 UFC-713



CLAMP DETAIL
NOT TO SCALE
B2
UFC-713 UFC-713



DEADMAN ANCHOR ROD
SCALE: 1 1/2" = 1'-0"
B3
UFC-710, UFC-711 UFC-713
UFC-720, UFC-721



FENCE U-BOLT DETAIL
SCALE: 3" = 1'-0"
A1
UFC-713 UFC-713

GRAPHIC SCALES

3" = 1'-0" 0 1" 2" 3" 4" 5" 6" 1'
1 1/2" = 1'-0" 0 4" 8" 1'-4"
1" = 1'-0" 0 6" 1' 2'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

CABLE REINFORCING DETAILS

UFC-713

DRAWFORM REVISION: 04 AUGUST 2007

FILE NAME: J:\UCF\FENCE DRAWINGS\050305-UFC-713.dwg LAYOUT NAME: Layout1 PLOTTED: Monday, April 29, 2013 - 2:23pm

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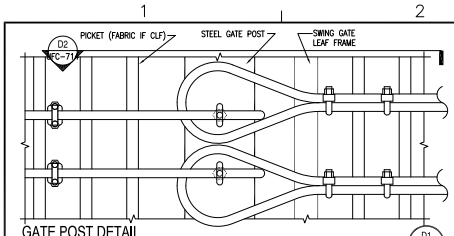
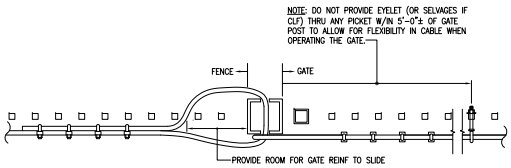
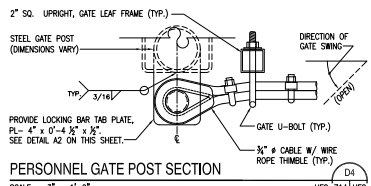


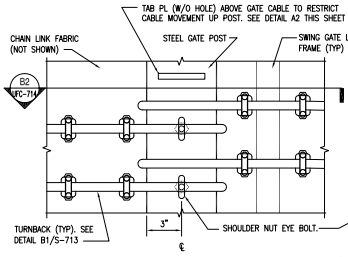
GATE POST DETAIL (D1)
SCALE: 3" = 1'-0"
UFC-712, UFC-714 & UFC-722 UFC-714



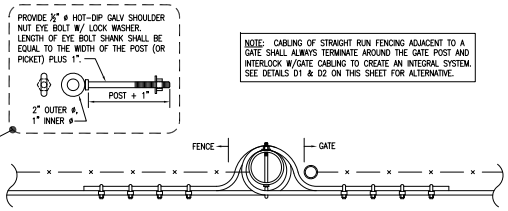
ALTERNATIVE CABLE LASHING - ORNAMENTAL SHOWN (CLF SIMILAR) (D2)
SCALE: 1 1/2" = 1'-0"
UFC-714 UFC-714



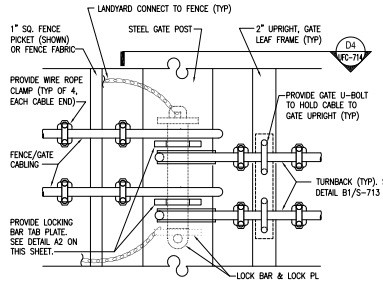
PERSONNEL GATE POST SECTION (D4)
SCALE: 3" = 1'-0"
UFC-714 UFC-714



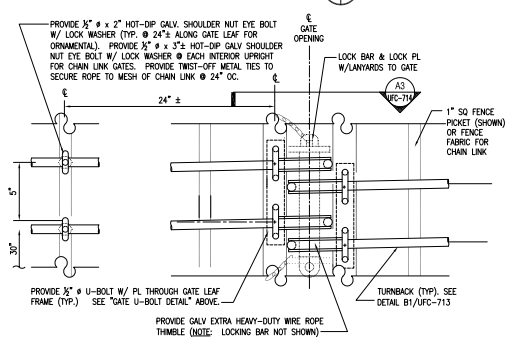
GATE POST DETAIL (B1)
SCALE: 3" = 1'-0"
UFC-712 & UFC-722 UFC-714



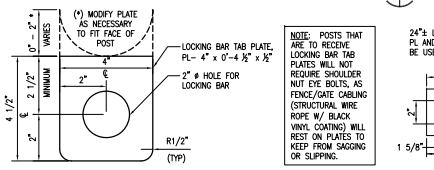
SECTION (B2)
SCALE: 1 1/2" = 1'-0"
UFC-714 UFC-714



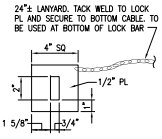
PERSONNEL GATE POST DETAIL (TYP.) (B4)
SCALE: 3" = 1'-0"
UFC-712 & UFC-722 UFC-714



