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Technical Criteria for Correctional Institutions

ISSUED BY FACILITY PLANNING AND STANDARDS
APRIL 2015

Canada

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PREFACE

Canada

The Technical Criteria document was first issued in 1979 to guide construction material and assembly requirements for new builds which were anticipated to address a forecasted inmate population growth. Defining requirements unique to the correctional environment was particularly important as CSC earned a departmental status of a 'knowledgeable client' in its working relationship with Public Works and Government Services Canada when delivering construction projects. During the subsequent period, a Facility and Standards professional staff complement would oversee capital construction projects across all five regions and contribute in keeping the standards current and relevant.

Since its first issue, the Technical Criteria document underwent several reviews which resulted in revisions to all sections. This occurred in the late 1980's and again in the early 2000's. A number of amendments were also issued in the intervening years. The current revision of this document is the third formal undertaking in order to capture a number of required changes and new standards.

Introduction of new or changed standards generally follows a review of outcomes of events such as:

- Incidents in institutions which demonstrate that current standards are no longer effective to ensure safety of the institution or effective custody of inmates,
- Introduction of new weapons or operational protocols which have an impact on facilities,
- CSC and government initiatives in the form of new directives and policies,
- Industry technological advances and the use of these in other jurisdictions as best practices.

When conducting reviews of standards aimed at capturing changes, CSC assesses the following key factors:

- Have technological advances been subject to the proof of time,
- If threat risk assessments are used to substantiate changes, are they evidence based,
- As a steward of public funds, are various options assessed and substantiated and are they supporting a cost effective approach to the delivery of our mandate to provide a safe and secure work and living environment.

The prescriptions in the Technical Criteria document have proven performance based on independent testing and history of actual usage. Standards are based on the best evidence available and for this reason when providing rulings either in the court of law or for any 3rd party review, consistency with standards must be established and achieved. Notwithstanding, special circumstances may lead an institution to require a unique solution. In such case, the institution must submit via their Regional Deputy Commissioner their requests to the Director General Technical Services and Facilities for consideration by an appointed committee composed of the Commissioner, the Senior Deputy Commissioner, the Assistant Commissioner Correctional Operations and Programs and the Assistant Commissioner Corporate Services. Other Executive Committee members may also be asked to participate.

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SECTION G - GENERAL

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G-1 GENERAL - INTRODUCTION

1. PURPOSE

1.1 The Purpose of this document is to prescribe proven technical requirements for site and buildings as tested in use or in accordance with recognized standards authorities. Requirements are described by performance and specification and cover the needs unique to correctional facilities. Other governing construction codes and authorities supplement this document.

1.2 This document is to be used for the development of all Men's and Women's CSC institutional design and construction projects. All specialized technical requirements for Women's institutions are denoted within the text of this document and within the Women's Technical Reference Guideline that is in the Appendix.
Community Correctional Centres use separate standards.

1.3 The prescriptions in this document are cross referenced in the CSC "Accommodation Guidelines" which is a separate document used in the planning and design of CSC correctional facilities.

2. CONTEXT

The Technical Criteria contributes to the CSC Corporate Priorities through its prescriptions in infrastructure content and through management and enforcement of construction projects to promote consistency and to achieve fiscal responsibility. The **CSC corporate priorities** are as follows:

- Safe management of eligible offenders during their transition from the institution to the community, and while on supervision
- Safety and security of members of the public, victims, staff and offenders in our institutions and in the community
- Effective, culturally appropriate interventions for First Nations, Métis and Inuit offenders
- Mental health needs of offenders addressed through timely assessment, effective management and appropriate intervention, relevant staff training and rigorous oversight
- Efficient and effective management practices that reflect values-based leadership in a changing environment
- Productive relationships with diverse partners, stakeholders, victims' groups, and others involved in public safety

The Technical Criteria also contributes in mitigating the risks inherent to its mandate to protect society, staff and offenders while preparing and encouraging offenders to be law abiding citizens. The **CSC corporate risk profile statements** are as follows:

- There is a risk that SCC will not be able to respond to the complex, diverse and evolving profile of the offender population.
- There is a risk that CSC will not be able to maintain required levels of operational safety and security in institutions and in the community.
- There is a risk that CSC will not be able to manage significant change related to transformation, legislative changes and fiscal constraints.
- There is a risk that CSC will lose support of partners delivering critical services and providing resources for offenders.
- There is a risk that CSC will not be able to sustain results related to re-offending violently.

3. APPLICATION

3.1 For new construction, adherence to the documented solutions is considered important. Deviations, however, will be considered providing equal performance can be demonstrated. In such cases, requests shall be submitted to the issuing authority, the Director Facility Planning and Standards.

3.2 For renovations, alterations and expansions of existing buildings and systems, conformity to this document may not always be practicable or cost effective due to existing physical features and the age of the facility. In such cases, information contained in this document should be used as guidelines and alternate solutions, with appropriate justification, shall be submitted to the issuing authority.

4. UPDATING

In order to keep the document current, Technical Criteria sections are systematically amended as new information or lessons learned are raised to the issuing authority. The Technical Criteria Document is also periodically reviewed to determine the need for revisions.

5. DOCUMENT DISTRIBUTION

5.1 The document in its final revised version will be available on the Facilities Branch Infonet page. Updates will be posted at this Infonet location when amendments are made.

5.2 Distribution of the Technical Criteria Document will be made in electronic form to listed recipients. Recipients are responsible for broader distribution to parties outside CSC on an as need basis. .

5.3 The office of Director Facility Planning and Standards at NHQ is responsible for issuing the Technical Criteria Document in both official languages.

6. SECURITY REQUIREMENTS FOR CONSTRUCTION

Security requirements, which are critical for construction within occupied institutions, have been established to satisfy the special needs of CSC. Contractors performing construction in operating institutions must conform to the provisions contained in the "Security Requirements" issued by the office of Director Facility Planning and Standards. This document will form part of the specification of the contract documents for works to be undertaken.

7. SECURITY CLASSIFICATION AND HOUSING

In order to provide a general understanding of the security classifications of correctional institutions, the following brief definitions are included. While CSC uses the minimum, medium, maximum etc. designations under the following headers (institution security classification) to classify their institutions[1], there exists another designation (S-X) which describes the types of housing units found at CSC. Because institutions and expansions have been built over time and since the influencing factors may have differed from time to time, there exists an array of unit types. CSC has classed these housing units by an S category ranging from S-2 to S-7, with higher security in ascending order. S-1 refers to Community Correctional Centers, which are not described in this document. S-2 housing matches the minimum designation but may also be found at mediums, S-3 to S-5 match the medium designation, and S-6 and S-7 are at maximum. Multi-level institutions have units at the S-4 and S-5 level but may have added features to address their special purpose. An S designation for housing at a Special Handling Unit has been omitted given the unlikely need for additional capacity at that level. Here is a description of each category:

7.1 Minimum security institutions and housing type (S-2)

Minimum security institutions do not have a defined and fenced perimeter. Internal security is low key with only one 24 hour post referred to as the duty post to which all visitors report to. All buildings are constructed to commercial standards and are free egress. Approximately 15% of CSC beds are located at minimums.

S-2: Housing units resemble apartments, attached or detached houses with each unit housing a maximum of 10 inmates but more typically 5-8, eight being most common (see also G-2 Subsection 4 for special provisions). Houses/apartments provide for a shared living experience and are free egress in accordance with residential occupancy of the NBC. Ease of detection and alarms warn of unauthorized egress after hours.

[1] Following Commissioner's Directive #706 of March 15, 2010

7.2 Medium security institutions and housing type(S-3, S-4 & S-5)

Medium security institutions have a double fence perimeter with intrusion detection systems and cameras. Several old institutions still have walls with detection capability. Armed officers in vehicles conduct patrols on the exterior side of the perimeter. Entry into the institution is highly controlled and guarded. Arms are kept only at the perimeter. On the interior, movement and activity areas are moderately controlled. Buildings are generally constructed of harder materials, some having impeded egress. Housing units vary in the degree of security and supervision. Activities are zoned by time of use and fences may separate the zones. Approximately 58% of CSC beds are located at mediums.

S-3: Housing units which provide for a similar living experience as S-2 but where the envelope of each apartment/suite is secured. A number of apartments make up the unit which is supervised by an officer in an open control post. This post allows for the control of traffic to and from the suites but there are no views of the interior of the suites from the location of the control post. A separate office suite is combined with the unit. This type of unit provides for containment at the apartment level but does not secure inmates within the apartment.

S-4: Housing units which are based on the cell block approach but where the ranges are more open to permit better views and encourage interaction. Several ranges make up the unit surrounding a common core but with no physical separation to allow free movement. An open control post is located in the core positioned optimally for sight and sound. The post controls access to cells. A separate office suite is combined with the unit. This type of unit provides for containment at the cell and building level.

S-5: While the S-3 and S-4 medium categories are quite distinct, this housing unit category has a broad collection of unit types and features. As it represents the most secure unit at the medium, the features aim to either control the group sizes or offer a protected control post or may have both of these features. Because the control posts are enclosed with security glass, sound of surrounding area is deadened. A separate office suite is combined with the unit. This type of unit provides for containment at the cell and building level and in many cases at the range level.

7.3 Maximum security institutions and housing type(S-6 & S-7)

Maximum security institutions have perimeters and access points similar to mediums. Arms however are kept not only at the perimeter but also in the interior. Conveyance of arms is highly controlled via tunnels and galleries which connect control posts at key areas. Armed intervention is possible to circulation areas as well as many activity areas from a Control post or gallery. Buildings and activity zones are packed close together or buildings may be interconnected. Due to the incompatibility of many inmates, activities and movement are scheduled and highly controlled. Approximately 15% of CSC beds are located at maximums.

S-6: Housing units at this level are intended to test inmate's ability to integrate with others and therefore enable CSC to render a decision on candidacy for relocation to a medium. Inmates in these units share common program and occupational areas including gym and yard. The units have armed control posts, containment at the cell and range level but the ranges are more open.

S-7: Housing units at this level vary. All units are designed to have the highest degree of security including armed control posts and containment at the cell and range level. While most units are connected to an interior corridor, the most recently built units are stand alone but attached to the main institution by a fenced corridor. These latter units are provided with more programming capability to make them more autonomous thus reducing movement out of the units. S-7 max units have attached yards to limit movement and group size. Galleries with intervention capability to most activity areas supplement the control post.

7.4 Special Handling Unit (SHU)

Special Handling Unit is essentially a maximum except that movement is even more restricted, activities more limited, and all inmate areas located at ground level with armed intervention possible to all circulation and activity areas. There are approximately 130 beds at this classification and the single facility is an annex to a main institution. A separate similar unit is located in another Region but it has been used as a maximum unit allowing for repurposing if the need arises. The main distinguishing feature of the housing unit is that all cells are located at ground level.

7.5 Multi-level institutions

Multi-level institutions serve a special purpose at CSC. Some accommodate inmates who are new to CSC to be assessed and pen placed. These institutions are referred to as Reception units. There are also Regional Health and Psychiatric centers for temporary stay from main institutions. And finally, there are remote institutions where different security levels are co-located on one site. In the case of mixing classifications, housing type is distinct for each level but activities and programs are generally integrated at the minimum and medium level. Maximums however remain segregated. For special purpose institutions as in the first two examples, the units are self-contained integrating minimum and medium inmates while maxes are generally segregated. There are no firearms in multi-levels except at the perimeter. Maximum units for general population inmates are also equipped with firearms.

Approximately 12% of CSC beds are multi-level.

8. PLANNING FOR EXPANSION IN CAPACITY

The infrastructure of every institution (service and program areas and all utilities: water, sewage, heating electrical, etc.) is designed to meet the needs of the designated rated capacity of an institution and for an expansion of housing accommodation by 25% without significant strain on the original infrastructure. All expansions should nonetheless undergo a review to assure that all current needs can be satisfied by the existing infrastructure.

G-2 GENERAL – FIRE AUTHORITIES AND CLASSIFICATION

1. SCOPE

This section identifies the authorities and use classifications related to fire protection requirements for correctional institutions.

2. GENERAL

This section treats fire protection requirements in the broad sense; specific fire protection requirements are treated in greater detail in the appropriate sections of this document.

3. AUTHORITIES

3.1 Fire Protection Authority Having Jurisdiction

3.1.1 The authority for Fire Protection rests with the respective Departments. Correctional Service Canada projects, including design and construction of new facilities, renovation of existing facilities, and change in use, shall be reviewed by Technical Services and Facilities, Engineering and Maintenance.

3.1.2 Plans and specifications for Correctional Service Canada projects shall be submitted to the Technical Services Directorate at various stages for final approval according to the schedule specified in the Fire Safety Manual 345 prior to tender call. Fire Protection inspections may also be carried out at the substantial completion stage of construction to ensure that fire related building systems are in accordance with the approved contract documents. Any systems requiring remediation must be corrected prior to obtaining approval for user occupancy.

3.2 National Building Code and National Fire Code

CSC projects shall be designed and constructed to meet the requirements of the National Building Code of Canada (NBC). Part 3 of the NBC relates to most of CSC buildings while Part 9 of the NBC is applicable to small buildings including residential built of combustible materials. The National Fire Code (as amended) remains applicable throughout the entire lifecycle of the building.

3.3 Provincial and Municipal Building and Fire Codes

Fire protection regulations as set out by Provincial and Municipal Fire Authorities will also be complied with to the extent that is reasonable and practical and applied without contravening any federal statutes, laws or regulations and without prejudice to the Crown's legal and constitutional rights.

3.4 Commissioner CSC

The Commissioner CSC has the responsibility for the care and custody of inmates under which fire protection forms part of that mandate. Security however remains a principal consideration and as such a balance may at times need to be struck. Technical Services Directorate will bring up potential conflicts and advise on the best resolution.

4. OCCUPANCY CLASSIFICATIONS AND SPECIAL PROVISIONS

4.1 The occupancy classification of buildings is set out in National Building Code (NBC).

4.2 The NBC states that every building or part thereof shall be classified according to its major occupancy as belonging to one of the Groups / Divisions described in NBC Table 3.1.2.1.

The following are examples of occupancy classifications that would apply to buildings having free egress[2]:

Table G-1-1: Examples of Occupancy Classifications Having Free Egress

Examples of Description of *Major Occupancies*	**Group**	**Division**
Recreation (Gymnasia and Fitness)	A	2
Kitchen and dining facilities	A	2
Socialization & Programs (Spiritual, Libraries, Meeting Rooms)	A	2
Medical services	B	2
Living units	C	
Administration	D	
Maintenance and works	F	2
Shops – Industrial & vocational	F	2
Stores, Garages & SIS	F	2

4.3 Any building of any occupancy type in which exits cannot be readily unlocked and/or opened by all occupants is considered to be an impeded egress or contained use building and shall comply with the requirements of the NBC for Group B-1 Occupancies. Typical examples are living units with cells and program buildings where exit doors are locked and require the unlocking by remote control or locally from the interior or exterior by a correctional officer.

4.4 S-2 living units at minimum security institutions which consist of single or double occupancy bedrooms and which allow “Free Egress” shall be classified under the NBC as Group C Occupancy. For reasons of fire emergency evacuation, the maximum occupancy of each living unit or suite shall be 10 residents. This number may be exceeded and be as high as 16 under conditions of population pressures when special provisions are met. One of these provisions is to incorporate a commercial exhaust hood over the stoves in the kitchen located in the suite.

[2] Section 3.1 of the National Building Code of Canada 2010 National Research Council, especially subsection 3.1.2.1, Table 3.1.2.1 and Appendix *A-3.1.2.1.(1)*

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SP-1 SITE – SITE PLANNING AND DEVELOPMENT

1. SCOPE

This section outlines planning and development principles and specific definitions of terms related to detention institutions.

2. RELATED SECTIONS

SP–2 – Fence
SP–3 – Gates / Sally Port
SP–4 – Exterior Lighting
SP–5 – Traffic Circulation and Parking

3. INSTITUTIONAL PROPERTY

3.1 There is no specific requirement for demarcation or fencing at the CSC owned property line. Signage at the property limit is recommended. Where signage is used, it shall follow the Federal Identity Program[1].

3.2 Property features such as topographical conditions and existing trees and bushes shall be used to screen CSC institutions from adjoining properties. Landscaping and site development along the main entry road shall be visually appealing.

3.3 Where more than one institution is located on a CSC property, sufficient space shall be allowed between institutions. Minimum security institutions shall be located furthest from that part of a medium or maximum institution where inmate circulation and activities take place.

4. RESERVE OF OPEN LAND

4.1 Where possible and with minimal alterations to natural land and its condition, a reserve of open land shall be provided for a distance of 100 m from the exterior of the outer perimeter fence to facilitate views of an intruder or escapee. Where natural grade changes exist, these shall be retained. Where open land reserves are smaller than the 100 m due to prohibitive site conditions or limiting extent of CSC property, additional security measures may be required, as determined on a project specific basis.

4.2 Landscaping for the first 100 m within the open land reserve shall consist of grasses, trees and shrubs which minimize the potential for screening an intruder or an escapee.

4.3 Due to specific operational requirements, the reserve of open land can extend over structures such as CSC service buildings, parking lots, flag posts and light standards, and site enhancements. These elements should be located close to the main entrance of the institution and away from inmate outdoor circulation and activity areas in order to limit the potential for contraband transfer over the institutional perimeter.

[1] 4.3 – Common-use and operational signs, Federal Identity Program Manual, March 1990 http://www.tbs-sct.gc.ca/fip-pcim/man_4_3-eng.asp

5. NO MAN ZONE

5.1 This zone is the ground area between the outer perimeter fence and the inner perimeter fence. The distance between the perimeter fences is 7.5 m.

5.2 The no man zone ground surface shall have the top soil removed and covered with filter fabric and crushed stone for a depth of at least 200 mm to minimize plant growth.

5.3 This zone is equipped with an in-ground sensor to detect motion. It is a component of the Perimeter Intrusion Detection System (PIDS), referred to as the Motion Detection System (MDS). To minimize false alarms activated by the MDS, the ground surface between the fences shall be graded to prevent pooling of water and run-off shall be collected as described in section SU-1, Storm and Sanitary Sewers.

5.4 This zone is covered by camera surveillance. The cameras will focus on the section of the fence line which has been disturbed. Cameras are an integrated part of the PIDS.

6. BUFFER ZONE

6.1 A 4-meter buffer zone parallel to the interior side of the inner perimeter fence shall be free of all structures, trees, shrubs and roads, except for road access through the perimeter and connecting interior fences where required.

6.2 Where adjacent to playfields, ceremonial grounds, and gardens, this zone shall be marked by signage informing inmates not to trespass. Fencing shall not be used to demarcate this zone as it only serves to obstruct views from the mobile patrols on the outside of the perimeter. As well, the fence may captures balls which may only encourage retrieval resulting in enforcement and imposition of charges.

6.3 The buffer zone is covered by a separate line of PIDS cameras from those used to cover the no man zone. Similar to the no man zone, the cameras will focus on the section of the buffer zone in which the fence has been disturbed.

7. NO BUILDING ZONE

7.1 With the exception of the Gatehouse, no building shall be closer than 12 m to the inner perimeter fence.

8. NO INMATE ZONE

8.1 This is the area along the perimeter fence which is close to the Gatehouse and functions receiving vehicles. Access to inmates here is generally restricted or highly controlled. There is no specific distance to delimit this zone as it varies depending on the site layout configuration.

8.2 Functions allowing controlled access to inmates within this zone include Visits and Private family visits, both shared with outside visitors.

9. SITE PLANNING AND DEVELOPMENT OF AN INSTITUTION

9.1 Planning of facilities and amenities shall be dictated by time of use and user type. Institutional buildings closest to the gatehouse shall accommodate functions which are inaccessible to inmates or where access is supervised. Those functions requiring vehicle access for servicing and supplies shall also be relatively close to the gatehouse while vehicle access routes shall be away from inmate circulation and activity areas. Evening use functions, housing, playfields, gardens, and ceremonial grounds shall be located furthest from the entrance.

9.2 See item 11 for Landscaping and limited access grounds and item 12 for Playfields and yards. Also see Plate SP-1-1 for idealized site plan which illustrates building relationships.

10. SIGNAGE

10.1 All exterior and interior building signage shall conform to the Federal Identity Program (FIP). The FIP Manual is fully available at:

http://www.tbs-sct.gc.ca/fip-pcim/

10.2 The CSC "Search Sign" shall be located at each public entry leading to an institution. The "Search Sign" is a warning sign as prescribed in the Federal Identity Program Manual[2] (Caution!, Attention! under Type 3). The standard is yellow background with black letters. For the purpose of a reading distance of 30 m and a vehicular speed of 30 km/h, "x" is defined as 50 mm. Therefore, the text letters size is 50 mm (x) and the header letters size is 150 mm (3x). The layout is provided in Table 5 – Standard spaces, 50 mm to 200 mm x-height of section 4.3 of the FIP Manual (see footnote 8). The bilingual text is side by side, the official language on the left side being according to the regional practice. As the font and design follows the Federal Government standards the use of the Department signature or CSC badge is optional.