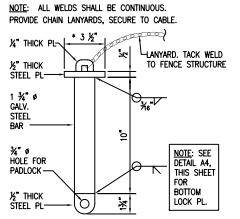
DOUBLE GATE LEAF LOCK DETAIL (A1)
SCALE: 3" = 1'-0"
UFC-712 & UFC-722 UFC-714



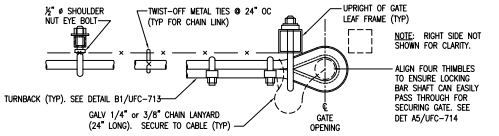
LOCKING BAR TAB PLATE DETAIL (A2)
SCALE: 6" = 1'-0"
UFC-714 UFC-714



LOCK PLATE (A4)
SCALE: 3" = 1'-0"
UFC-714 UFC-714



LOCK BAR DETAIL (A5)
SCALE: 3" = 1'-0"
UFC-714 UFC-714



SECTION (A3)
SCALE: 3" = 1'-0"
UFC-712 & UFC-722 UFC-714

GRAPHIC SCALES

3" = 1'-0"

1 1/2" = 1'-0"

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

CABLE REINFORCING DETAILS (CONT'D)

UFC-714

FILE NAME: J:\UCS\FENCE DRAWINGS\050305-UFC-714.dwg LAYOUT NAME: legend1 PLOTTED: Monday, April 29, 2013 - 2:27pm

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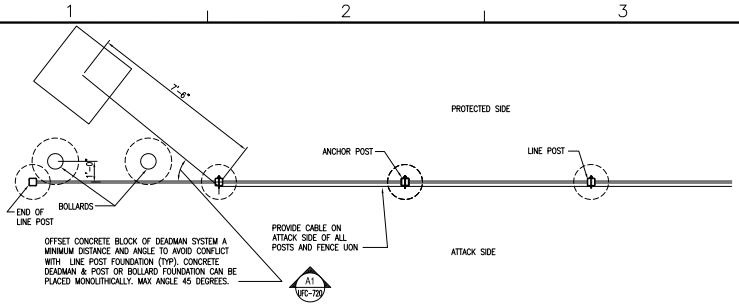
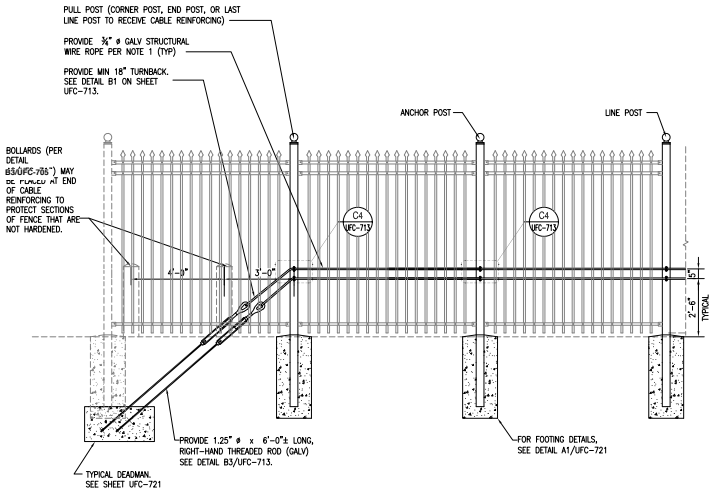


TYPICAL PLAN OF END POST DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

C1 CIVIL DWGS UFC-720



TYPICAL ELEVATION OF END POST DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

A1 UFC-720 UFC-720

LAYOUT OF REINFORCING

DESIGNER OF RECORD TO LOCATE DEADMEN ON SITE PLANS, SATISFYING SPACING CRITERIA, OVERLAPS, AND FENCE CORNERS / TURNING POINTS. AT GATES IT IS DESIRABLE TO HAVE TRAFFIC ON EITHER SIDE OF A MEDIAN TO OPERATE AND PROTECT INDEPENDENTLY (NOT UTILIZING THE SAME DEADMAN SYSTEMS). THEREFORE DEADMEN SHOULD BE PLACED IN THE MEDIAN TO ANCHOR THE GATE REINFORCING FOR EACH SIDE OF THE ROAD. IF THERE IS NO PHYSICAL MEDIAN (MERELY PAINTED LINES), LIMITED ROOM, OR UTILITY CONFLICTS THAT DO NOT ALLOW FOR DEADMEN PLACEMENT BETWEEN THE GATES, ENSURE THAT THE CABLING FOR BOTH GATES ARE CONNECTED-- EITHER DIRECTLY OR VIA AN INTERMEDIATE CABLE WHICH CREATES AN INTEGRAL CABLE SYSTEM ACROSS THE ENTIRE GATE AREA.

MODIFICATIONS TO TYPICAL DESIGN

IF LARGER DESIGN THREATS OR CUSTOMER REQUESTS INDICATE A NEED FOR GREATER SECURITY, MORE 3/4" ø CABLES CAN BE UTILIZED OR THE CABLES CAN BE UPGRADED TO 1" ø. BOTH SCENARIOS REQUIRE THE DEADMAN (WHICH WILL NEED TO BE LARGER) TO BE DESIGNED BY A PROFESSIONAL ENGINEER TO SATISFY THE CRITERIA OUTLINED IN REINF NOTE 19 ON THIS SHEET. FOR BIDDING PURPOSES, ESTABLISH A UNIT COST FOR ADDITIONAL EXCAVATION AND NEW CONCRETE PER CUBIC FOOT.

IF 1" ø CABLE IS USED, SPECIFICATIONS SHALL MATCH REINF NOTE 1 ON THIS SHEET, EXCEPT THE CABLE SHALL HAVE A MINIMUM BREAKING STRENGTH OF 70,000 POUNDS (35 TONS). OTHER COMPONENTS, SUCH AS EYEBOLTS, U-BOLTS, ROPE CLIPS, THIMBLES, AND OTHER ASSOCIATED HARDWARE SHALL BE SIZED ACCORDINGLY.

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

REINFORCING NOTES

1. REINFORCING CABLES SHALL BE U.S. DOMESTIC MINIMUM 3/4" ø 6x19 CLASS WIRE ROPE, REGULAR LAY, EXTRA IMPROVED PLOW STEEL (EIP), INDEPENDENT WIRE ROPE CORE (IWRC), CLASS A CONFORMING TO ASTM A1023 AND GALVANIZED IN ACCORDANCE WITH ASTM A475, & HAVE A MINIMUM BREAKING STRENGTH OF 40,000 POUNDS (20 TONS). CABLES SHALL HAVE A BLACK VINYL COATING, BUT SHALL NOT BE IMPREGNATED.
2. CABLES SHALL BE CONTINUOUS FROM DEADMAN TO DEADMAN. NO SPLICES IN CABLE SHALL BE ALLOWED. CABLE BARRIER SHALL BE INSTALLED BETWEEN FENCE POST AND FENCE FABRIC AS PER PLANS. U-BOLTS SHALL BE INSTALLED PERPENDICULAR TO THE LAY OR THE STRANDS OF THE WIRE ROPE AND SHALL BE TIGHTENED AFTER SAG IN CABLE BARRIER HAS BEEN REMOVED. CONCRETE DEADMAN SPACING SHALL BE AT MAXIMUM 200' INTERVALS & TURNING POINTS (EXTERNAL CORNERS).
3. WIRE ROPE ENDS SHALL TERMINATE AROUND TURNBUCKLES, GATE POSTS OR EXTRA HEAVY-DUTY WIRE ROPE THIMBLES (AT GATES). THESE TERMINATIONS REQUIRE 18" MINIMUM OF ROPE FOR TURN BACK AND A MINIMUM OF (4)- CLIPS EACH (EQUAL SPACING).
4. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO ORDERING MATERIALS.
5. DEADMEN TO BE INSTALLED ON THE SECURED SIDE (INTERIOR) OF THE FENCE; WHILE CABLES SHOULD BE INSTALLED ON THE EXTERIOR SIDE OF POST.
6. PROVIDE NECESSARY SLACK IN CABLES (GATES ONLY) TO ALLOW FOR FULL SWING OF ALL GATE LEAVES.
7. OFFSET DEADMAN SYSTEMS FROM FENCELINE (PLAN VIEW) TO AVOID CONFLICT WITH EXISTING FENCE POSTS.
8. ALLOW EPOXY ANCHOR BOLTS (MIN 2 DAYS) & CONCRETE DEADMEN (MIN 7 DAYS) TO CURE, PRIOR TO APPLYING LOADS (INSTALLING TURNBUCKLES & STRAIGHTENING CABLES).
9. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH AWS D1.1. ALL WELD MATERIAL SHALL BE E70XX ELECTRODES.
10. STRUCTURAL STEEL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE NINTH EDITION OF THE AISC "MANUAL OF STEEL CONSTRUCTION FOR ALLOWABLE STRESS DESIGN.
11. STRUCTURAL STEEL SHALL CONFORM TO ASTM A36 AND SHALL HAVE A MINIMUM YIELD STRESS OF 36000 PSI.
12. ALL STRUCTURAL STEEL MEMBERS AND HARDWARE USED IN CABLE ANCHORING SYSTEM SHALL BE HOT-DIPPED GALVANIZED. ANY AREAS WHERE COATING IS DAMAGED OR REMOVED SHALL BE COVERED WITH A ZINC RICH COMPOUND.
13. TURNBUCKLES SHALL BE 1⅜"x18", TYPE I, GALVANIZED IN ACCORDANCE WITH ASTM F1145.
14. WIRE ROPE CLAMPS SHALL BE TYPE I, GALVANIZED, IN ACCORDANCE WITH FS FF-C-450.
15. ALL THREADED RODS, U-BOLTS, AND BOLTS SHALL CONFORM TO ASTM A307 AND SHALL BE INSTALLED WITH F844 WASHERS AND A563 NUTS. ENTIRE BOLT ASSEMBLY SHALL BE GALVANIZED. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
16. ZINC RICH COMPOUND FOR REPAIRS SHALL BE 95% METALLIC ZINC, BY WEIGHT IN DRIED FILM; CONFORMING TO FED SPEC DOD-P-21035A & MEETING MILITARY SPEC MIL-P-26915A. INSTALL AT LEAST TWO COATS, 4 MILS MIN TOTAL THICKNESS.
17. ALL CONCRETE WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF ACI 318. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4000 PSI. THE MINIMUM CONCRETE COVER SHALL BE 3", UNLESS OTHERWISE NOTED.
18. ALL ITEMS NOT NOTED AS "EXIST" OR "EXISTING" SHALL BE PROVIDED AND INSTALLED UNDER THE REQUIREMENTS OF THIS CONTRACT.
19. DESIGN CRITERIA:
    UFC 4-022-03 "Security Engineering: Fences and Gates"