Attention! You are now entering a Correctional Service Canada reserve and all vehicles and persons on this reserve are subject to search.	**Attention!** Vous pénétrez présentement sur une réserve du Service Correctionnel Canada et tout véhicule et personne sur cette réserve sont sujets à être fouillés.

OR

[2] Federal Identity Program Manual – 4.3 Common-use and operational signs, Treasury Board of Canada, Secretariat, March 1990; http://www.tbs-sct.gc.ca/fip-pcim/documents/man_4_3__p1.pdf and http://www.tbs-sct.gc.ca/fip-pcim/documents/man_4_3__p2.pdf
Federal Identity Program Manual – 4.5 Signage typeface, Treasury Board of Canada, January 1988; http://www.tbs-sct.gc.ca/fip-pcim/documents/man_4_5.pdf

Attention!	**Attention!**
Vous pénétrez présentement sur une réserve du Service Correctionnel Canada et tout véhicule et personne sur cette réserve sont sujets à être fouillés.	You are now entering a Correctional Service Canada reserve and all vehicles and persons on this reserve are subject to search.

Refer to *CAN/CGSB-109.1M-1989*[3] for the sign structure and characteristics.

10.3 All areas restricted only to authorized personnel shall be clearly and boldly identified according to the common-use and operational signs as described in the Federal Identity Program Manual[4]. Refer to section A-9 Interior Signage for interior signage requirements.

11. LANDSCAPING AND LIMITED ACCESS GROUNDS

11.1 Only indigenous plants and locally available materials shall be used.

11.2 All layouts and landscape material shall take into account snow removal, grass cutting, watering and tree and shrub trimming to ensure minimum watering.

11.3 Soft landscaping is encouraged but plant type should be selected so as not to obstruct views. Gentle contouring is also acceptable as are earth berms and timber retaining walls provided they do not facilitate hiding.

11.4 Colour and visual relief can be achieved by the use of flowers beds, which shall be planted and maintained by inmates.

11.5 At medium security level and above, all site furniture shall be secured in place. All walking surfaces shall be of monolithic material or compacted stone dust. Small and light paving materials (brick, concrete pavers, or gravel) shall not be used.

11.6 Positive drainage for the entire site shall be provided with the use of ditches, swales and flumes. All drainage areas shall be designed to be as shallow as possible to allow for ease of maintenance and so not to obstruct visibility.

11.7 The minimum grade slope shall be 3% or gradual slope where natural grade changes exist for grass and landscaped areas.

11.8 Vegetable gardens where provided shall be located in designated areas away from general inmate traffic and playfields. Authorized inmates are permitted access to gardens.

11.9 Fruit trees are not permitted on institutional grounds.

11.10 Sacred Grounds for sweat lodge and ceremonies shall be located in designated areas away from general inmate traffic and playfields. Only authorized inmates are given access to sacred grounds. Firewood used in ceremonies shall be stored under cover and be protected.

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3 CAN/CGSB-109.1M-1989 – Signage System, Extruded Aluminum, Federal Identity Program

4 Page 11 – Federal Identity Program Manual – 4.3 Common-use and operational signs, Treasury Board of Canada, Secretariat, March 1990; http://www.tbs-sct.gc.ca/fip-pcim/documents/man_4_3__p1.pdf

11.11 Snow storage areas shall be located in a manner that does not restrict drainage and visibility. A space wide enough to accommodate tractor power mowers shall be provided between trees and planting beds. Hose bibs shall be provided throughout the site as required on a project specific basis. Underground watering pipes or hoses shall not be used.

12 PLAYFIELDS AND YARDS

Playfields, which often have a high concentration of inmates, generally have their outer bounds located adjacent to the perimeter fence. When planning playfields for new institutions or where housing unit disposition permits at existing, playfields shall be located within an interior courtyard bounded by housing units. Playfields in either location shall be distant from the Gatehouse, service buildings located on the exterior, and parking lots in order not to offer opportunities to covertly approach the perimeter fence line and throw over contraband in proximity of the playfield. Playfields shall also be located distant from Segregation and its yards and from Health Care facilities.

12.2 Playfields are typically grassed except where the activity calls for a hard surface. Compacted fine gravel or stone dust or, a monolithic hard surface such as asphalt is acceptable.

12.3 Mini fenced yards associated with Segregation, maximum security or special population units are provided with an engineered asphalt surface to allow use in all weather, to prevent hiding of contraband, and to facilitate maintenance. The asphalt surface shall extend beyond the containment fence by 900 mm for anti-tunnelling protection and to prevent edge fracture and removal. Poured in place concrete surface may be used on account of seasonal or installation constraints. Use of concrete may be favoured for ease of construction and maintenance where a yard is enclosed by buildings or walls where a wall is intended for screening.

13 FLAG AND FLAGPOST

Rules and protocol for “flying the flag” are fully available at:

http://www.pch.gc.ca/pgm/ceem-cced/etiqtt/101-eng.cfm

Refer to *CAN/CGSB-98.1-2003*[5] for the outdoor use of the National Flag of Canada.

[5] CAN/CGSB-98.1-20011 – National Flag of Canada (Outdoor Use) ICS 99.020.10

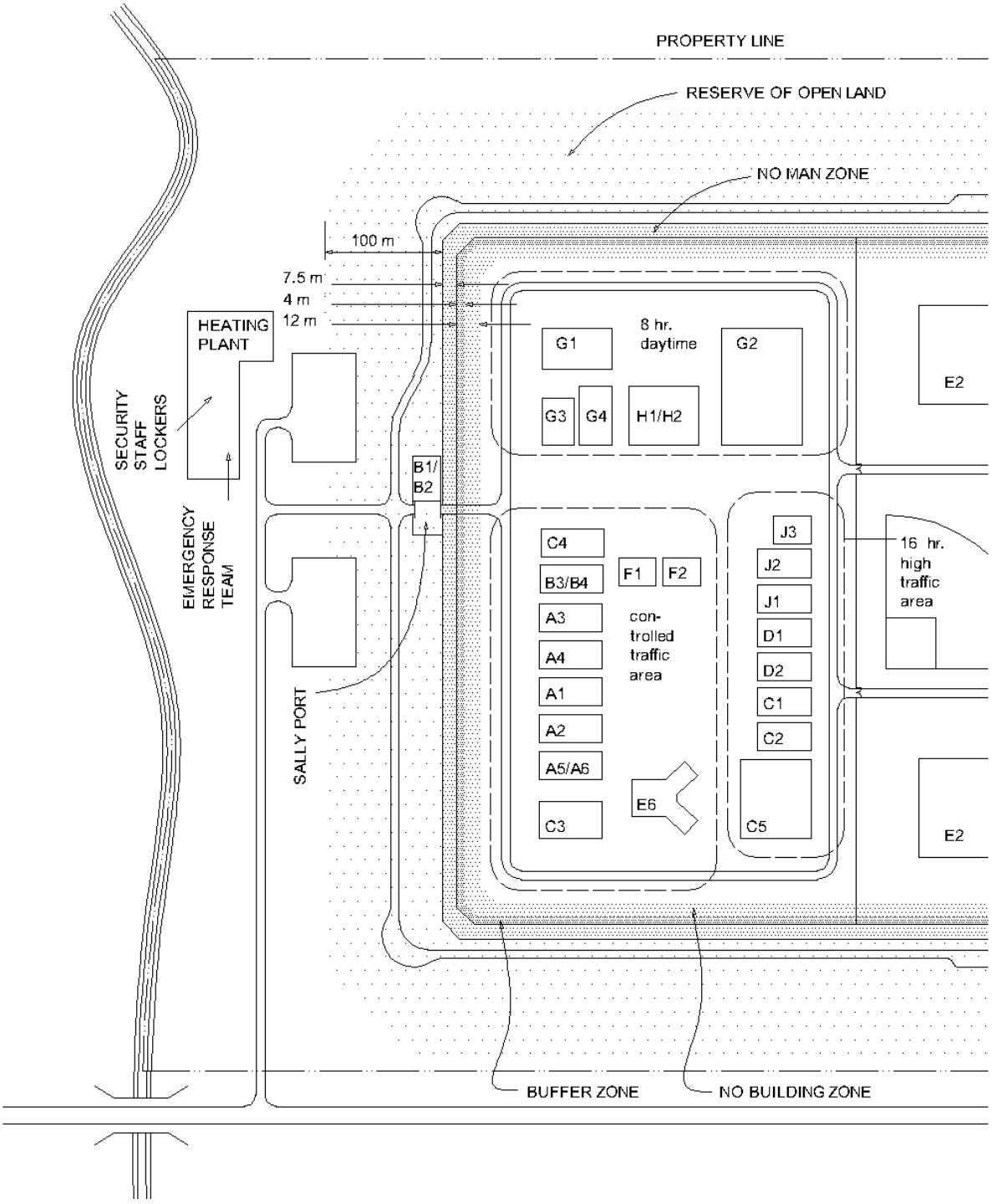
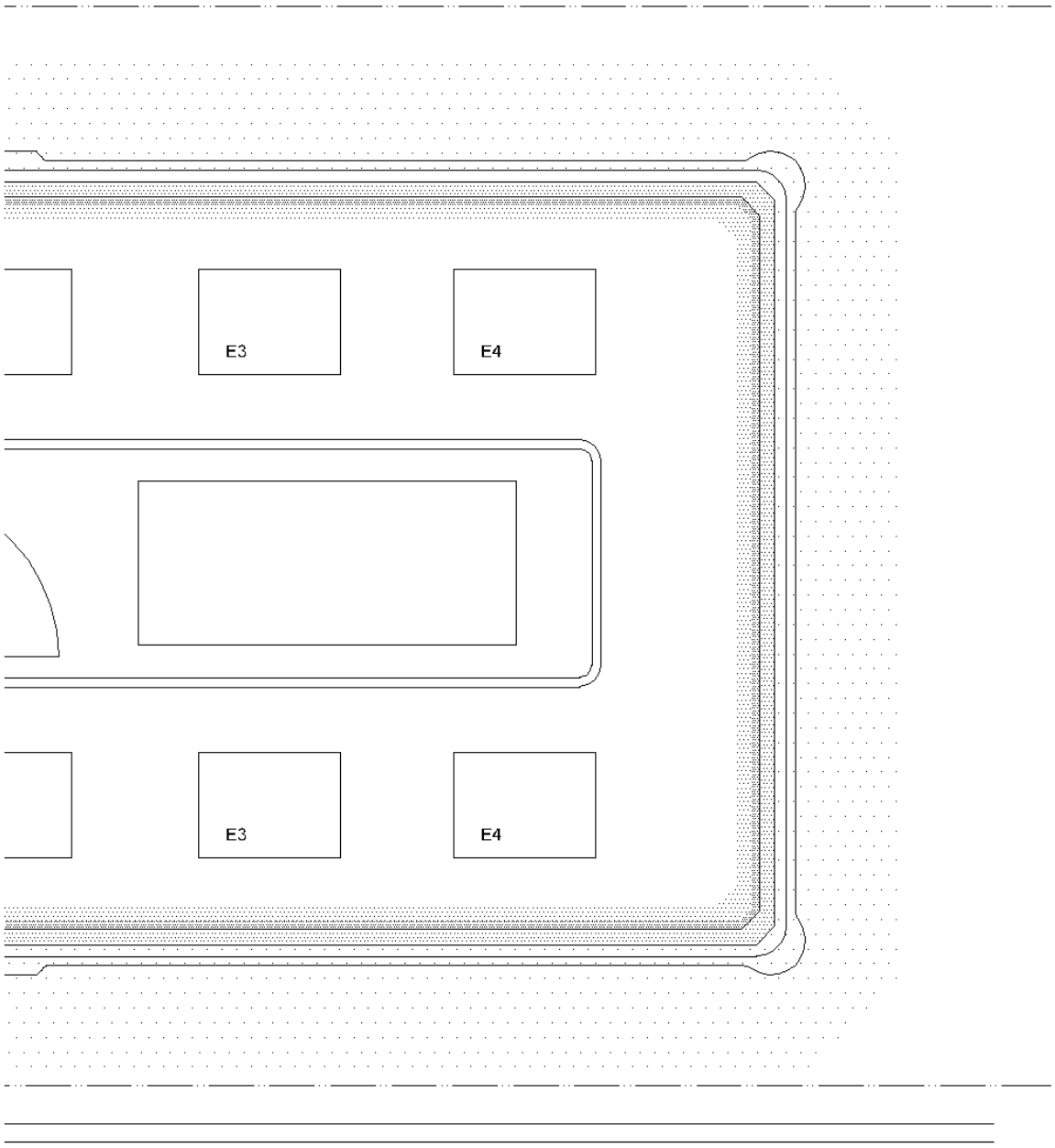

PROPERTY LINE
RESERVE OF OPEN LAND
NO MAN ZONE
100 m
7.5 m
4 m
12 m
HEATING PLANT
SECURITY STAFF LOCKERS
EMERGENCY RESPONSE TEAM
SALLY PORT
B1/ B2
G1
8 hr. daytime
G2
G3
G4
H1/H2
E2
C4
B3/B4
A3
A4
A1
A2
A5/A6
C3
F1
F2
con- trolled traffic area
E6
J3
J2
J1
D1
D2
C1
C2
C5
16 hr. high traffic area
E2
BUFFER ZONE
NO BUILDING ZONE

PLATE SP-1-1


E3
E4
E3
E4

BLE A–1–1 – ORGANIZATION OF DEPARTMENTS

GROUP A – ADMINISTRATION
A1 MANAGEMENT CENTRE
A2 FINANCE
A3 STAFF SERVICES AND TRAINING
A4 ADMINISTRATION AND PERSONNEL
A5 CASE AND SENTENCE ADMINISTRATION
A6 NATIONAL PAROLE BOARD HEARING

GROUP B – SECURITY
B1 EXTERNAL CONTROL (GATEHOUSE)
B2 EMERGENCY RESPONSE TEAM AND ARMOURY
B3 SECURITY ADMINISTRATION
B4 ADMISSIONS AND DISCHARGE

GROUP C – SOCIALIZATION
C1 SOCIAL AND CULTURAL DEVELOPMENT
C2 ARTS AND CRAFTS
C3 PRIVATE FAMILY VISITING
C4 VISITS AND CORRESPONDENCE
C5 RECREATION

GROUP D – SPIRITUALITY
D1 CHAPLAINCY
D2 ABORIGINAL SERVICES

GROUP E – HOUSING
E1 FREE EGRESS – SMALL GROUP ACCOMMODATION (S-2)
E2 RESPONSIBILITY UNITS (S-3)
E3 STRUCTURED SECURITY UNITS – OPEN POST / RANGE (S-4)
E4 STRUCTURED SECURITY UNITS – CLOSED POST / RANGE (S-5)
E5 MAXIMUM SECURITY UNITS (S-6 / S-7)
E6 SEGREGATION UNIT
E7 SPECIAL HANDLING UNIT

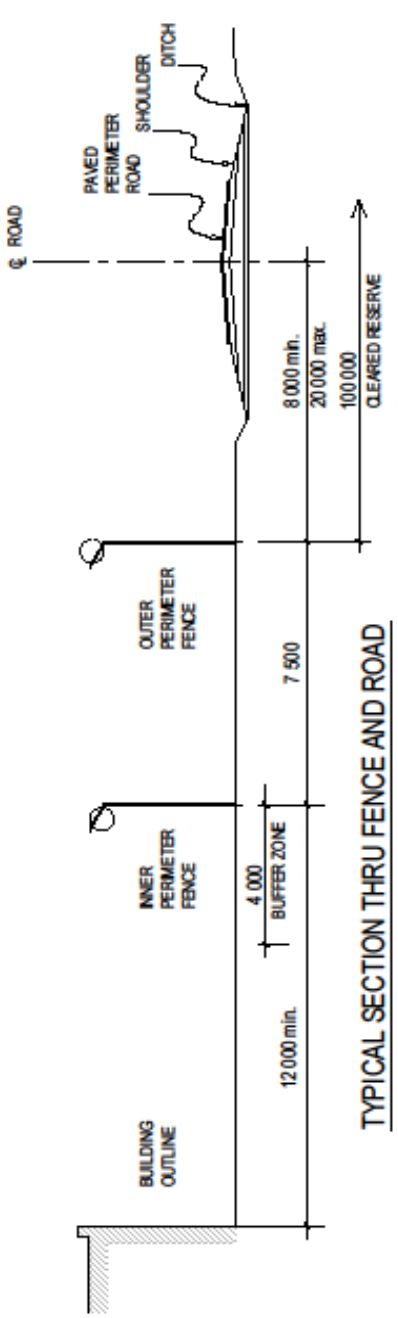
GROUP F – HEALTH CARE
F1 HEALTH CARE CENTRE
F2 MENTAL HEALTH CARE

GROUP G – TECHNICAL SERVICES
G1 MAINTENANCE
G2 FOOD SERVICES
G3 INSTIUTIONAL SERVICES
G4 MATERIAL MANAGEMENT

GROUP H – OCCUPATIONAL DEVELOPMENT PROGRAMS
H1 OCCUPATIONAL DEVELOPMENT PROGRAMS (ODP) CORE
H2 CORCAN

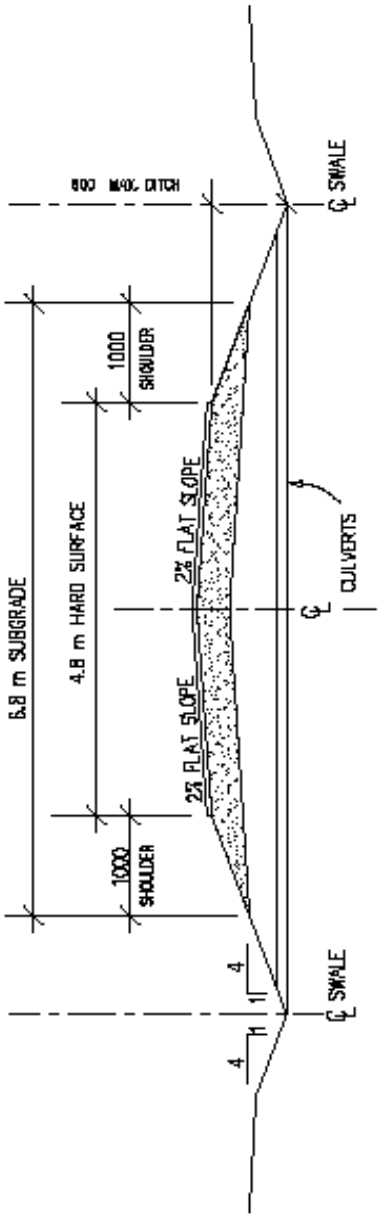
GROUP J – EDUCATION AND PERSONAL DEVELOPMENT

J1 EDUCATION
J2 CORRECTIONAL PROGRAMS
J3 LIBRARY



TYPICAL SECTION THRU FENCE AND ROAD

PLATE SP -1-2 - SECTION THROUGH FENCE AND ROAD



PERIMETER ROAD TYPICAL SECTION

SP-2 SITE - FENCE

1. SCOPE

This section provides performance criteria and conforming specifications for all fences related to institutions of security levels medium, maximum and multi-level inclusive. There are no special requirements for fences at minimum institutions.

It is imperative that all fence projects, either perimeter or interior, are submitted to the office of the Director Facility Planning and Standards at NHQ for review and approval.

2. RELATED SECTIONS

2.1 Technical Criteria Document sections:

SP–1 – Site Planning and Development
SP–3 – Gates/Sally Ports
SP-4 - Exterior Lighting
SP–5 – Traffic Circulation and Parking
ST–1 – Guard Towers
& any sub-section referring to the Perimeter Intrusion Detection System (P.I.D.S.)

2.2 National Master Specification Section

01 35 13.16 – Special Project Procedures for Detention Facilities
28 01 10 – Operation & Maintenance of Electronic Access Control & Intrusion Detection
28 16 00 (13705) – Intrusion Detection
32 31 13 – Chain Link Fences and Gates
32 31 13.53 – High-Security Chain Link Fences and Gates

3. EXTERNAL BOUNDARY FENCES

External boundary (property) lines shall not be fenced unless specific site conditions warrant it. The type of fence in such locations will be project specific.

4. PERIMETER SECURITY FENCES

4.1 Performance Criteria

4.1.1 The institution will be enclosed by a double chain link fence perimeter supported by intrusion detection and camera system, and mobile patrol on the exterior of the perimeter. The perimeter fences form the last physical obstacle to escape from the institution. The design of the fence system shall be such that an escapee shall not be able to breach the perimeter in less than 45 seconds. This time duration is based on a maximum time for the perimeter security mobile patrol to respond after the first signal following a detected disturbance of the fence at the Main communication control post (MCCP). The optimal reaction time for the mobile patrol is 30 seconds.