    UFC 4-022-02 "SELECTION AND APPLICATIONS OF VEHICLE BARRIERS."
20. IF CABLE REINFORCING GATES, PROVIDE EYEBOLTS TO SECURE CABLE TO GATE PICKETS @ 24" OC & U-BOLTS TO SECURE TO GATE UPRIGHTS. MODIFY AS NEEDED FOR OPERATION.

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

TYPICAL CABLE REINFORCED ORNAMENTAL FENCE - END POST

UFC-720

FILE NAME: J:\UCS\FENCE DRAWINGS\UFC-720.dwg LAYOUT NAME: 1-1-1 PLOTTED: Monday, April 29, 2013 - 2:29pm

DRAFTING REVISION: 04 AUGUST 2007

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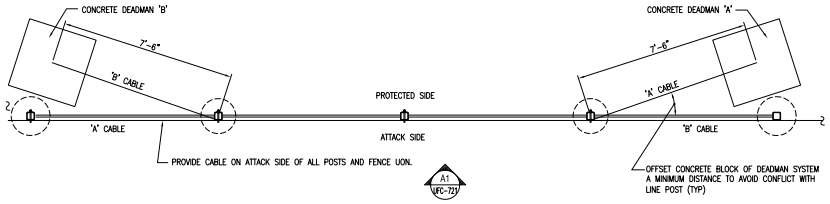
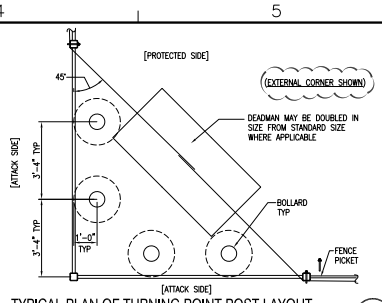


TYPICAL PLAN OF DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

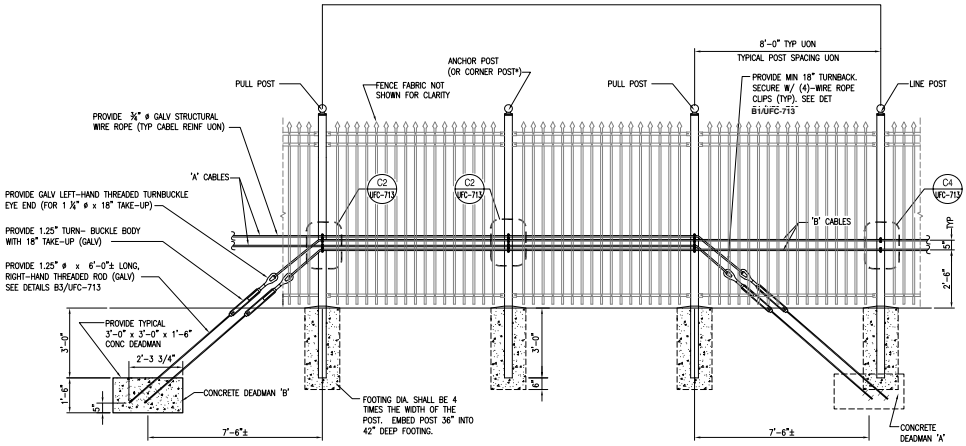
C1 CIVIL DWGS UFC-721



TYPICAL PLAN OF TURNING POINT POST LAYOUT

SCALE: 1/2" = 1'-0"

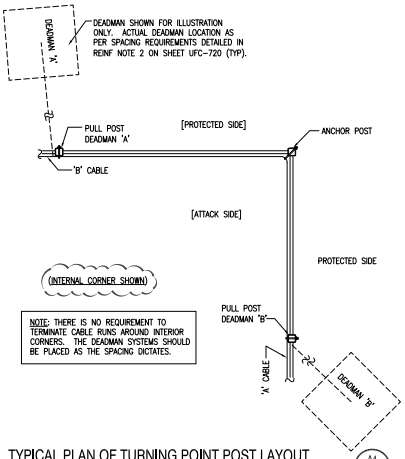
C4 CIVIL DWGS UFC-721



TYPICAL ELEVATION OF DEADMAN AND LINE POST LAYOUT

SCALE: 1/2" = 1'-0"

A1 CIVIL DWGS UFC-721



NOTE: THERE IS NO REQUIREMENT TO TERMINATE CABLE RUNS AROUND INTERIOR CORNERS. THE DEADMAN SYSTEMS SHOULD BE PLACED AS THE SPACING DICTATES.

TYPICAL PLAN OF TURNING POINT POST LAYOUT

NOT TO SCALE

A4 CIVIL DWGS UFC-721

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
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TYPICAL CABLE REINFORCED ORNAMENTAL FENCE - DEADMAND AND LINE POST

UFC-721

DRAWING REVISION: 04 AUGUST 2007

FILE NAME: J:\UCS\STRUCT DRAWINGS\050305-UFC-721.dwg LAYOUT NAME: F-HH PLOTTED: Monday, April 29, 2013 - 2:31pm

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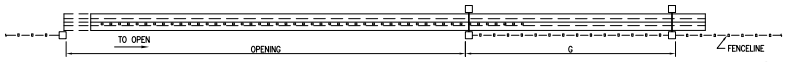


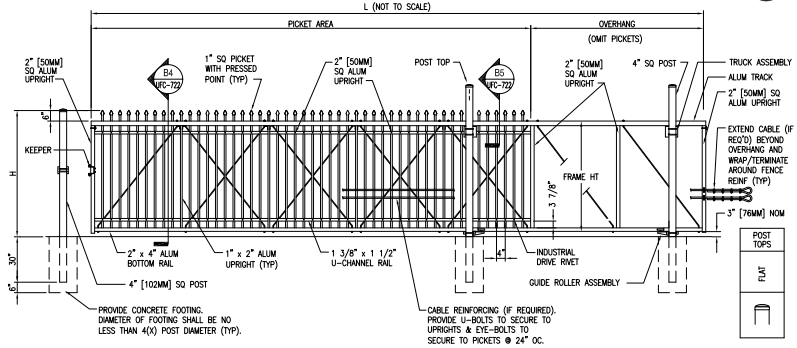
GATE PLAN

NOT TO SCALE

D1 CIVIL DWGS UFC-722

BAYS	OPENING (F/F)	NOM HEIGHT (H)	LENGTH (L)	GATE POSTS (G)	BAYS / OVERHANG
5	30'-0" [9144MM]	8'-0" [2438MM]	42'-3" [12878MM]	12'-0" [3658MM]	5(Pickets) / 2(w/o)

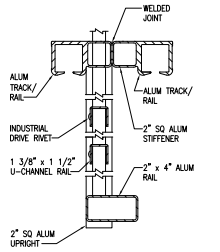
* NOTE: VERIFY SIZE OF OPENING WITH SITE PLANS. DIMENSIONS WILL VARY BASED ON OPENING. DIMENSIONS ABOVE PROVIDED FOR BASELINE PURPOSES.



TYPICAL SINGLE CANTILEVERED SLIDING GATE ELEVATION- (5) BAYS SHOWN

NOT TO SCALE

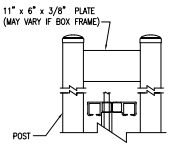
B1 CIVIL DWGS UFC-722



SECTION (TYP)

NOT TO SCALE

B4 UFC-722 UFC-722

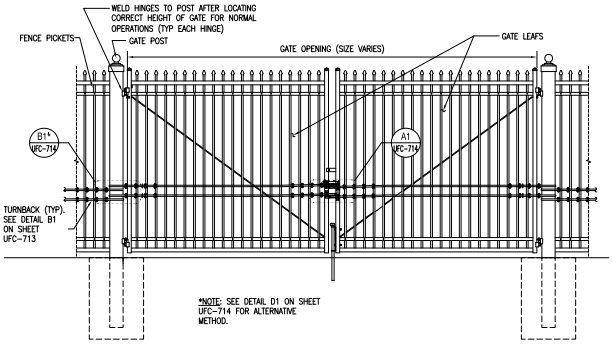


SECTION (TYP)

NOT TO SCALE

B5 UFC-722 UFC-722

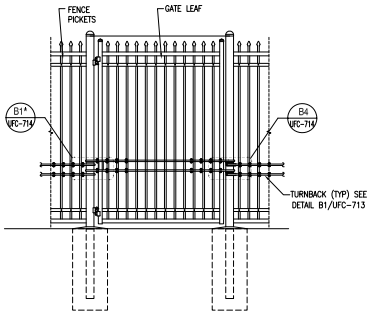
*NOTE: SEE DETAIL D1 ON SHEET UFC-714 FOR ALTERNATIVE METHOD.