4.1.2 Fences shall be erected in straight lines from corner to corner for direct viewing by camera. The corners of the perimeter shall be truncated at 45° to allow suitable placement of camera poles and cameras to afford optimal viewing

between the fences and on the interior of the Inner Perimeter Fence. In addition, the truncated corners allow for a gentler curve of the patrol road.

4.1.3 To render climbing more difficult, the fence fabric shall be installed on the institution side of the fence posts. Sharp corners of less than 120°, shall be avoided except where fences intersect.

4.1.4 For fences equipped with a Fence Detection System (FDS), the fence shall balance fabric tension to ensure fabric vibration travel across posts while not causing excessive false alarms. Fabric vibration terminates at strain post locations where the fence fabric ends thus allowing zone separations for the PIDS.

4.1.5 Special attention shall be paid to sloped sites to ensure that gaps do not develop between the ground surface and the lower fence rail. Where necessary, due to severe ground slope longitudinally, fencing may be stepped, but the minimum height of the fence shall be maintained at all times. Ground slope across the fence line shall be minimized to prevent erosion under the perimeter fences.

4.1.6 Water shall be prevented from pooling between the perimeter fences, as this could affect the operation of the Motion Detection System (MDS). For special underground drainage requirements relating to perimeter fences, see sections SU-1 Storm and Sanitary Sewers.

4.1.7 Barbed tape concertina (BTC) wire shall be installed in such a manner that it prevents the passage of a person across the barbed coils. (See plates SP-2-2 and SP-2-3).

4.1.8 Where interior fences intersect the Inner Perimeter Fence, the interior fence shall be designed to prevent it from being used to aid in crossing the Inner Perimeter Fence. To achieve this, the interior fence shall be equipped with:

- a Fence detection system (FDS) for a length of 2.5 meters. The fence fabric shall extend for that length and be connected to a strain post so that the vibration does not travel beyond.
- and BTC on both sides on the fence No gap between posts or fabric shall exceed 125 mm.

4.1.9 To inhibit tunnelling under the Inner Perimeter Fence, a ground barrier shall be provided by installing either a continuous concrete footing or a concrete or asphalt sidewalk on the institution side. (See Plate SP-2-1). Roadways crossing perimeter fence lines shall be topped with asphalt which also serves as a ground barrier.

4.1.10 The fence system comprising foundation, line, strain, corner and gate posts shall meet local environmental conditions. Fence systems shall be engineered to resist local wind and snow conditions.

4.1.11 Where a building or other structure interrupts the perimeter fence run, the design to ensure perimeter integrity shall be approved by the issuing authority.

4.1.12 Where a perimeter comprises or integrates a wall, the design to ensure perimeter integrity shall be approved by the issuing authority.

4.2 Conforming Specifications

4.2.1 Perimeter fences shall consist of two (2) parallel fences, erected in straight lines, with a 7.5-m gravel strip between the fence lines. For retrofit installations, where it has been proven that a lesser separation has been effective, the existing spacing shall be maintained. Height of both fences, excluding overhang arms, shall be 3.6 m. Corners shall be truncated and the maximum length of the interior fence on the truncated line shall be 25 m.

4.2.2 No structure, with the exception of the Gatehouse and guard towers, shall be closer than 12 m to the Inner Perimeter Fence.

4.2.3 The area between the perimeter security fences shall be free of topsoil and be graded to a slope of 2% from the interior to the Outer Perimeter Fence. The surface will then be covered with a filter fabric and topped with a mix no larger than 20 mm crushed stone to a depth of 200 mm. For the Outer Perimeter Fence an area of 500 mm on each side of the fence shall be stabilized to a depth of 300 mm with a compaction of 95% corrected maximum dry density to hinder run off erosion and tunnelling by inmates.

4.2.4 All chain link fencing shall be installed in accordance with the *National Master Specification (NMS) 32 31 13* [6] and *CAN/CGSB-138.3-96* standard[7]. Where there is a conflict between the NMS and this criterion, the TCD shall prevail.

4.2.5 Chain link fence fabric shall conform to the following specifications[8]:

4.2.5.1 Wire Size: 4.8 mm (min) (6 Gauge)

4.2.5.2 Size of mesh: 50.8 mm

4.2.5.3 Height of fence fabric: 3600 mm

4.2.5.4 Barbed edges top and bottom

4.2.5.5 Average mass of zinc coating to be not less than 610 g/m^2 of uncoated wire

4.2.5.6 Breaking tensile strength to be 10,000 N·min.

4.2.6 Wire mesh shall be continuous from top to bottom and shall be applied on the institutional compound side of the posts.

4.2.7 Fence fabric shall be pulled taut before fixing in place. Tautness, when fixed in place, is to be established by pull tests. The application of a 12 kg perpendicular pull at the midpoint of the mesh panel (midpoint of posts/rails) shall show a displacement of no more than 30 mm from the fence at rest plane.

4.2.8 Posts, (corner, gate, strain, line) shall conform to *CAN/CGSB-138.2-96* [9], galvanized steel pipe.

4.2.8.1 Posts shall be spaced a maximum of 2.5 m apart.

4.2.8.2 Line post minimal size shall be 73 mm O.D. 8.6 kg/m.

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[6] National Master Specification 32 31 13 – Chain Link Fences and Gates (2004/12/31), there is also specifically Master format reference number 32 31 13.53 for High-Security Chain Link Fences And Gates

[7] CAN/CGSB-138.3-96 – Installation of Chain Link Fence

[8] Refer also to: CAN/CGSB-138.1-96 – Fabric for Chain Link Fence

[9] CAN/CGSB-138.2-96 -- Steel Framework for Chain Link Fence

4.2.8.3 Strain post minimum size shall be 114.3 mm O.D. 15.92 kg/m. Strain posts shall be spaced not more than 60 m apart.

4.2.8.4 Corner and gate post minimum size shall be 143.3 mm O.D. 21.0 kg/m.

4.2.9 Galvanized steel arms shall be provided on all posts where barbed concertina is to be installed, as shown on Plate SP-2-2 and SP-2-3.

4.2.10 Bottom and top rails shall be 42.2 mm O.D. minimum, 3.4 kg/m.

4.2.11 Tie wires shall be 3.7 mm diameter (9 gauge) galvanized steel wire to secure chain link fabric to bottom rail, top rail and line posts at 300 mm spacing.

4.2.12 An intermediate galvanized anchor shall be used to secure the bottom rail to the ground barrier, where such a barrier is installed. This anchor shall limit vertical movement of the bottom rail to a maximum of 125 mm.

4.2.13 Intermediate rails shall not be used.

4.2.14 Tension bars used for holding the ends of the fence fabric at the location of strain posts and corner posts shall be 5 mm x 20 mm minimum x 3600 mm galvanized steel.

4.2.15 Tension bar bands shall be 3 mm x 20 mm minimum galvanized steel and spaced vertically at 300 mm o.c.

4.2.16 Where nuts and bolts are required for fastening, nuts shall face compound exterior and be torqued tight.

4.2.17 Where tension cables are used at corner, end, gate, strain posts, and fittings shall be of galvanized steel.

4.2.18 Barbed tape concertina (B.T.C.) shall be galvanized tape 20 x 0.5 mm clenched around a 2.5 mm diameter spring steel galvanized core wire to form a concertina coil with a nominal exterior coil diameter of 710 mm. The coil, when installed, shall have a minimum diameter of 635 mm. The barbed concertina shall have 20 mm long blade type barbs measured from tip to tip of the blade, and barb clusters shall be spaced approximately 45 mm on centre (see Plate SP-2-3). The concertina shall be formed by clipping adjacent loops of single helical coils together at a minimum of three (3) points on the circumference. Clips shall be galvanized. The resulting coil, when stretched, shall form a cylindrical pattern. The loop spacing shall not exceed 230 mm.

4.2.19 For concertina coil support at fence top, two barbed wires stretched and fixed to post arms shall be provided. Barbed wire shall consist of two strands of 12 gauge wire with 4 point barbs at 130 mm spacing, all galvanized.

4.2.20 Concertina coils are to be turned onto a secondary internal fence for a distance of 2.5 m when such a fence meets the perimeter fence. (See plate SP-2-6).

4.2.21 Installation of barbed tape coils shall be as follows:

4.2.21.1 The barbed tape concertina is to be supported and tied at 230 mm spacing onto each of the barbed wire. Additional coils that are required on fences are to be tied as shown on Plate SP-2-3.

4.2.21.2 A second row of BTC may be installed on fence tops at existing sites due to local conditions with the approval of the issuing authority (see plate SP-2-3)

5. INTERIOR FENCES

5.1 Area and Yard Fences

5.1.1 Performance Criteria

5.1.1.1 Interior fences located at Maximum security institutions and those defining segregation yards at Mediums and Maximums shall be a maximum of 3.6 m in height topped with steel arms, barbed wire, and BTC. Other fenced areas at Medium Institutions may be topped with BTC where the fence separates inmate high activity from vehicle circulation areas and loading bays.

5.1.1.2 The use of fences and those topped with BTC for refuge corridors for staff evacuating housing units will be evaluated based on a Threat Risk Assessment. Proposed works must be submitted for approval to the issuing authority.

5.1.1.3 The use of fences and those topped with BTC for separation of housing unit types in mediums such as S-3, S-4 and S-5 will be evaluated based on a Threat Risk Assessment. Proposed works must be submitted for approval to the issuing authority. See item 6 for Separation of distinct populations as in multi-level

5.1.1.4 Where interior fences intersect the Inner Perimeter Fence, refer to item 4.1.8 above and plate SP-2-6.

5.1.1.5 Tunnelling barriers are not required on interior fences except where they are topped with BTC. Barrier type shall be compacted gravel to 300 mm on either side extending 900 mm.

5.1.1.6 See chapter SP-1 Site Planning and Development, item 12.3 for mini yard ground surface and anti-tunnelling protection.

5.1.1.7 Fences shall not be used to demarcate the buffer zone.

5.1.2 Conforming Specifications

5.1.2.1 Materials shall be similar to those specified for the perimeter fences (see item 4.2).

5.1.2.2 For fences where post steel arms or outriggers are not provided, posts shall be provided with galvanized post caps.

5.1.2.3 Two coils of BTC shall be installed on the top of Segregation exercise yard fence as indicated on Plate SP-2-3. A flat solid wall shall be provided where visibility and contact is at issue with approval of the issuing authority.

6. SEPARATION OF DISTINCT POPULATIONS IN ONE INSTITUTION (MULTI-LEVEL)

Types of Multi-level and Fencing Needs

Multi-level institutions vary in the type of populations they accommodate. Two populations such as minimum and medium may be fully integrated with no physical separation or fencing required. Control and supervision is managed through operational means.

A second type of multi-level institution accommodates several populations, short term and assigned to a specialized program. Inmates here have limited access to the institution at large and have restricted movement. The housing units accommodating these populations are generally self-contained integrating staff and related program areas including mini yards. These units do not require fenced separation as movement outside of the units are under escort and limited to individual or small groups. Yards for these units are fenced and topped with BTC.

A third type of multi-level is where a distinct smaller population as part of a specialized program remains largely in their unit and does not mix with the general population which has normal movement to program and activity areas. The specialized program unit is also self-contained which includes mini yards. The mini yards of this unit are fenced and topped with BTC while the complete unit is separated from the rest of the institution by a fence but without BTC topping. The fenced mini yards here do not form part of the separation fence.

7. EXTERIOR SERVICE COMPOUND FENCE

7.1 Performance Criteria

Where bulk fuel storage (propane and gasoline) is provided, the storage area shall be fenced (see section SP-5, Traffic Circulation and Parking).

7.2 Conforming Specifications

7.2.1 Materials will be similar to those specified for the perimeter fences (item 4).

7.2.2 Fence height shall be 2.5 m.

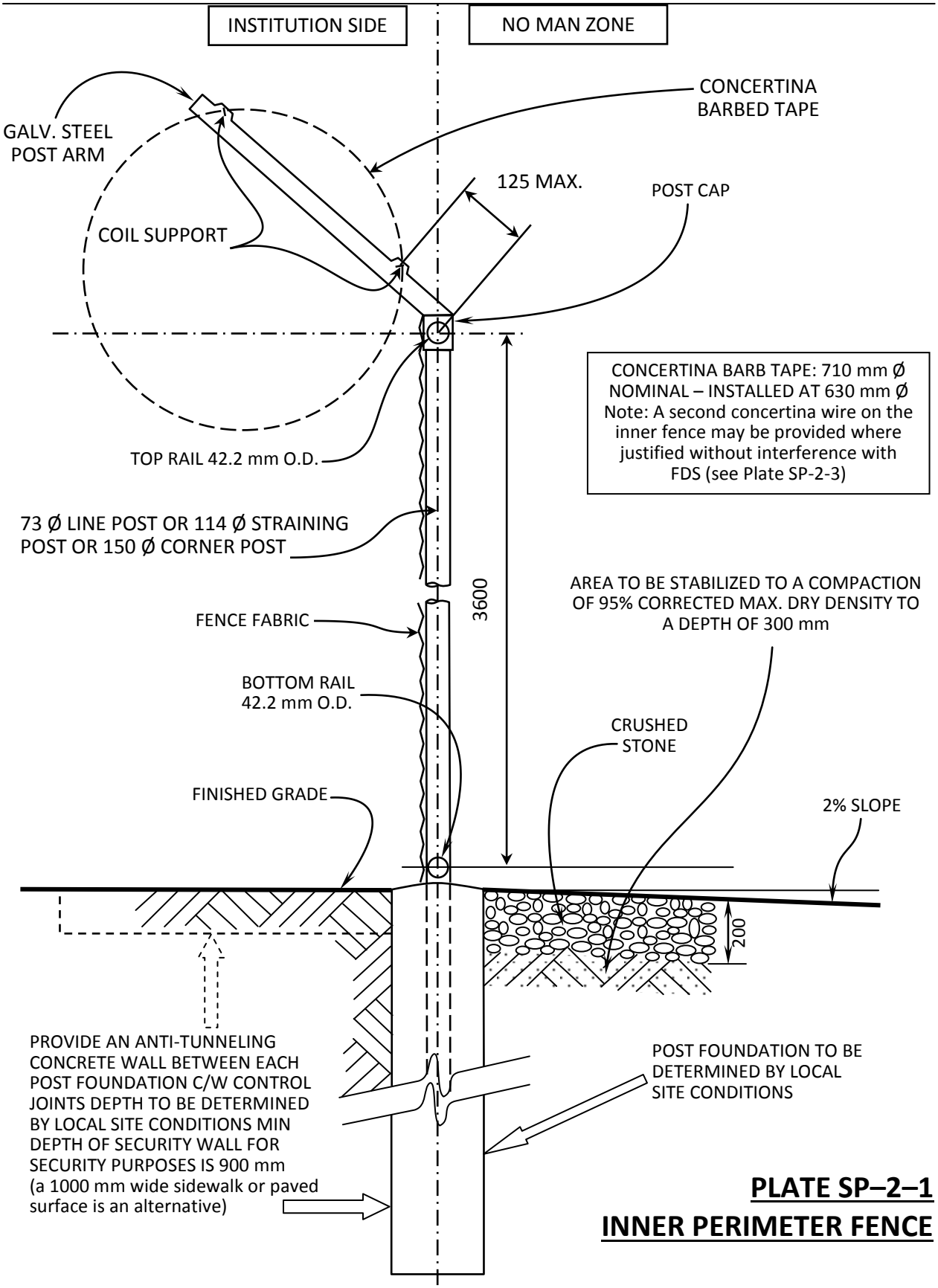


PLATE SP–2–1
INNER PERIMETER FENCE

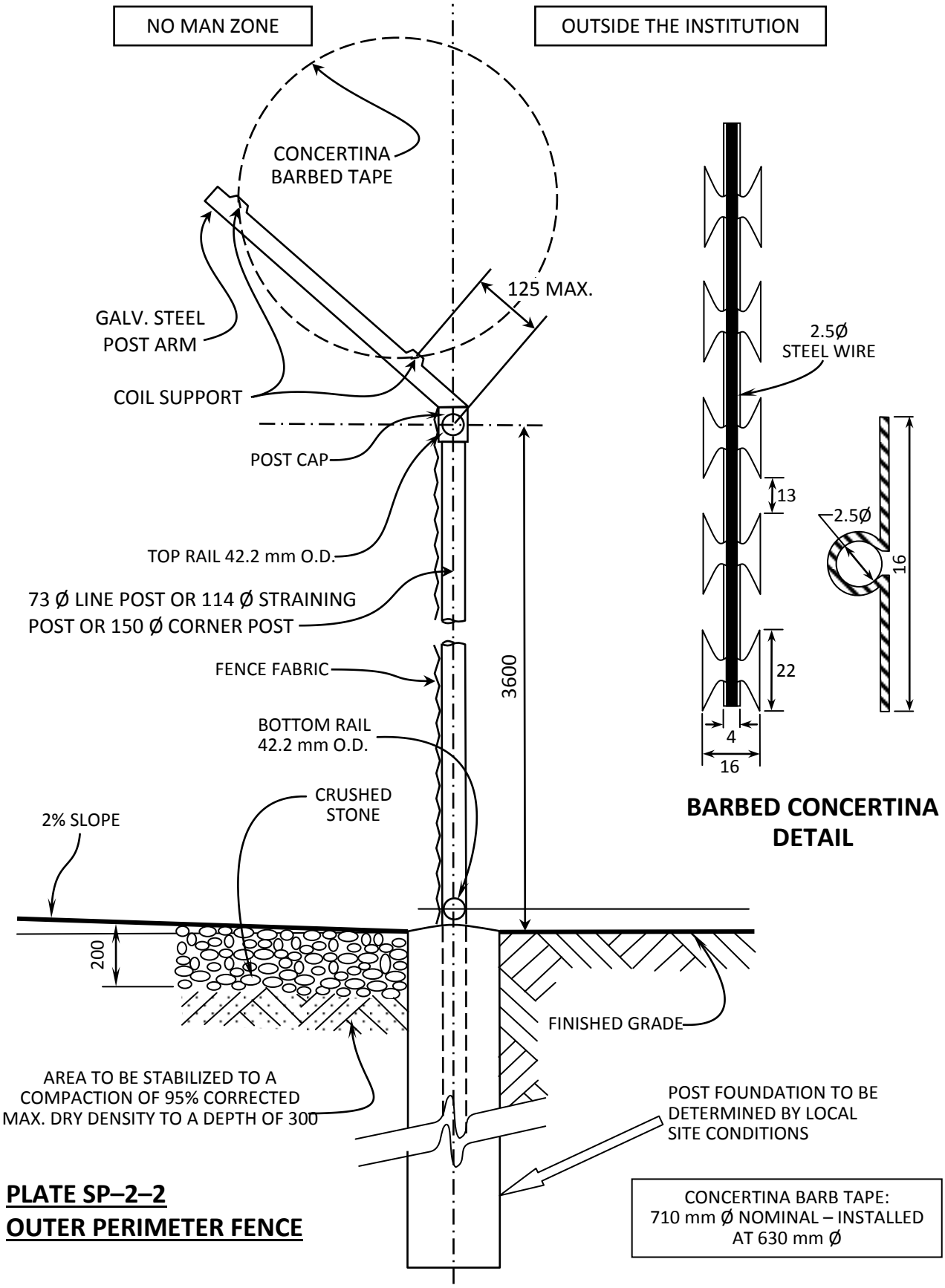


PLATE SP–2–2
OUTER PERIMETER FENCE

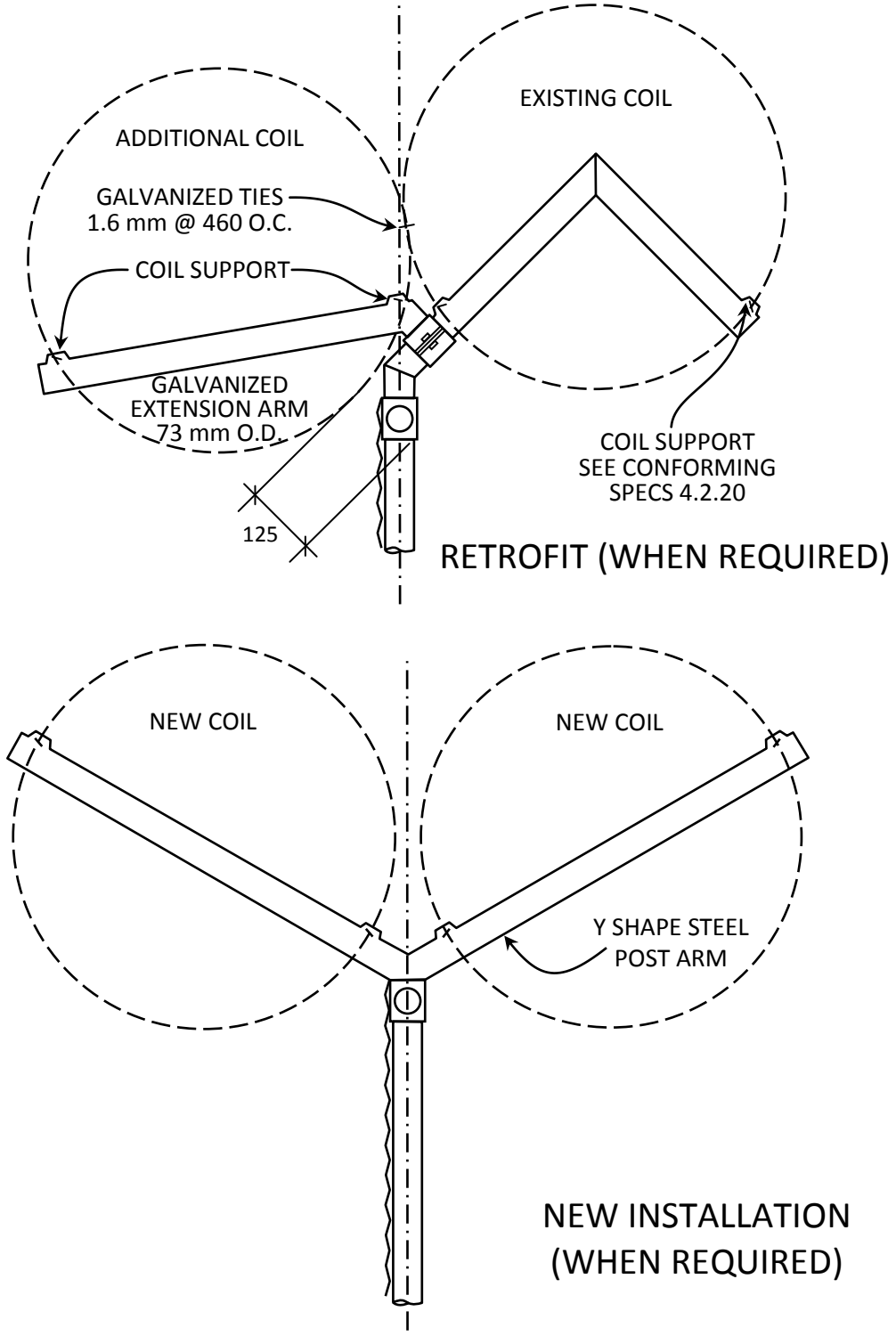


PLATE SP–2–3 – INNER FENCE WITH A SECOND CONCERTINA TAPE

CONCERTINA BARB TAPE: 710 mm Ø NOMINAL – INSTALLED AT 630 mm Ø

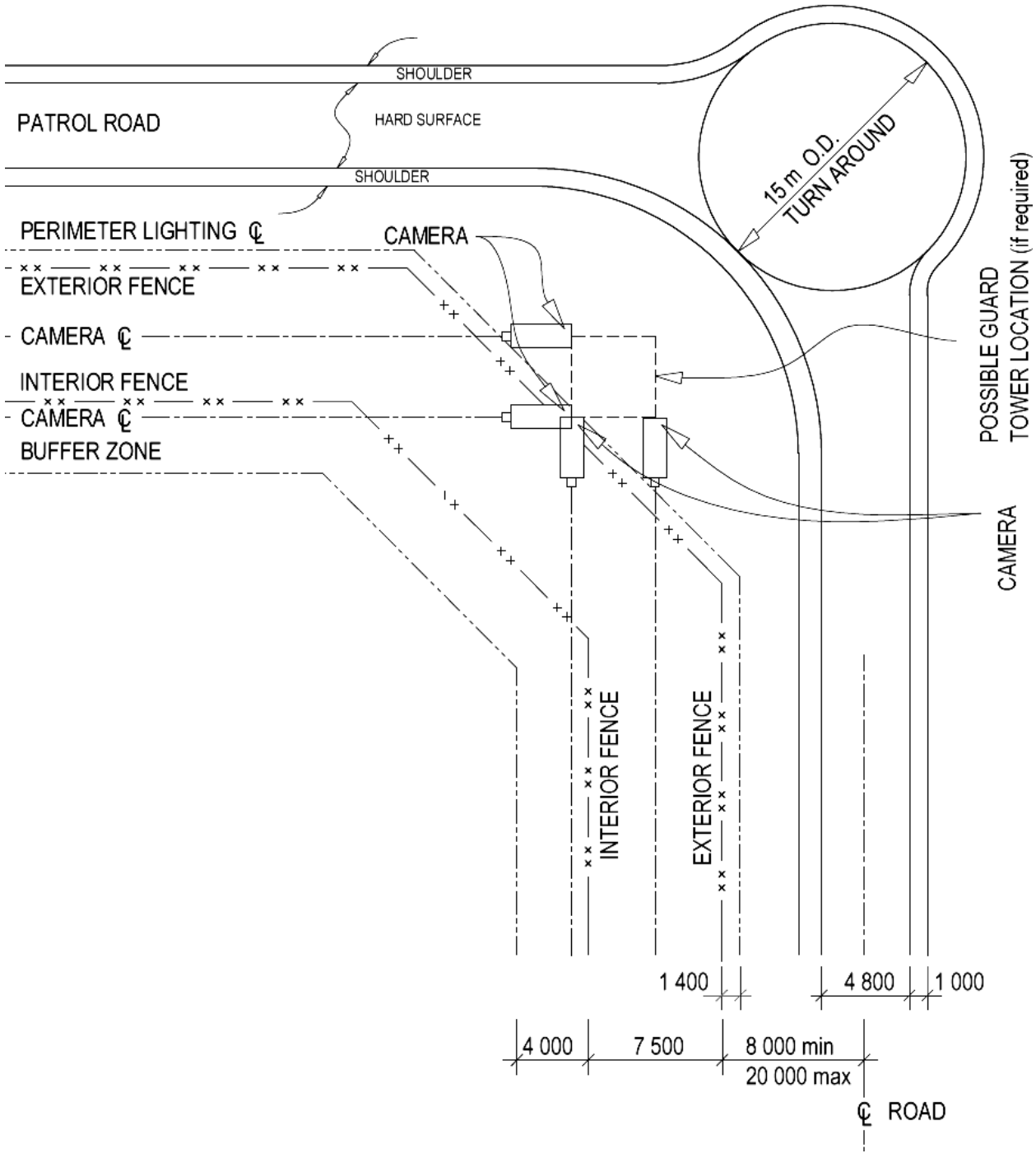


PLATE SP–2–4 – TYPICAL PERIMETER FENCE CORNER WITH TOWER

NOTE: CAMERA LINES ARE FOR INFORMATION PURPOSES ONLY

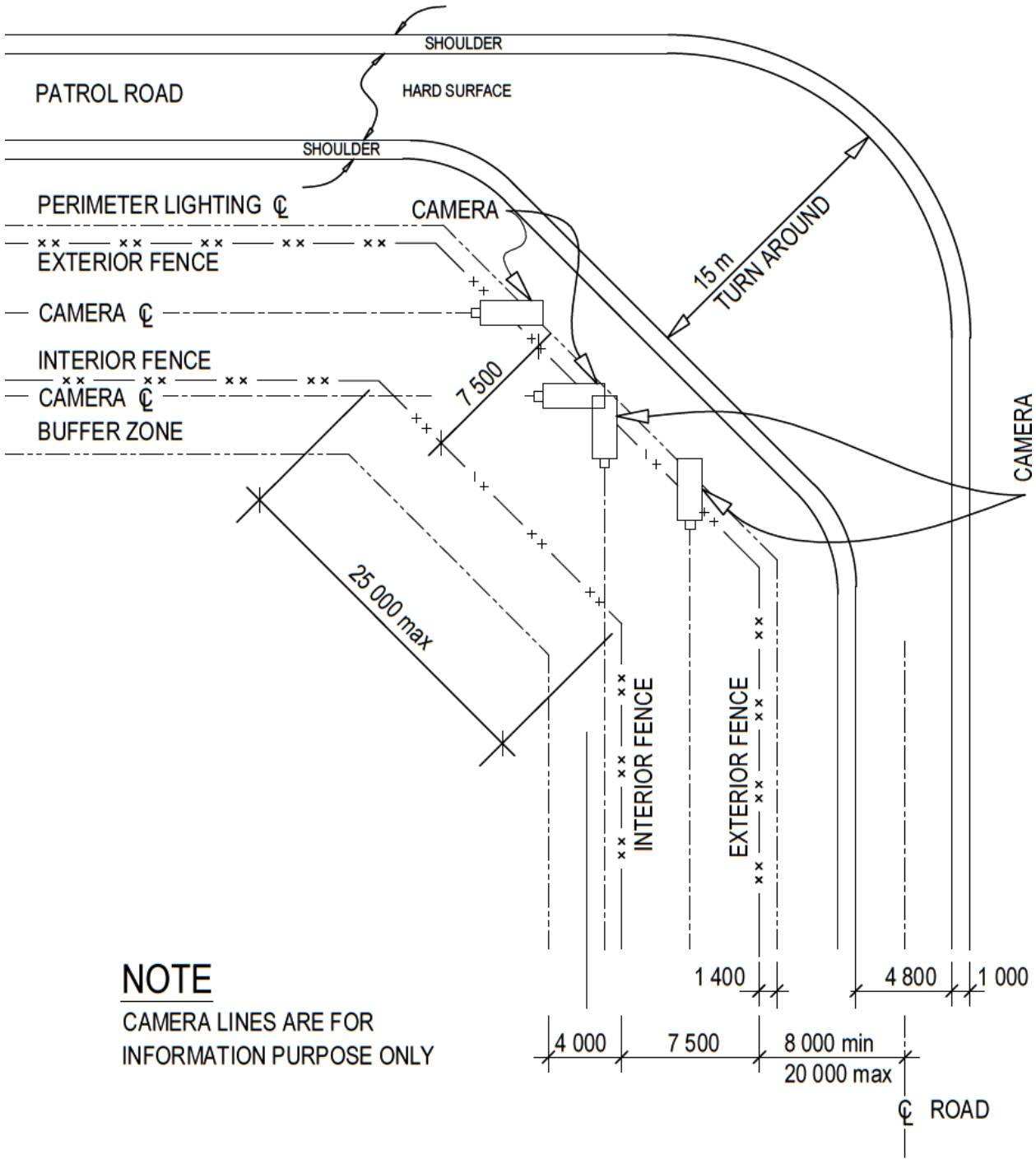


PLATE SP–2–5 – TYPICAL PERIMETER FENCE CORNER WITHOUT TOWER

CAMERAS ARE MOUNTED ON OUTRIGGERS OVER THE CONCERTINA

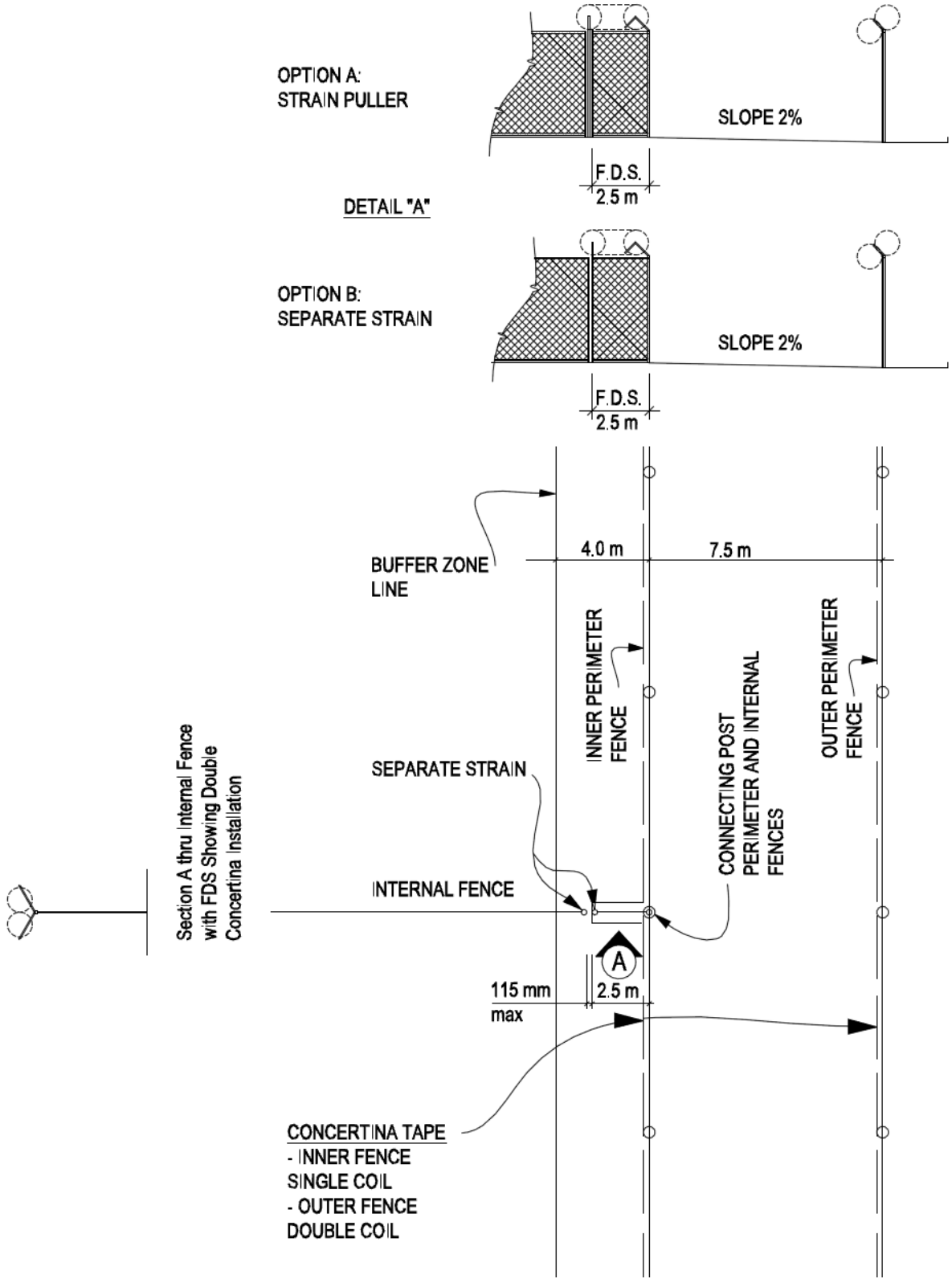


PLATE SP–2–6 – INTERNAL FENCES INTERSECTING THE INNER PERIMETER FENCE – DETAILS

SP-3 SITE – GATES/SALLY PORT

1. SCOPE

This section outlines requirements for vehicle and pedestrian access and egress control for institutions with a secure perimeter as at medium, maximum and multi-level institutions.

Access and egress control for open minimum institutions involves signage and reporting to a 24 hr Duty office but does not include fencing and gates. Refer to A-12 Control posts for functional requirements as well as the CSC Accommodation Guidelines.

It is imperative that all Gate projects, on either perimeter or interior fences, are submitted to the office of the Director Facility Planning and Standards at NHQ for review and approval.

2. RELATED SECTIONS

7.3 Technical Criteria Document sections:

SP–1 – Site Development
SP–2 – Fences
A–6 – Hardware
A–10 – Contraband Control Systems
A–12 – Control Posts and Dedicated Security Routes

2.1 National Master Specification Section

01 35 13.16 – Special Project Procedures for Detention Facilities
08 34 56 – Security Gates
32 31 13 – Chain Link Fences and Gates
32 31 13.53 – High-Security Chain Link Fences and Gates
34 71 13 – Vehicle Barriers
34 71 13.16 – Vehicle Crash Barriers
34 75 13.13 – Active Vehicle Barriers

2.2 ASTM Standards

F2656–07 – Standard Test Method for Vehicle Crash Testing of Perimeter Barriers

3. ACCESS CONTROL SECURITY REQUIREMENTS

3.1 All new institutions equipped with a fenced perimeter shall have one entrance point for pedestrian and vehicle traffic, referred to as the Principal Entrance.

3.2 Because the Principal Entrance may at some time be inoperable, one Emergency Vehicle Entrance shall be provided, to be located at a point convenient for vehicle access. This Emergency Vehicle Entrance can have either a Sliding Gate (Section 5.1) or a Swing Gate (Section 5.2).

3.3 Vehicle access shall be provided into the area between the inner and Outer Perimeter Fences for snow clearing and maintenance of the Motion Detection System (MDS). Snow build up between the fences can adversely affect the operation of the MDS.

4. PRINCIPAL ENTRANCE

4.1 Definition

The Principal Entrance is formed by a Gatehouse for pedestrian traffic control and an open air chain-link fence compound with inter locking gates for vehicle traffic control (vehicle Sally Port). The Gatehouse contains the Principal Entrance Control Post and a reception station from which staff supervise all traffic in and out of the institution and operate by remote control all gates and doors. For detailed requirements see A-12 Control Posts and Dedicated Security Routes. At institutions where a separate vehicle service entrance Sally Port exists, Sally Port gates are remote operated from an adjacent tower or a post within the Sally Port. The tower or ground post officer also observes the inspection of vehicles and assures the safety of the vehicle inspection officer.

4.1.1 All vehicle Sally Ports shall be equipped with sliding gates. The sliding gates shall be remote controlled from the Principal Entrance control post and interlocked to prevent simultaneous unlocking. The sliding gates control must provide for the opening of one of the gate only when the other gate is in its latched position. Both gates shall be also capable of manual unlocking and opening.

4.1.2 Vehicle Sally Ports shall be sized to include an inspection area, to facilitate a thorough inspection of vehicles, which can hold in width two van type trucks (8.5 m min.), and hold one semi trailer truck in length (23 m min.).

4.1.3 In order to prevent forced drive through of vehicles, the exterior gate of the vehicle Sally Port shall be equipped with a crash barrier (see section 4.4 and Plates SP-3-6 to SP-3-8). The width of the Sally Port shall be sized to accommodate the crash barrier in the open position.

4.1.4 All Principal Entrance pedestrian traffic shall be physically separated from vehicular traffic.

4.1.5 Where vehicle access into the area between the perimeter fences is provided from the vehicle Sally Port, the gates shall be swing type, manually operated and lockable with a padlock.

4.1.6 All pedestrian traffic through the Principal Entrance, including traffic between the vehicle Sally Port and the pedestrian Sally Port, shall be through swing gates. Principal Entrance pedestrian gates shall be remote unlocking, self closing and locking, and capable of manual unlocking.

4.1.7 To allow continuous CCTV coverage of the area between the perimeter fences while maintaining a minimum number of cameras, the Gatehouse building shall be sited on the outside of the Outer Perimeter Fence with one face of the building flush with that Outer Perimeter Fence.

4.1.8 See Plate SP-3-1 for a typical Principal Entrance layout.

4.2 Crash Barriers

4.2.1 Crash barriers for Sally Port sliding gates shall be connected to the interior side of the exterior gate or the rack and pinion rail depending on the gate operator type and shall be operated simultaneously with the remote operation of the gate**.**

4.2.2 In order to resist vehicle impact, crash barriers shall be made of a steel I-beam or rectangular tubing supported on anti friction rollers on heavy uprights. In a test equivalent to the US Department of State K4 certification[10] (6 804 kg @ 48.3 km/hr or 15,000 lbs @ 30 mph) the vehicle must be inoperable after hitting the crash bar; disabling the vehicle being the main purpose.

4.2.3 Three heavy engineered uprights support the crash barrier and as well serve as bollards protecting the adjacent fence and gate posts. In either open or closed gate position, the crash barrier is supported by 2 uprights.

4.2.4 If crash barriers are used for emergency gates on the perimeter, they shall be made of a simple beam or rectangular tubing with a counter weight mechanically lifted and lockable in closed position with the use of a security padlock.

4.2.5 Gates having integrated crash bar or crash cables system are acceptable if they meet M30 designation of *ASTM F2656-07*[11], K4 certification of the US Department of State (see footnote 1) or the European equivalent.

4.2.6 See Plates SP-3-3 to SP-3-5 for typical Sally Port crash barriers.

5. FENCE GATES

5.1 Vehicle Sliding Gates

5.1.1 The size of each gate shall provide for a 4 m wide x 4.5 m high clear opening.

5.1.2 Gate chain link fabric shall match perimeter fence. (See section SP-2, Fences).

5.1.3 Gate framing members shall be 73 mm O.D. pipe weighing 8.6 kg/m welded and drained.

5.1.4 Motorized gates shall be capable of moving at a speed of 150 mm/s.

5.1.5 Gate shall have three point locking (top, bottom and middle) or be locked by way of rack and pinion mechanism and a vertical channel to clasp the gate.

5.1.6 Locking column shall be equipped with an emergency manual control mechanism located for easy access.

5.1.7 Operator and track shall be protected and electrically heated to ensure all weather operation. In rack and pinion system (or “drive rail” operator) the teeth of the rack can be unprotected provided that they are on the lower side of the rack and visible to the operator.