ELEVATION - TYP CABLE REINFORCING DOUBLE FOR SWING GATE

SCALE: 1/2" = 1'-0"

A1 CIVIL DWGS UFC-722



ELEVATION - TYP CABLE REINFORCING SINGLE SWING GATE

SCALE: 1/2" = 1'-0"

A3 CIVIL DWGS UFC-722

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

ORNAMENTAL CANTILEVERED AND SWING GATES AND CABLING DETAILS

UFC-722

DRAWING REVISION: 04 AUGUST 2007

FILE NAME: J:\UGS\FENCE DRAWINGS\UG005-UFC-722.dwg LAYOUT NAME: F-HH PLOTTED: Monday, April 29, 2013 - 2:32pm

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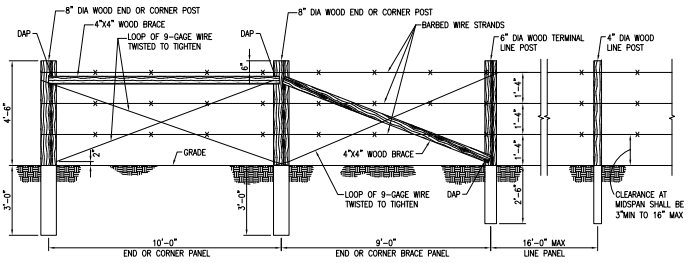
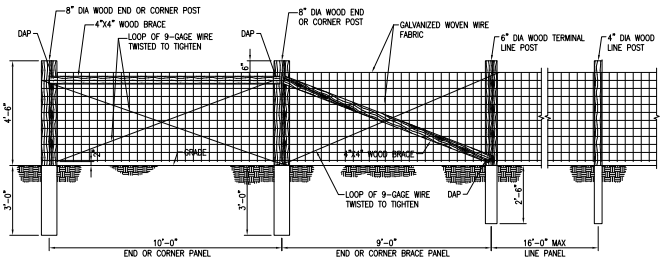


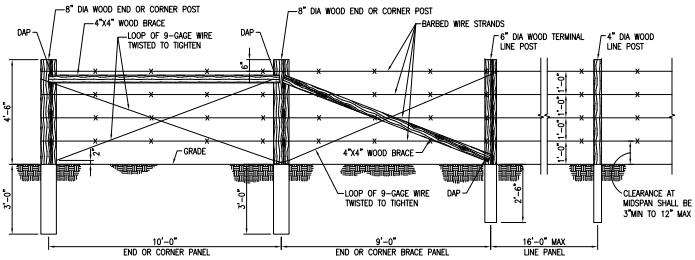
TYPICAL 3 STRAND BARBED WIRE FENCE

SCALE: 1/2" = 1'-0"



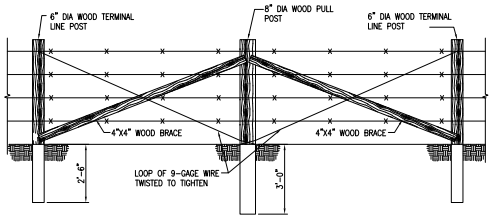
TYPICAL LAYOUT - WOVEN WIRE FENCE

SCALE: 1/2" = 1'-0"



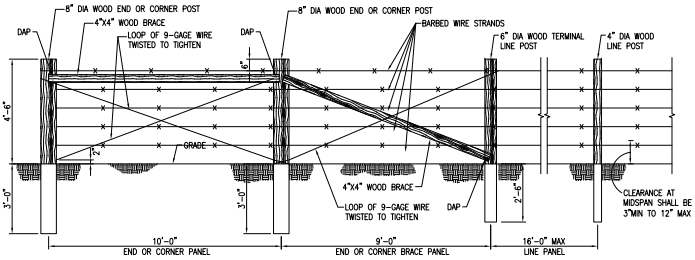
TYPICAL 4 STRAND BARBED WIRE FENCE

SCALE: 1/2" = 1'-0"



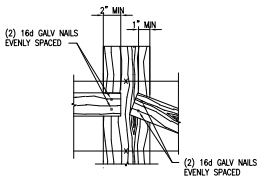
PULL POST BRACE PANEL DETAIL

SCALE: 1/2" = 1'-0"