5.1.8 Outer perimeter gates with connected crash beams shall be designed to take the additional weight into account.

5.1.9 For gates operated by an overhead chain drive system, a guide shall be provided at the bottom of the gate running in a channel.

5.1.10 Motors shall be located low to the ground to facilitate maintenance

5.1.11 All gate components shall be galvanized.

---

[10] US Department of State SD–STD–02.01, Revision A , March 2003, Test Method for Vehicle Crash Gate Testing of Perimeter Barriers and Gates

[11] ASTM F2656–07, Standard Test Method for Vehicle Crash Testing of Perimeter Barriers, M30 Designation: Medium-duty truck (M) 6800 kg @ 50 km/h

5.1.12 All security hardware shall be in accordance with chapter A-6, Hardware of the present document. All other components shall be in accordance with the Fences section of this criterion.

5.1.13 See Plates SP-3-2 and SP-3-3 for a typical gate installation.

5.2 Vehicle Swing Gates (Perimeter and Internal Fences)

5.2.1 Gates shall consist of a pair of 2 m wide by 4.5 m high sections, for an opening of 4 m wide X 4.5 m high, except where municipal by law or sufficient height and width for local emergency vehicles (fire trucks) dictate otherwise[12].

5.2.2 The swing direction of gates shall be based on road access design and snow removal constraints.

5.2.3 Any gap between the bottom rail of a gate and the ground shall not exceed 125 mm. Where gates are located on a fence equipped with a ground barrier, this barrier shall be continuous.

5.2.4 The chain link fabric for gates shall match that of the fence (see section SP-2, Fences).

5.2.5 Gate framing shall be as per item 5.1.3 above.

5.2.6 There shall be three gate hinges and they shall be of standard quality. Foot, mid height, and top locking shall be accomplished with either detention grade cremone locksor engineered mechanism and locked with the use of padlocks.

5.2.7 Plate SP-3-7 illustrates a typical design for vehicle swing gate.

5.3 Pedestrian Gates (Perimeter and Internal Fences)

5.3.1 The size of each swing gate shall provide for a 1.2 m wide x 2.1 m high clear opening.

5.3.2 Items 5.2.2, 5.2.3 and 5.2.4 noted above for vehicle swing gates shall apply.

5.3.3 Swing gate framing members shall be 43 mm O.D. pipe weighing 3.4 kg/m.

5.3.4 Swing gates shall be manually operated with security key locks when gates are used daily. Principal Entrance gates shall be remote unlocked and equipped with closers. Infrequently used gates shall be security padlocked.

[12] For example, in Ontario the *Highway Traffic Act* Section 109 stipulate a maximum height of 4.15 m by a width of 2.6 m, which is similar to the 13'-6" (4.12 m) by 8 (2.43 m) in USA.

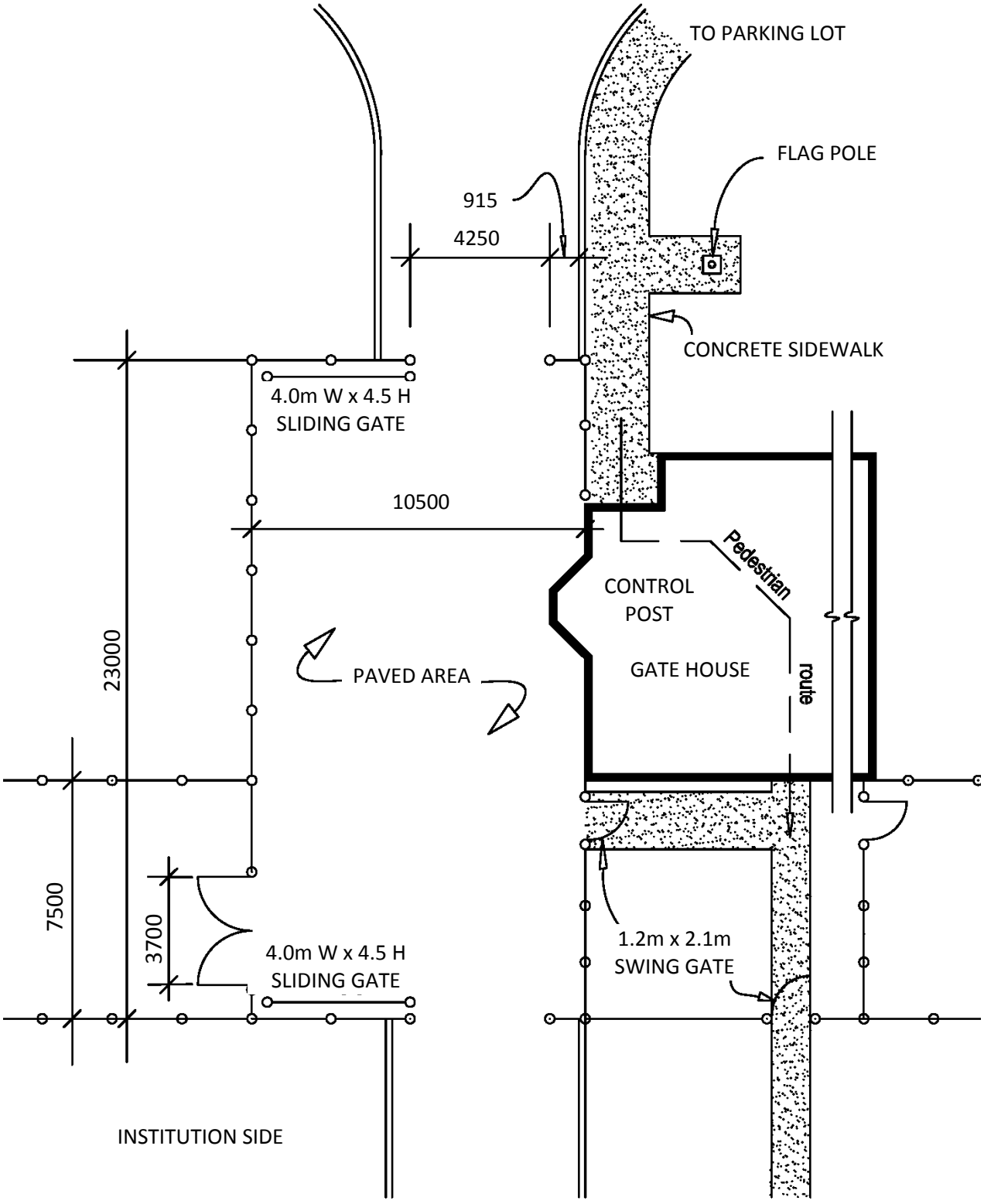
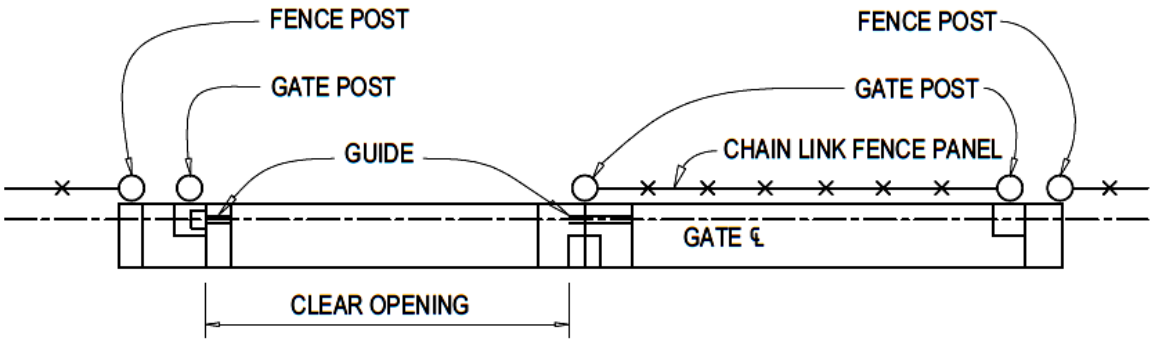
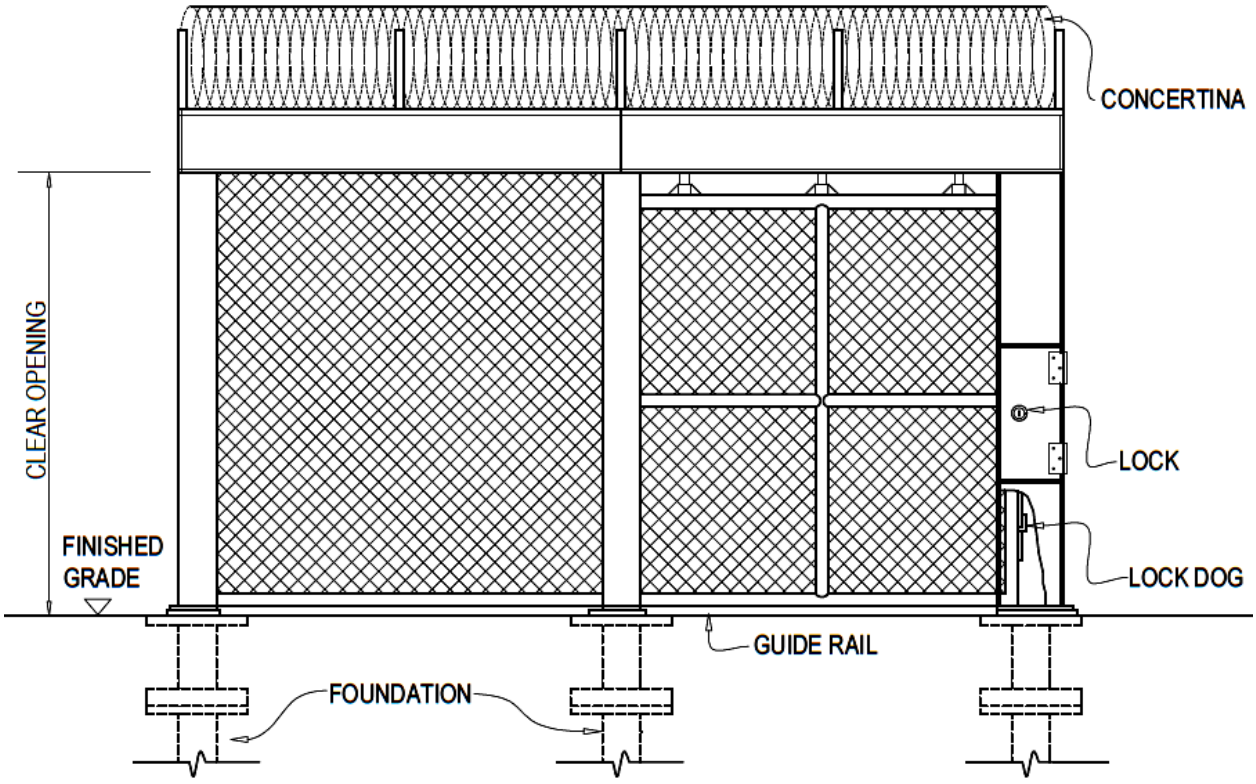


PLATE SP–3–1 – TYPICAL SALLY PORT ARRANGEMENT

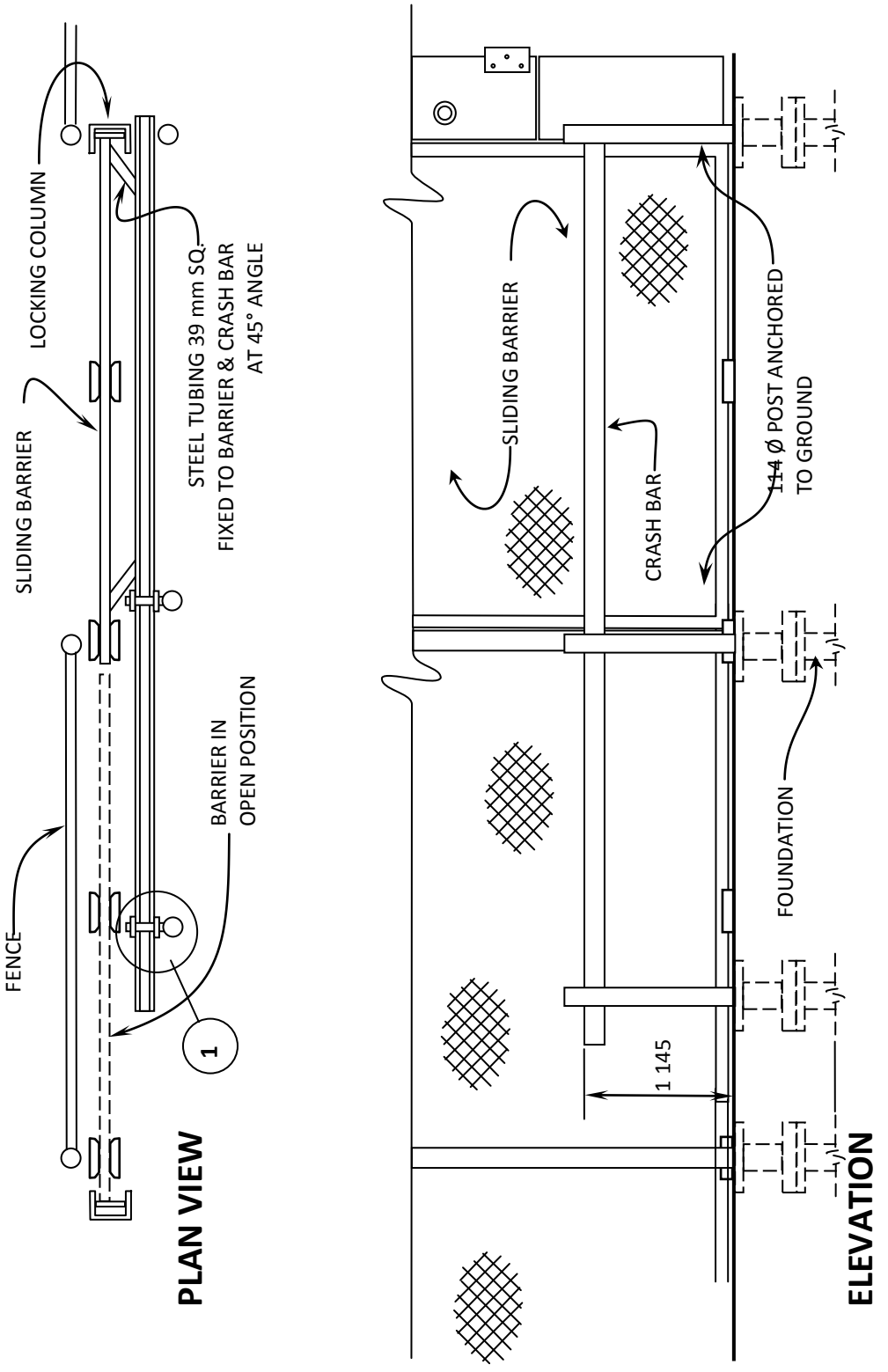


TOP VIEW



FRONT VIEW

PLATE SP–3–2 – FENCE GATE WITH OVERHEAD CHAIN DRIVE INNER PERIMETER FENCE



SP–3–3 – FENCE GATE WITH OVERHEAD CHAIN DRIVE
OUTER PERIMETER FENCE

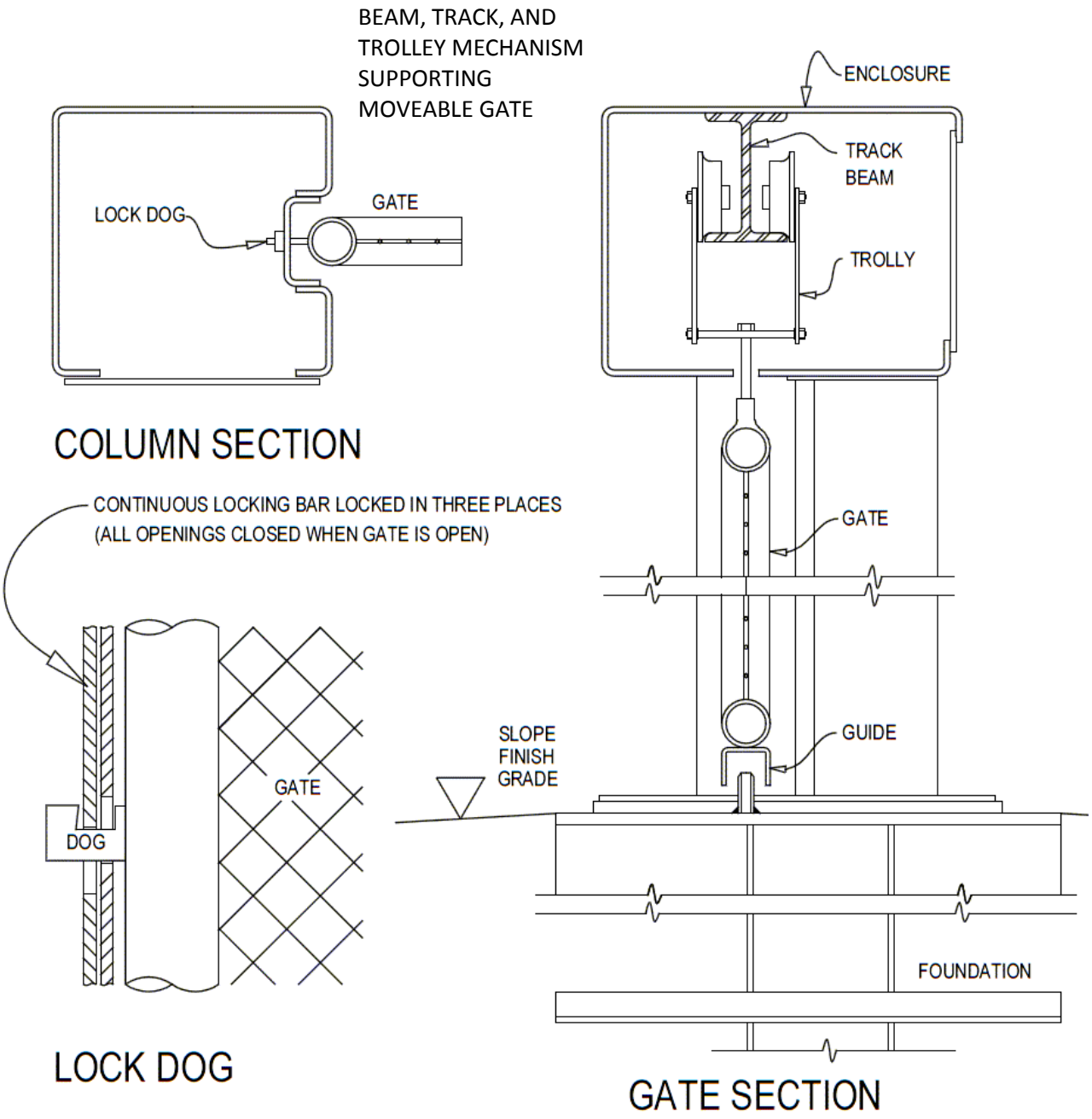


PLATE SP–3–4 – FENCE GATE WITH OVERHEAD CHAIN DRIVE – DETAILS

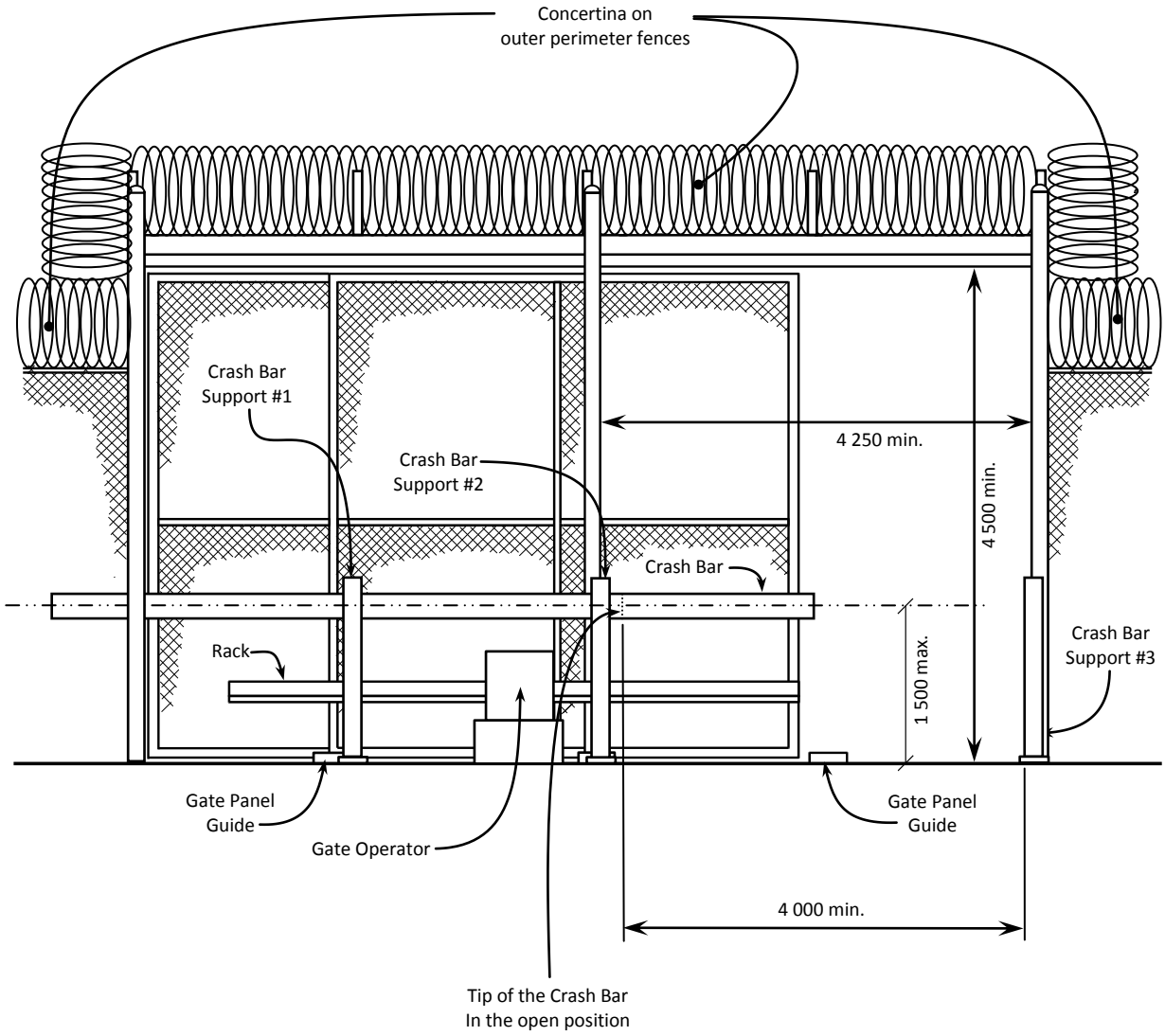


PLATE SP–3–5 – FENCE GATE WITH RACK & PINION – INSIDE ELEVATION OUTER PERIMETER FENCE

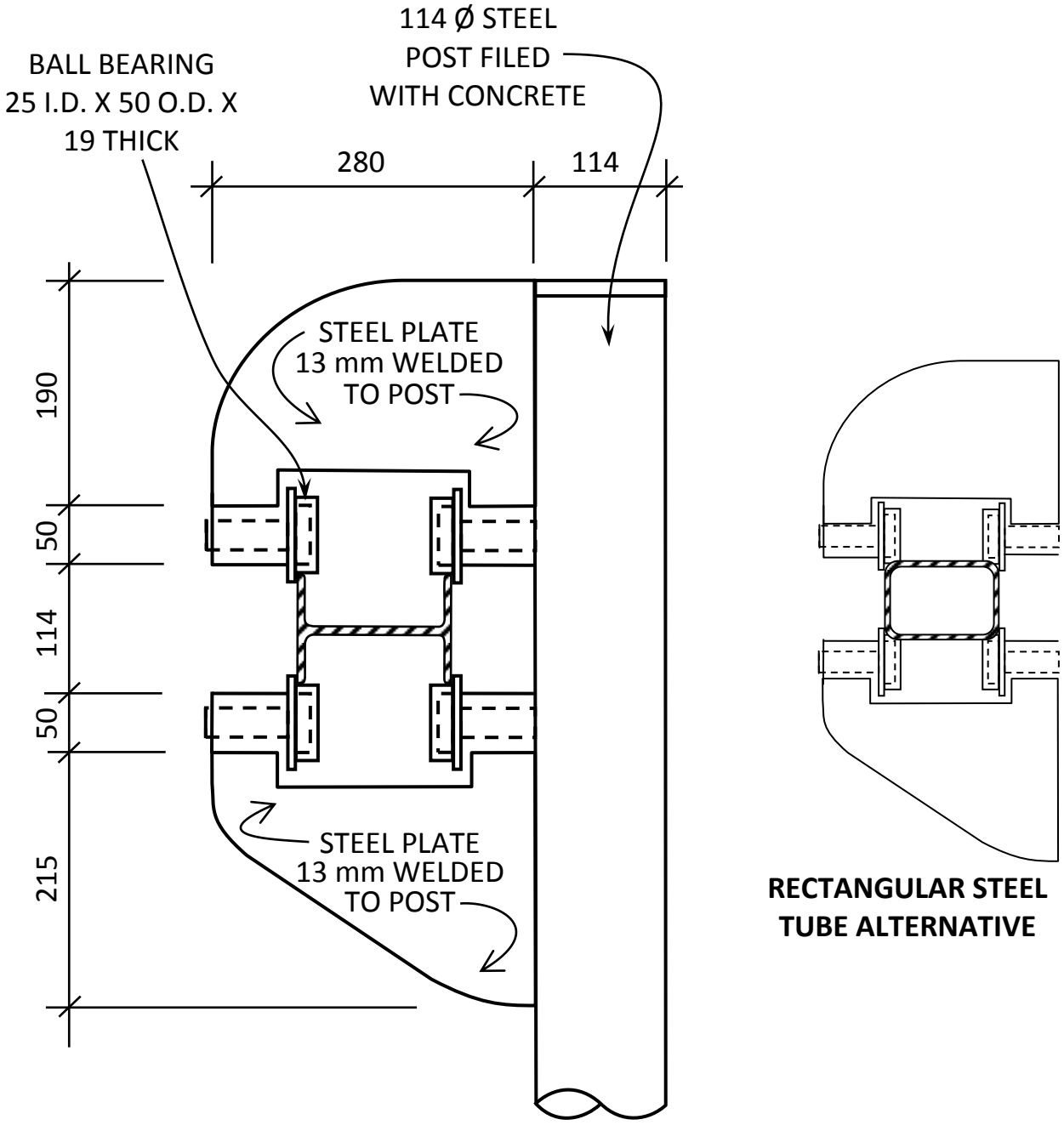


PLATE SP–3–6 – CRASH BAR DETAILS

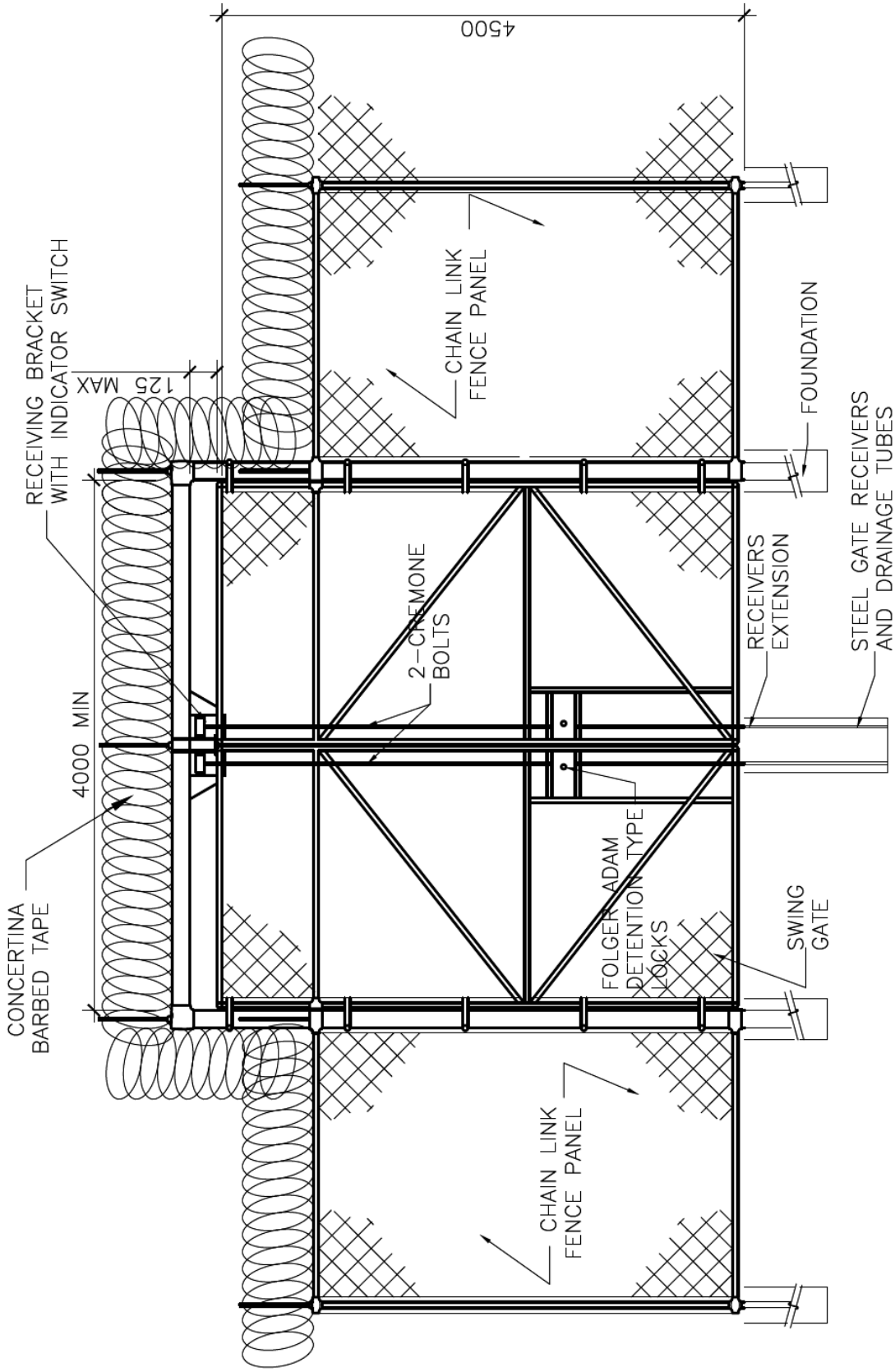


PLATE SP–3–7 – VEHICLE SWING GATE (EMERGENCY GATE)

SP-4 SITE – EXTERIOR LIGHTING

1. SCOPE

This section outlines the requirements for site lighting including perimeter fence lighting and provides design guidelines for the following:

- Type of lighting systems and standards.
- Recommendations for lighting levels.
- Quality of illumination.
- Recommendations for control of glare.
- Recommendations for uniformity and brightness control of the environment.

• RELATED SECTIONS

SP–2 – Fences
SP–5 – Traffic Circulation
E–1 – General Electrical Engineering and Electrical Distribution
E–7 – Emergency Electrical
ST–1 – Guard Towers

2. GENERAL REQUIREMENTS

3.1 Exterior lighting is provided for safety and security within institutional grounds; to assist in the visual detection of escape attempts, and to permit the use of exterior amenities after daylight.

3.2 Exterior lighting shall be situated to minimize light entering sleeping areas.

3.3 Exterior lighting systems shall be designed to caste a practicably uniform level of lighting, free of shadows or dark spots and with minimal glare.

3.4 Energy saving features and systems shall be used in accordance with government policy.

3.5 Levels of illumination herein presented refer to average and avg./min. ratio values for either horizontal, ground level, or vertical illumination, unless otherwise stated. Local conditions may make it necessary to adjust values.

3.6 Lighting is provided to assist CCTV and vehicle patrol monitoring on the perimeter.

3.7 Systems shall be designed to withstand a wind velocity of 160 km/h and ice loading characteristic of the area in which the institution is located.

3.8 All security lighting systems shall be equipped with automatic control and manual override. The manual override shall reset itself to the automatic mode after it has been left in the manual mode for 24 hours. Recreational lighting controls shall be manual only.

3. APPLICATIONS

Exterior lighting is designed to provide illumination of the following:

- Signage
- Entranceways and exits, including exterior stairways and ramps
- Pedestrian walks
- Institutional Grounds
- Parking lots and roadways
- Outdoor amenity areas
- Perimeter fences (and walls).

4. PERFORMANCE REQUIREMENTS

5.1 Security Lighting

5.1.1 Lighting requiring Emergency Power Source

5.1.1.1 Perimeter Fence Lighting System - Special requirements for the perimeter system are covered in item 5.2.

5.1.1.2 Medium and Maximum security institutions. – the entire area within the inner perimeter fence illuminated to 10 ℓx average to allow silhouetting surveillance.

5.1.2 Illumination

5.1.2.1 Entrances and Sally Ports shall be illuminated to allow recognition of persons entering the institution after daylight hours. Fixture placement shall not impede optimal visibility. The Entrance and Sally Ports shall generally have an illumination level matching that of the perimeter fence.

5.1.2.2 Glare Control -.Lighting system shall be engineered to ensure that spill light will not produce a glare problem without affecting the minimum illumination levels.

5.1.2.3 Uniformity – The placement of the luminaires should be arranged so as to ensure good uniformity of illumination over the area illuminated. Uniformity is expressed as the ratio of average illumination to minimum. In the area between perimeter fences the ratio should not exceed 3:1.

5.1.2.4 Luminaires – Exterior security lighting fixtures shall be based on the following requirements:

a) Shatterproof lenses and vandal resistant housings
b) Non yellowing lenses
c) Pole, luminaires and brackets capable of withstanding the force of 160 km/h wind
d) Lighting fixtures location to facilitate replacement of components.

5.1.2.5 Electrical System – The electrical system must meet the following minimum requirements.

a) The security lighting system including the perimeter fence lighting shall be connected to the standby power system for continuity of service.
b) Grounding methods shall meet the requirements of the Canadian Electrical Code, *CSA C22.1 2012* [1].
c) Protect each phase with dedicated single phase circuit breaker. This will prevent the possibility of a fault on one phase affecting the other two.

5.1.2.6 Codes and Standards – Installation shall comply with the latest edition of the Canadian Electrical Code, Part 1, *CSA C22.1-2012* (see footnote 1) and any applicable local or provincial regulation. Requirements outlined herein however, shall take precedence.

5.2 Perimeter Fence Lighting

5.2.1 General

5.2.1.1 Security Lighting for Perimeter Fences shall:

a) Discourage or deter escape attempts.
b) Make detection certain should an escape be attempted within the immediate area of the perimeter fence.
c) Avoid glare that can impact good visibility while not adversely affecting surrounding area.
d) Ensure high system reliability.
e) Meet levels of illumination indicated in Plates SP-4-2 and SP-4-6.
f) Have automatic control.
g) Consist of poles, lighting equipment and components located outside the double security fences and be made vandal or sabotage proof.
h) Be connected to the standby power system for continuity of service.
i) Provide minimum illumination level of 10 ℓx to the centre line of the perimeter road (typically between 8 m and 20 m from the edge of the outer perimeter fence).

5.2.2 Design

Perimeter Fence Lighting System shall be designed to achieve and maintain lighting quality based on the following factors and considerations:

5.2.2.1 Institutions are typically located in remote areas with little light from off property. Therefore, the lighting system shall autonomously enable clear viewing within the illuminated area of the fence line.

5.2.2.2 The height of the perimeter fences, the distance between fences and any structures such as guard towers or CCTV towers will impact the design of the security lighting system pertaining to the height of the poles and the mounting height of the fixtures.

5.2.2.3 A maintenance factor shall be applied in the design calculation to make allowance for luminaire dirt and any depreciation. Also consider weather conditions which will adversely affect visibility.

5.2.3 Luminaire Type

5.2.3.1 LED Luminaires– The current choice for lighting is Light Emitting Diode (LED) These will normally be fully operable between -40°C (or less) and + 50°C (or more) and emit a white or bluish bright light of superior quality which enhances vision and colour distinction. See Plate SP-4-6 for LED layout. LED Luminaires are specified as follows:

a) Mounted directly onto posts at a 9m of height.
b) Type Short II diffusion pattern.
c) 100 000 hours or higher rated lifetime.
d) Colour temperature between 4000K and 5700K.
e) 90 lumens/Watt or better
f) CRI ≥80
g) Corrosion resistant finish of all materials of the fixture.
h) Integral 10kV surge protection in accordance to IEEE/ANSI C62.412
i) Power factor of 0.9 or greater.
j) Total harmonic distortion of 20% or lower.
k) IP66 rated fixture
l) Meets ANSI C136.31-2001 standard for vibration resistance
m) Designed to operate at temperature from -40°C.

n) cULus listed.
o) LED modules and driver to meet **CSA-C22.2 No. 250.13-12**
p) LM-79 and LM-80 tested.
q) Valid IES photometric data file.
r) 10 years warranty on all parts.

5.2.3.2 Low Pressure Sodium is being used in most existing CSC institutions for perimeter lighting. See Plate SP-4-2 and SP-4-3 for layout.
Sodium Luminaires, Lamps and Ballasts – Sodium lamps are specified as follows:

a) Type 135 W SOX low pressure sodium, with separate ballast, available from Philips series SDP 828 or approved equal.
b) With "unitized" cast aluminium housing free of welds, butt joints and lapped corners with baked enamel finish, anodized aluminium reflector and a clear acrylic diffuser.
c) With HRC fuse rating as per ballast manufacturer and installed in the transformer base for protection of each luminaire.
d) With stainless steel hardware on the outside and corrosion resistant finish of all materials inside the fixture.
e) With an optical system protected by a neoprene gasket to keep out dust and moisture.
f) With guard for protection against excessive vibration by using porcelain lampholder and a spring steel plastic coated lamp support.
g) With a T-21 bulb providing 21,500 lm output (minimum) and an average rated life of 15,000 hours.
h) With ballasts designed and manufactured to meet *CSA C22.2 No. 74-96 (R2005)*[13], *ANSI Standard C82.1-2004*[14] and CBM Standard. Ballast rated voltage shall match supply current voltage and voltage ratings of the lamps. Ballasts to have a power factor correction to a minimum of 90%.
i) With ballasts designed to operate 135 W low pressure SOX sodium lamps at minus 40°C and to maintain lamp wattage within 8% of nominal with a supply line fluctuation of 20%.
j) With ballast of constant wattage auto transformer type.

5.2.4 Poles are specified as follows:

5.2.4.1 Octagonal tapered of steel complete with transformer bases, eye bolts and gasketed electrical outlet boxes.
5.2.4.2 Hot dipped galvanized on interior and exterior surfaces as per *ASTM A123–09 and* hot dipped galvanized anchor bolts and hardware accessories where possible.
5.2.4.3 Height and luminaire spacing to match type of lighting system as shown on Plates SP-4-3 & SP-4-6.

[13] CAN/CSA-C22.2 No. 74-96 (R2005) – Equipment for Use with Electric Discharge Lamps
[14] ANSI C82.1-2004 – American National Standard for Lamp Ballasts – Line Frequency Fluorescent Lamp Ballasts

5.2.4.4 Hardwood plywood template for retaining anchor bolts when grouting them in place in the concrete base.

5.2.4.5 With non-shrink grout.

5.2.4.6 Transformer base plates drilled in the manufacturer's plant to match the anchor bolt configuration set in the bases.

5.2.4.7 Access doors in the transformer bases are c/w gasket and use tamperproof hardware for securing doors in place.

5.2.4.8 Transformer base oriented so that their access doors are parallel to but facing away from the fence.

5.2.4.9 Yellow PVC guards installed on the guy wires on the anchor poles terminating the linear sections of the spans (applies to catenary system where used).

5.2.4.10 For grounding requirement specify:

a) 10 mm threaded copper grounding stud welded to the inside of each transformer base at the back and above the bottom of the door opening. Ground studs are supplied complete with two nuts, one lock washer and one copper clamp type lug for minimum 13 mm^2 stranded bare copper wire.

b) Ground studs welded to the transformer bases in such a manner as to present a smooth surface on the exterior of the bases.

5.2.4.11 Aluminium nameplate located one foot above its base to include the manufacturer's name or identification mark, year of manufacture, pole length and ordering reference number.

5.2.4.12 Shims for levelling consisting of one 1.5 mm and two “U” shaped 3 mm.

5.2.5 Catenary System

Only to be used for low pressure sodium light system as illustrated SP–4–3. In specifying the catenary system, consider the following requirements:

5.2.5.1 The system shall be capable of withstanding a wind velocity of 160 km/h and ice loading characteristics of the area and a luminaire dead weight of not less than 9 kg and a projected area of 0.3 m^2

5.2.5.2 Maintain total linear balance by anchoring the terminal poles of each linear section as shown in Plates SP-4-4 & SP-4-5.

5.2.5.3 The catenary (upper) and the messenger (lower) cables shall be 9 mm nominal diameter.

5.2.5.4 The strainer (vertical) and suspension cables shall be a minimum 3 mm diameter stainless steel.

5.2.5.5 Electrical cable assembly shall spiral around the messenger cable. Electrical cable shall be XLPE insulated stranded copper conductors in multi cord cable assembly with overall PVC jacket.

5.2.5.6 Provide 3 luminaires in each span of 30 m as shown in Plates SP-4-2 and SP-4-3 resulting in a luminaire every 10 m.