TYPICAL 5 STRAND BARBED WIRE FENCE

SCALE: 1/2" = 1'-0"



DAP DETAIL

SCALE: 1 1/2" = 1'-0"

GENERAL NOTES

1. THE SPACING OF END OR CORNER PANEL AND BRACE PANEL OF 10'-0" AND 9'-0" IS MAXIMUM. WHEN CORNER OR END PANEL CONFLICTS WITH GATE OR CATTLE GUARD BRACE PANEL OR TWO CORNER PANELS CONFLICT, BRACING AND SPACING OF POSTS SHALL BE ALTERED TO PROVIDE ADEQUATE BRACING AS REQUIRED.
2. THE GATE SHOWN IS TYPICAL. ANY STANDARD COMMERCIAL GATE THAT VARIES ONLY IN NON-ESSENTIAL DETAILS SHALL BE ACCEPTABLE, SUBJECT TO APPROVAL.
3. LATCH AND PIN FOR PANEL GATE REQUIRED, BUT NOT SHOWN.

GRAPHIC SCALES

1" = 1'-0" (0, 6", 1', 2')

1 1/2" = 1'-0" (0, 4", 8", 1'-4")

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

FARM STYLE FENCES

UFC-730

FILE NAME: J:\UCS\STACE DRAWINGS\UC0205-UFC-730.dwg LAYOUT NAME: S-702 PLOTTED: Monday, April 29, 2013 - 2:50pm

DRAWFORM REVISION: 04 AUGUST 2007

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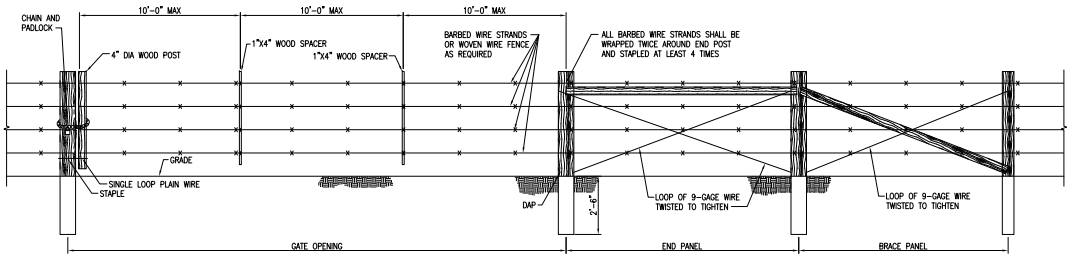
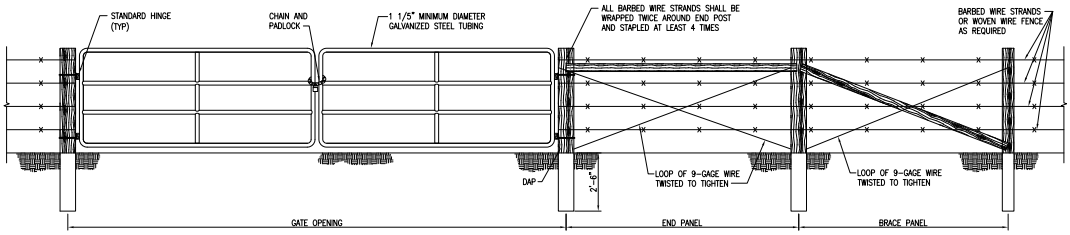


TYPICAL BARBED WIRE DROP GATE ELEVATION

SCALE: 1/2" = 1'-0"



TYPICAL PANEL GATE ELEVATION

SCALE: 1/2" = 1'-0"

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

FARM STYLE GATES

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

UFC-731

FILE NAME: J:\UCS\STACE DRAWINGS\UFC-731.dwg LAYOUT NAME: 5-702 PLOTTED: Monday, April 29, 2013 - 2:27pm

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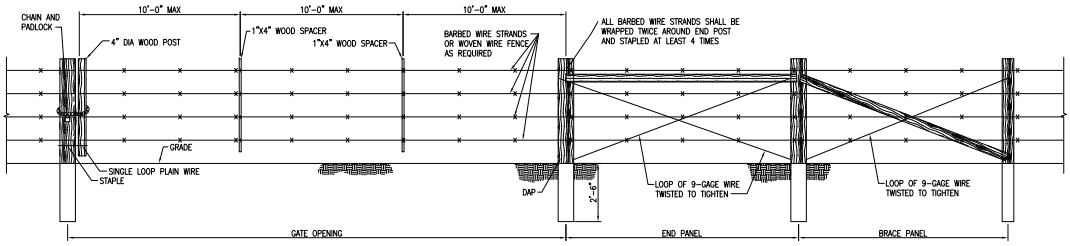
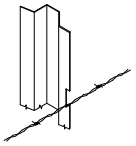