5.2.5.7 All hardware including turnbuckles, wire rope, clamps, etc., to be hot dipped galvanized steel.

5.2.6 Pole Mounted Luminaires and Lamps

5.2.6.1 Distance between luminaires shall be based on Light diffusion modelling using approved lighting, their manufacturers and fixtures. Plate SP-4-6

illustrates existing installation characteristics for pole mounted luminaires.

5.2.7 Controls

Perimeter fence lighting shall be controlled by a photo cell and meet the following requirements:

5.2.7.1 A photo control unit shall automatically turn on the security fence lighting system.

5.2.7.2 The weatherproof unit capable of operating over a range of -60°C to +55°C shall be mounted on a fence lighting pole located closest to the Gatehouse.

5.2.7.3 The control shall energize the lamps on a preset (adjustable) value.

5.2.7.4 A manual control override turns the lights on and off as required.

5.2.7.5 The system shall operate on stand-by power and "be fail-secure".

5.2.7.6 Controls shall be connected in parallel with the "ON" contacts of the "ON OFF" selector switch located as specified.

5.2.7.7 The photo control shall have a standard NEMA twist lock plug.

5.2.7.8 The photocell shall be temperature stabilized pre-aged and hermetically sealed.

5.2.7.9 The Installation Contractor shall adjust the photo control unit to switch on at not less than 40 ℓx. The unit shall be rated 1000 W incandescent, 120 volts, 60 HZ and CSA approved.

5.3 Other Exterior Lighting

5.3.1 Luminaire type - Lighting type shall be selected based on energy efficiency, economy and accepted practices for Recreational Areas, Parking Lots, Signage, Roads and sidewalks, Building entranceways and exits, and Institutional grounds. Luminaires must be fully operable between -40°C (or less) and + 50°C (or more).

5.3.2 Illumination Levels - The light levels requirements should be adapted for an LED technology conversion according to ***I.E.S. Handbook 10th Edition***

5.3.2.1 Recreation area illumination system shall be installed on a project specific basis so as to form an integral system as part of the exterior lighting system. Illumination levels for recreational purposes are approximately 70 ℓx.

Illumination levels for the following recreational activity areas are (Total Area 22,736 m², see Plate 2 for typical layout):

a) Softball Diamond - 18 x 18 m overall with 73 m outfield radius, Infield 100 ℓx, outfield 70 ℓx.
b) Hockey Rink - 60 x 26 100 ℓx.
c) Running Track – 50 ℓx
d) Games / fitness as established on a project specific basis illuminated to a maximum of 100 ℓx.
e) Dedicated mini yards connected to living areas -70 lx.

5.3.2.2 Parking Lots, Institutional Grounds. Roads and sidewalk illumination levels:

a) Average Illumination Levels – 10 lx.

b) Illumination Uniformity – Maintain a maximum ratio of average lux to minimum lux of 3:1.

c) Illumination Quality – To minimize shadows especially between parked cars illuminate each point from at least two luminaire locations.

5.3.3 Signage, Building entranceways and exits

5.3.3.1 Direct lighting with similar luminaires to that for sidewalks and roads will serve to illuminate the target door or sign to a higher level.

5.3.4 Controls

5.3.4.1 The recreational lighting controls shall be manually switched on and off as required from a specified location.

5.3.4.2 All other exterior lighting shall be controlled by photocell or astronomical dial time clock with manual bypass from a specified location. Lighting controls shall be separated for each use.

5.3.5 Poles and Masts

5.3.5.1 Specify that all poles and masts used as light standards shall be fabricated from steel conforming to *CSA Standard G40.21-04 (R2009)*[15] Type T, grade 60T, Low silicon, 60,000 psi yield strength. Do not use concrete poles and masts.

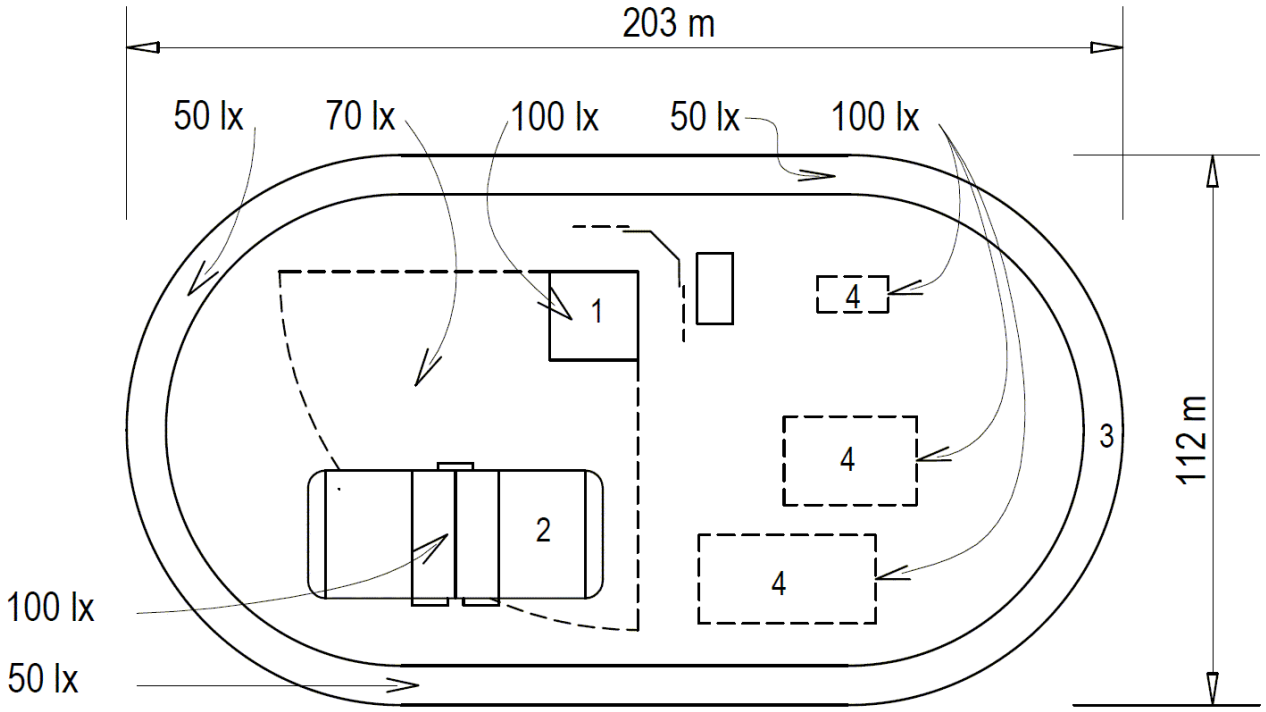
5.3.5.2 Avoid having steps on poles and masts.

5.3.5.3 Minimum height of post for pedestrian walks 3.05 m, for parking lots 6.1 m.

5.3.5.4 The lighting system should incorporate a method by which luminaires on high standards (poles) may be easily and economically maintained.

5.3.5.5 High Standards (30 m poles) are not necessary for Minimum Institution but the pole height should be less than 13 m.

[15] CSA G40.20-04/G40.21-04 (R2009) – General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel

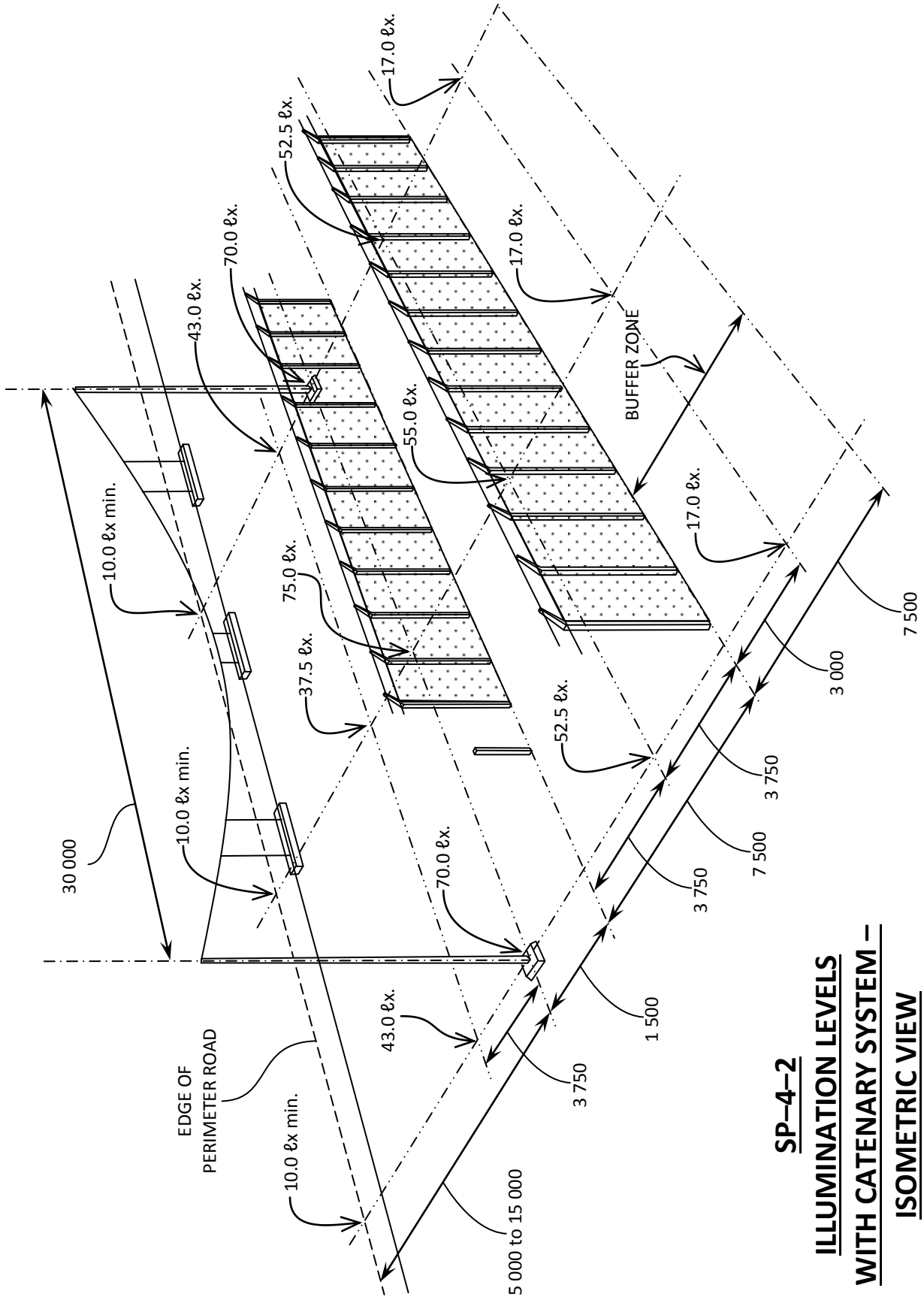


ALLOCATION FOR ILLUMINATION AND LIGHTING LEVELS

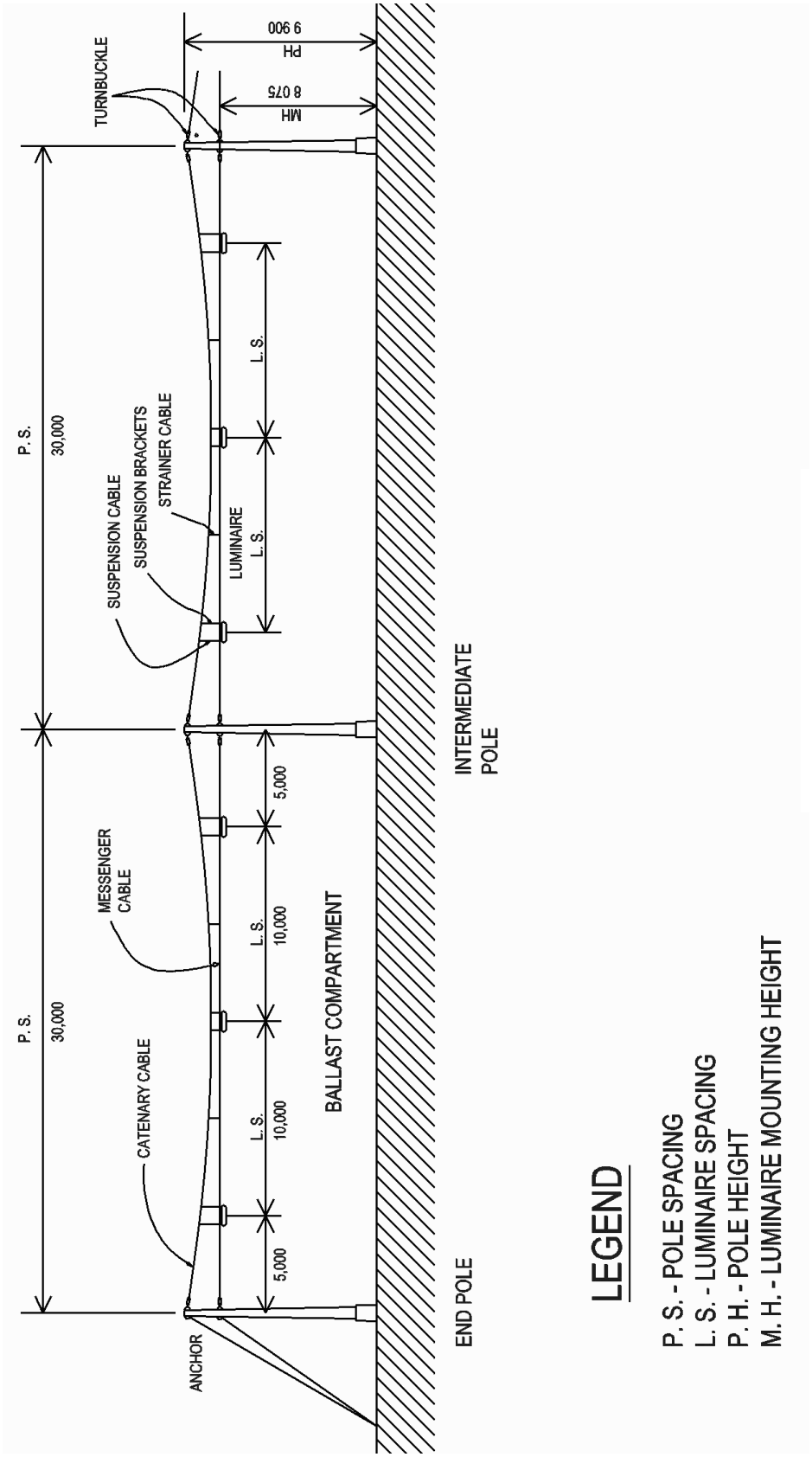
1. SOFTBALL DIAMOND 18 X 18 – 73 m OUTFIELD 4 183 m²
   (100 ℓx INFIELD, 70 ℓx OUTFIELD)
2. ICE HOCKEY RINK 60 X 25 m, 155 m² (100 ℓx)
3. TRACK LENGTH NON-STANDARD (50 ℓx)
4. SMALL GAMES – VARIOUS, TOTAL 1 343 m²