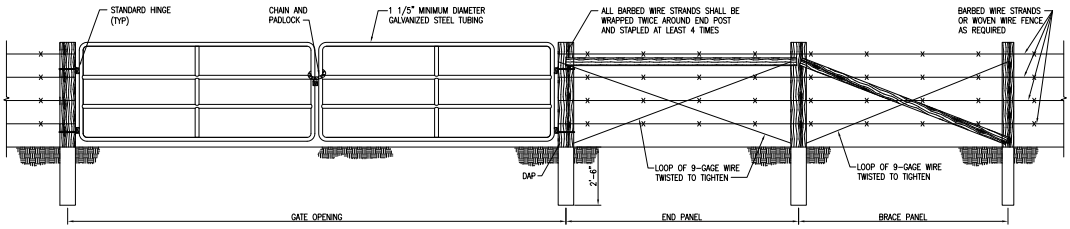
TYPICAL BARBED WIRE DROP GATE ELEVATION

SCALE: 1/2" = 1'-0"



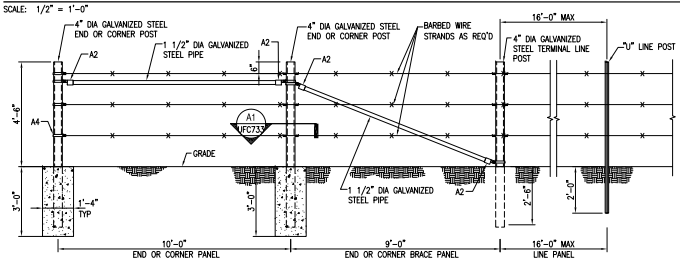
"U" LINE POST

NO SCALE



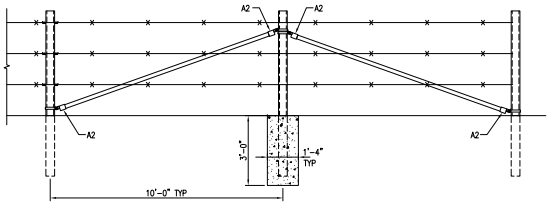
TYPICAL PANEL GATE ELEVATION

SCALE: 1/2" = 1'-0"



TYPICAL 3 STRAND BARBED WIRE FENCE WITH STEEL POSTS (FOR OTHER STRAND CONFIGURATIONS SEE SHEET 730)

SCALE: 1/2" = 1'-0"



PULL POST PANEL - BARBED WIRE FENCE WITH STEEL POSTS

SCALE: 1/2" = 1'-0"

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

FARM STYLE GATE AND FENCE DETAILS

UFC-732

FILE NAME: J:\UCS\STACE DRAWINGS\UCS005-UFC-732.dwg LAYOUT NAME: S-732 PLOTTED: Monday, April 29, 2013 - 2:29pm

DRAFTING REVISION: 04 AUGUST 2007

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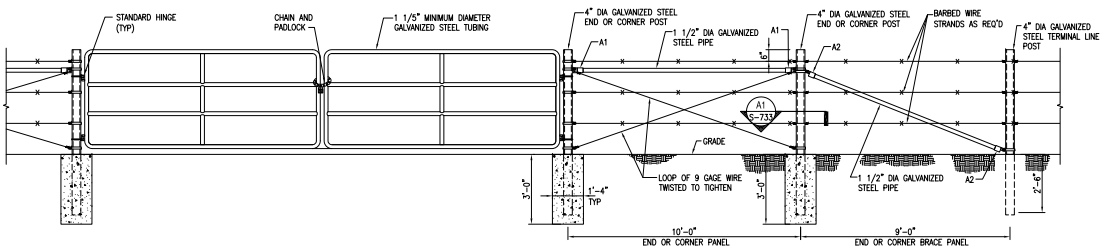
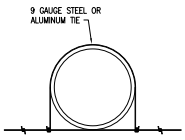


TYPICAL 3 STRAND BARBED WIRE FENCE WITH STEEL POSTS (FOR OTHER STRAND CONFIGURATIONS SEE SHEET 730)

SCALE: 1/2" = 1'-0"



SECTION A1

SCALE: 1/2" = 1'-0" UFC-732, UFC-733 UFC-733

GRAPHIC SCALES

1/2" = 1'-0" 0 1' 2' 4'

UNIFIED FACILITIES CRITERIA 4-022-03 SECURITY ENGINEERING: FENCES, GATES AND GUARD FACILITIES
DEFINITIVE DRAWINGS FOR SECURITY FENCING, GATES AND CABLING

FARM STYLE FENCES

UFC-733

GRAPHICAL REVISION: 04 AUGUST 2007

FILE NAME: J:\UCS\STORAGE DRAWINGS\UG3005-UFC-733.dwg LAYOUT NAME: S-702 PLOTTED: Monday, April 29, 2013 - 2:41pm