APPROXIMATE FIELD SIZE 22 736 m²

SP–4–1 – ATHLETIC FIELD LIGHTING



SP–4–2
ILLUMINATION LEVELS
WITH CATENARY SYSTEM –
ISOMETRIC VIEW



SP–4–3 – CATENARY SYSTEM – SIDE VIEW

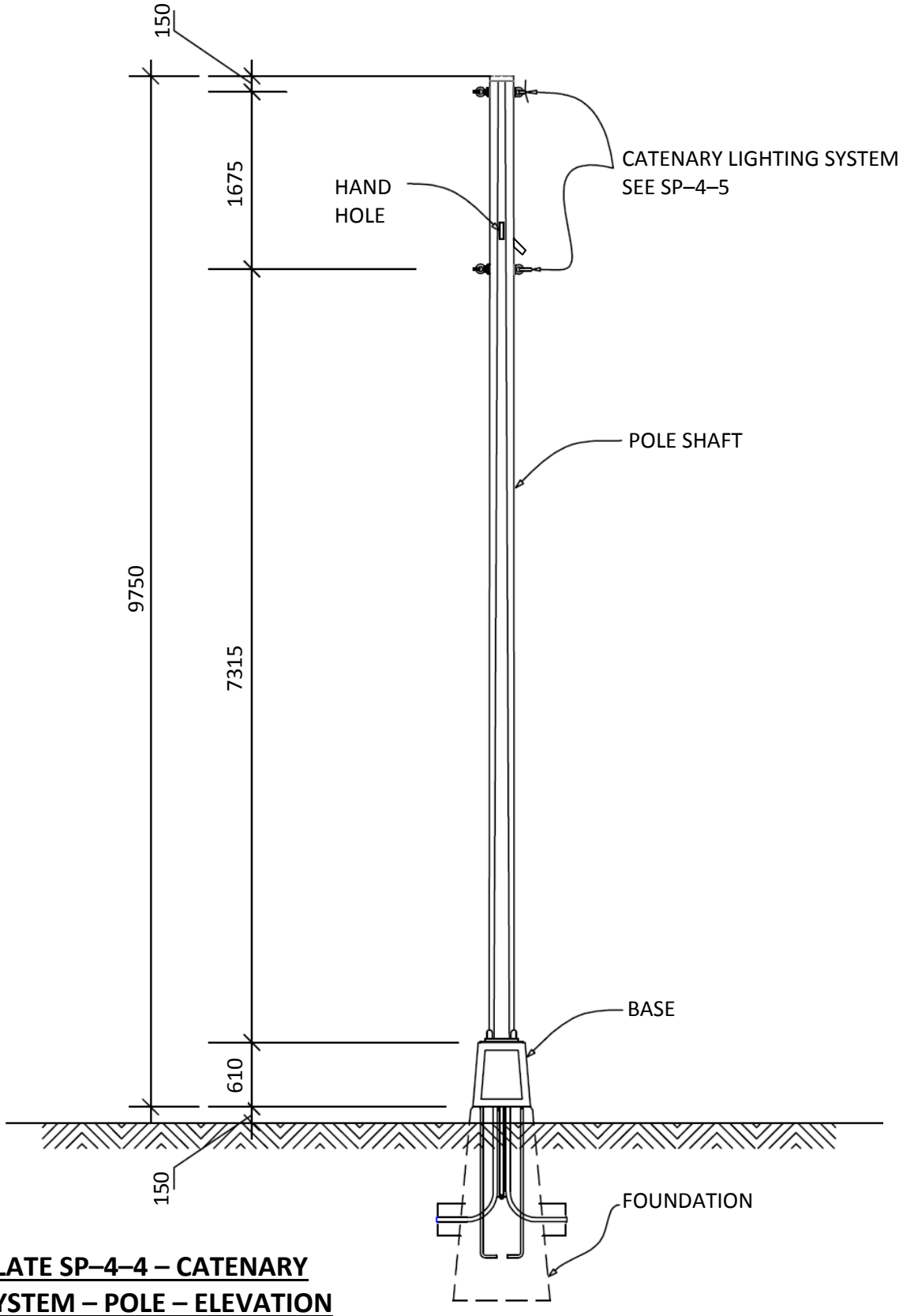
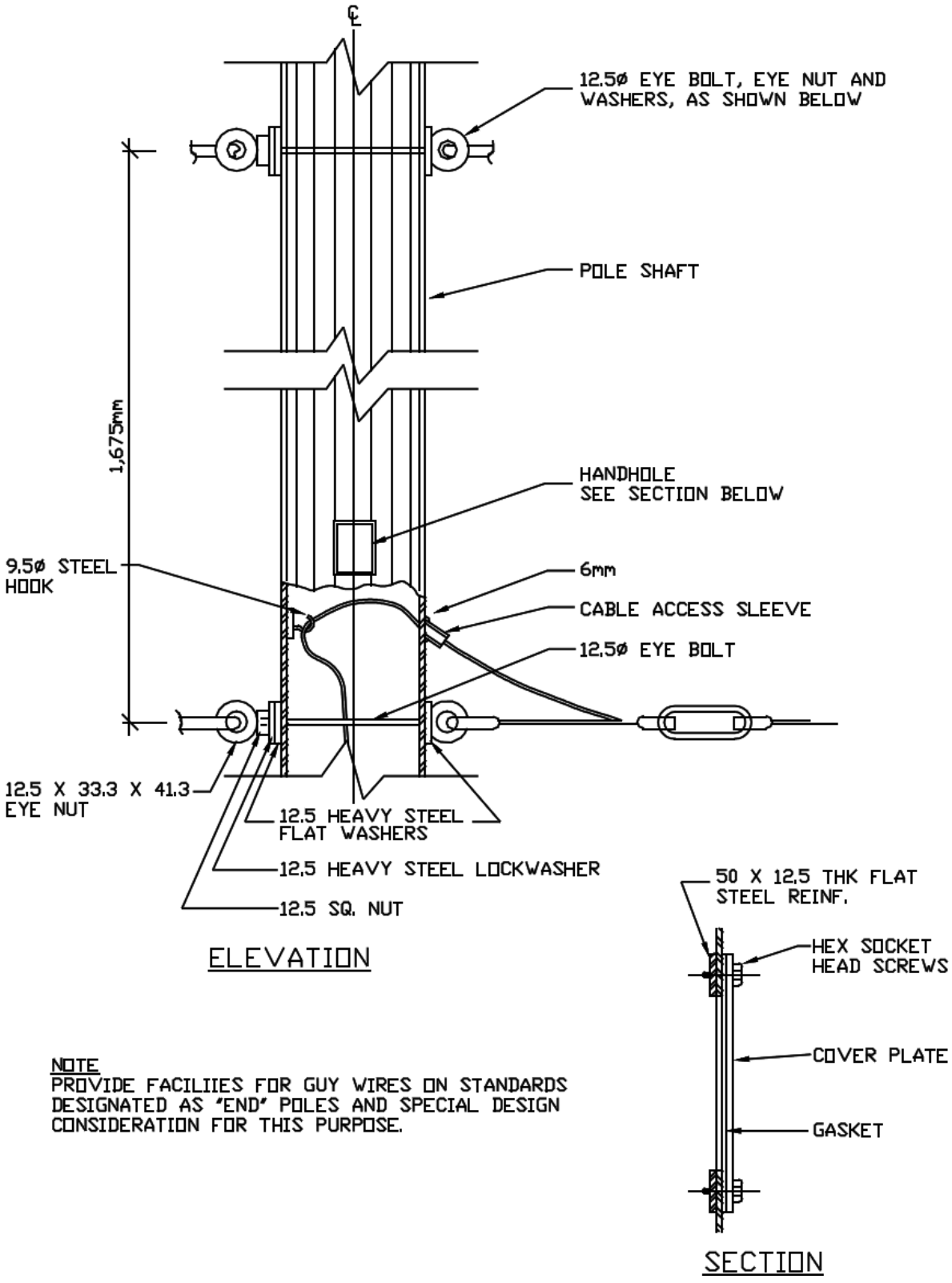
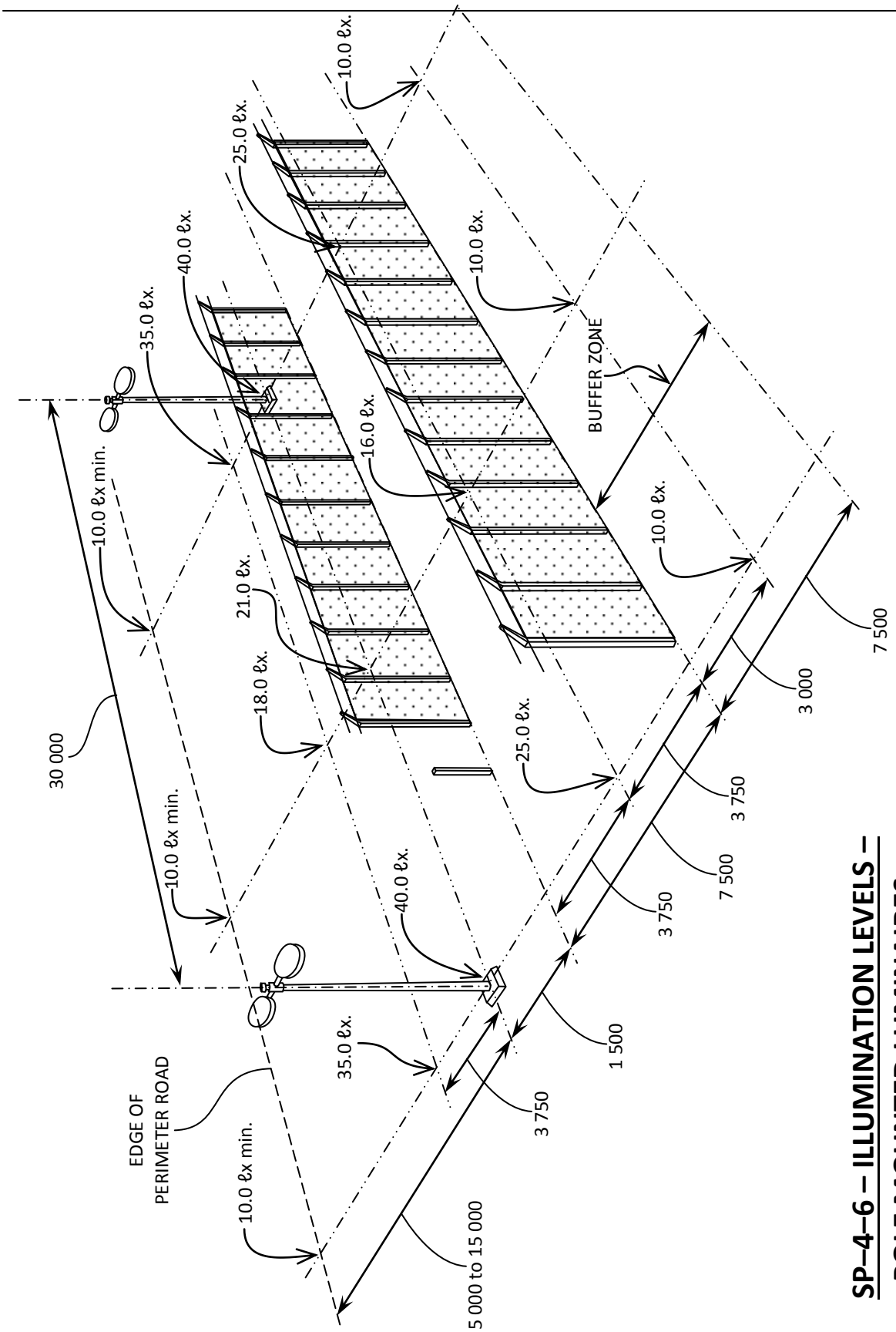


PLATE SP–4–4 – CATENARY SYSTEM – POLE – ELEVATION



NOTE
PROVIDE FACILIIES FOR GUY WIRES ON STANDARDS DESIGNATED AS 'END' POLES AND SPECIAL DESIGN CONSIDERATION FOR THIS PURPOSE.

SP–4–5 – CATENARY SYSTEM – POLE DETAIL



SP–4–6 – ILLUMINATION LEVELS – POLE MOUNTED LUMINAIRES – ISOMETRIC VIEW

SP-5 SITE – TRAFFIC CIRCULATION AND PARKING

1. SCOPE

This section outlines requirements for vehicle and pedestrian circulation and for vehicle parking inside and outside correctional institutions.

2. RELATED SECTIONS

SP–1 – Site Development
SP–2 – Security Fences
ST–1 – Guard Towers
SP–3 – Gates/Sally Ports
SP–4 – Lighting

3. CIRCULATION SECURITY REQUIREMENTS

3.1 Outside the Institutional Perimeter

3.1.1 For ease of control, there shall be only one roadway providing access to the institution from a public thoroughfare.

3.1.2 All parking, including that of staff, visitor and CSC owned vehicles, shall be located on the exterior of the institution and in proximity to the Principal Entrance.

3.1.3 A dedicated perimeter patrol road shall be provided which will allow a rapid patrol vehicle response and which will have a minimum number of crossings. This road shall also be used for access into the institution via the Emergency Vehicle Entrance or a dedicated construction entrance and as well for maintenance of systems related to perimeter security.

3.1.4 Pedestrian walks shall only be provided from the parking area to the Principal Entrance.

3.2 Inside the Institutional Perimeter

3.2.1 A pedestrian circulation network shall connect all buildings. At the Maximum security level, the network may be fenced, enclosed (unheated) or be part of the building for optimum movement control. Consideration of enclosed networks must be based on security requirements only; they are not intended to provide shelter from the elements for pedestrian movements from one activity area to another.

3.2.2 Fire vehicle access shall be in accordance with applicable authorities. Two different access routes, one to the Principal Entrance, one to the Emergency Vehicle Entrance shall be provided with clear signage (see SP-3:3.2).

3.2.3 Vehicle roadways are required for service functions and shops. Vehicle movement shall be separated from inmate circulation and located away from outdoor inmate activity areas.

3.2.4 Vehicle loading and unloading zones shall be centralized where possible, or located in proximity to one another to facilitate their control. Loading zones shall be located away from inmate movement and exterior activity areas, and shall be close to the Principal Entrance or Service Entrance where applicable.

4. DESIGN REQUIREMENTS

4.1 Roadways (Other than Perimeter Patrol Road)

4.1.1 The access road shall be integrated into the public road system; it shall not provide hazardous crossings nor cause undue congestion during peak hour movements.

4.1.2 All roads shall be asphalt paved unless local conditions dictate otherwise.

4.1.3 The minimum widths of paved surfaces shall be as follows:

- One way single lane: 3.5 m
- Infrequently used access ways: 4.8 m
- Two way double lane: 7.0 m

4.1.4 Roadway curbs shall not be used.

4.1.5 Drainage, turning radii, prepared shoulders and intersections shall conform to local municipal standards.

4.1.6 Pedestrians and vehicles shall share the same traffic surfaces except as provided for above.

4.1.7 Roadways shall be illuminated as per section SP-4 Exterior Lighting.

4.2 Perimeter Patrol Road

4.2.1 The perimeter patrol road shall encircle the complete perimeter at a distance of 8 m (minimum) to 20 m (maximum) from the face of the Outer Perimeter Fence to the centre line of the road.

4.2.2 The paved width of the patrol road shall be 4.8 m, with a prepared shoulder of 1 m on each side.

4.2.3 The patrol road surface elevation shall not be lower than the ground elevation between the perimeter security fences.

4.2.4 The area between the patrol road and the perimeter fence shall be clear of all obstructions, except for guard towers where applicable.

4.2.5 The roadway shall be generally straight; curves shall be mild and sufficiently banked to permit moderate speeds. Optimal response time for a patrol vehicle to travel one half of the perimeter circumference is 30 seconds by one of two vehicles (one vehicle patrols on the morning shift). Patrol road system should allow for a maximum response time of 45 seconds.

4.2.6 The patrol road shall have turn-arounds on each side of the institution as well as at each corner of the perimeter fence. Generally, turn-arounds are provided at approximately 150-m intervals. See Plates SP–2–4, SP–2–5 and SP–5–1. All turn-

arounds shall be paved and sized to allow for a vehicle to turn a full circle. Vehicle turning radius is assumed to be 7.5 m.

4.2.7 The patrol road when used for truck movement to construction sites via dedicated access points other than the principle entrance shall be widened at the location of the entrance gates in order to facilitate vehicles turns and to not obstruct patrol vehicle movement as trucks await entry.

4.2.8 Drainage for the patrol road shall consist of flanking shallow and broad swales to permit vehicle access onto the terrain on either side of the road. Maximum slope for the swale shall be 25% (1:4), to a maximum depth of 600 mm (Plate SP-5-2). The minimum grade cross-slope of the paved surface shall be 2% [16]. See Plate SP-1-2 for a perimeter fences and patrol road general layout and SP-1-3 for a cross-section detail of the road.

4.2.9 Culverts over 350 mm in diameter shall be provided with grilles to prevent their use as hiding places by inmates. Clear grille openings in any one direction shall not exceed 125 mm by 610 mm in the other direction (see details in M-4: 8.2).

4.2.10 Illumination of the patrol road shall be satisfied by perimeter fence lighting as per Section SP-4 Exterior Lighting.

4.3 Pedestrian Walkways

4.3.1 Walkways shall be of monolithic material such as asphalt, concrete, or compacted stone dust. Small or thin pavers which can be lifted or broken shall not be used.

4.3.2 Walkway design shall allow for movement of handicapped persons and snow removal equipment s well as projected traffic volume.

4.4 Parking (Other than for CSC Vehicles)

4.4.1 Inmate visitor parking and staff parking shall be separately demarcated. Inmate visitor parking stalls shall be provided at a ratio of 50% of the maximum number of inmates allowed in the visits area at one time (visit capacity); such visit capacity shall be identified on a project specific basis. For optimal time of use distribution, the visitor parking lot shall also accommodate official visitor cars.

4.4.2 The number of staff parking stalls shall be provided at the rate of 1.2 multiplied by the peak weekday shift. Staff complement shall be identified on a project specific basis.

4.4.3 Barrier-free parking shall be located close to the gatehouse and be combined for use by staff and visitors. The number of stalls shall be based on established need ranging from a minimum of 2 to a maximum of 4.

4.4.4 Parking areas shall be asphalt paved unless local conditions dictate otherwise.

4.4.5 Curbs shall not be used, although pre-cast wheel stops are permitted.

4.4.6 Landscape islands and trees are permitted but dense planting shall be avoided.

[16] American Association of State Highway and Transportation Officials (AASHTO), A Policy on Geometric Design of Highways and Streets, 5th Edition, 2004 – AASHTO GD-2 A Policy on Geometric Design of Rural Highways, 1965 – Transport Association of Canada also refers to this document

4.4.7 Parking stall dimensions (including barrier-free) and drainage provisions shall conform to governing standards.

4.4.8 Parking areas shall be illuminated as per section SP-4 Exterior Lighting.

4.5 Parking for CSC Vehicles

4.5.1 A CSC vehicle parking compound shall be provided, located on the outside of the perimeter fence; size shall be defined on a project specific basis.

4.5.2 The parking compound shall be located in proximity to the Principal Entrance and the perimeter patrol road for ease of periodic surveillance.

4.5.3 The parking compound shall house fuel dispensing pumps and tanks. The compound shall be protected by bollards and a 2.5m high fence.

4.5.4 Fuel shall be stored in registered tanks in accordance with the Storage Tank Systems for Petroleum Products & Allied Petroleum Products Regulations[17]. The fuel storage tanks (preferably aboveground) will be located adjacent to the fuel pumps and the distribution lines shall also be aboveground, where feasible.

4.5.5 The parking compound shall be illuminated as per section SP-4 Exterior Lighting.

4.6 Electrical Outlets for Engine Blocks

Institutions are typically located in isolated areas in climate zones having sustained low temperatures, frequently -20°C or less. In such situations, a decision to determine whether electrical outlets for engine blocks are required is based on the following:

4.6.1 CSC Vehicles

CSC institutions, by their very nature, situation, and role, differ from other government installations. The intent is that institutions have ready to run CSC vehicles for everyday operations including escort or transfer of inmates. Consequently, electrical outlets for block heaters are mandatory.

4.6.2 Staff Vehicles

The provision of outlets must be consistent with local practices. For this, a survey of other Government buildings and local area business and plants will determine the need to provide electrical outlets for block heaters.

4.6.3 Other Vehicles

Electrical outlets for block heater shall not be provided for visitor parking or for other short term parked vehicles.

4.6.4 Parking Electrical Outlets General Requirements

Where provided, electrical outlets may be controlled by timer or by a programmable controller.

[17] Tank Systems for Petroleum Products & Allied Petroleum Products Regulations (SOR/2008-197). Regulation under the Department of Justice Canada. http://laws.justice.gc.ca/eng/SOR-2008-197/index.html

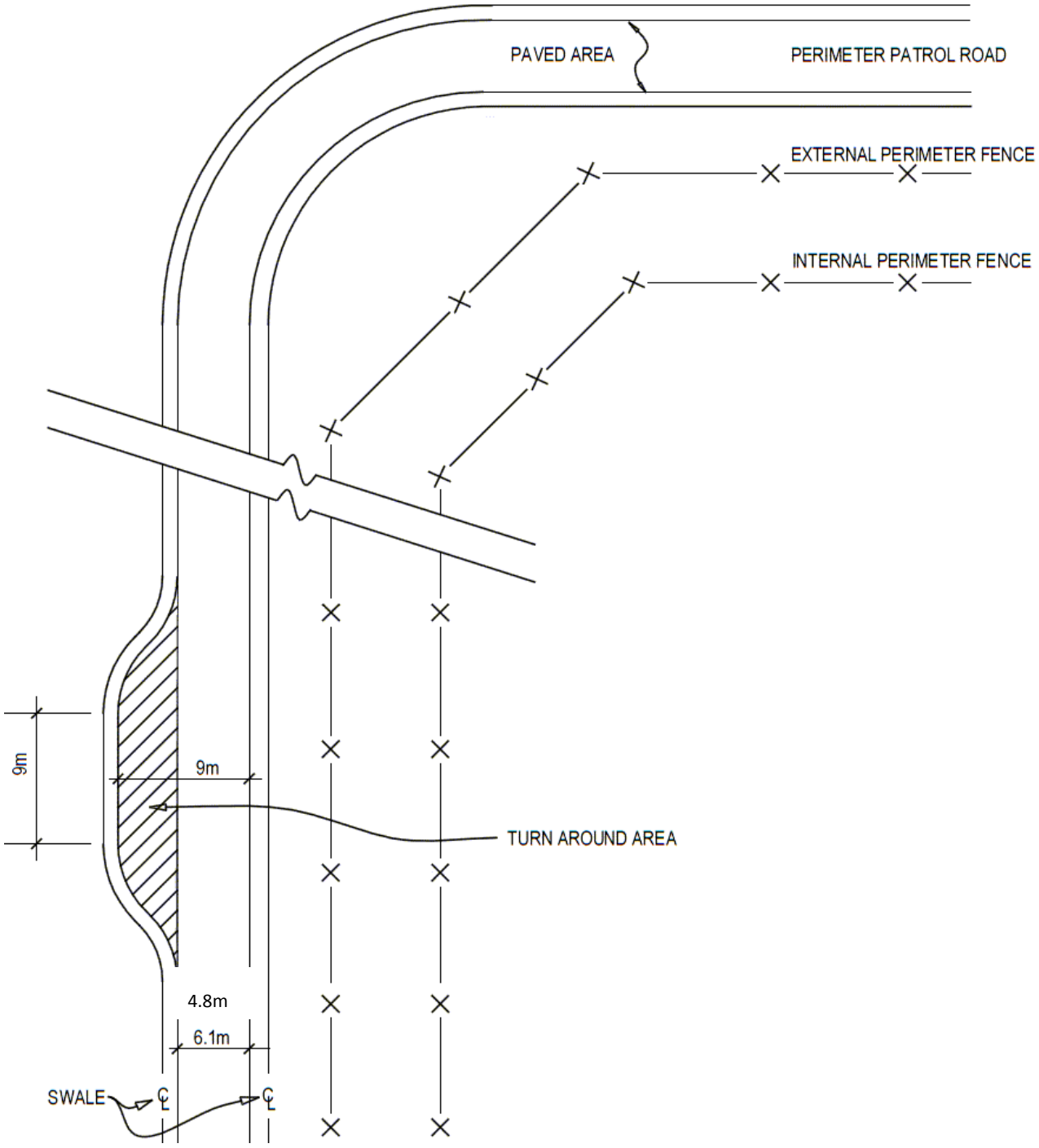


PLATE SP–5–1 – OPTIONS FOR TURN-AROUND

SP-6 SITE – TEMPORARY CONSTRUCTION FENCES

1. SCOPE AND DEFENITIONS

This section provides performance criteria and relevant specifications for all temporary construction fences for minimum, medium, maximum and multi-level Institutions.

Several options for temporary fences are available. Their selection must weigh the following factors: location of construction, the risk of breach, and the duration of construction. Fence types include:

Type 1`Minimum institution construction fence is used primarily as a physical barrier to prevent unauthorized persons access to the site for reasons of safety and to protect the contractor's assets. This fence is no different from that used in the community.

Type 2 Fence is used in restricted and highly controlled inmate areas such as where routine vehicle movement takes place for deliveries at medium and higher level institutions and therefore where breach concerns should not be elevated. This fence therefore serves to prevent unauthorized access for similar reasons as above and as such the fence type is also as above. Construction truck traffic is via the main entrance vehicle Sally Port where it is inspected for contraband. Type 2 Fence shall also be used where construction duration is short term as for a repair or replacement of existing systems or where the work site shifts by phase from building to building. The institution in this case will schedule inmate movement and activities so as to mitigate risk of breach. Truck traffic to the site will be escorted from the main entrance. Type 2 fence may be used as an alternative to Type 3 assuring adequate security where required by being topped with BTC.

Type 3 Fences is used in inmate movement and activity areas at medium and higher level institutions and where breach is possible. Construction truck traffic is via the main entrance vehicle Sally Port where it is inspected for contraband. Trucks are escorted to the construction site. This fence is used for long term projects which have a substantial scope and cost. Fences here must assure appropriate security based on assessed risk.

Type 4 Fence is used for long term projects which are in proximity to the perimeter fence, a secured fence compound shall be constructed which is integrated with the perimeter, effectively forming an extension of the inner perimeter fence. This fence will be fitted with a Fence detection system and covered by camera and lighting integrated with the PIDS. A dedicated Sally Port will be constructed on the perimeter fence line for construction truck traffic to be controlled by contracted commissionaires.

2. RELATED SECTIONS

2.1 Technical Criteria Document sections:

SP-1 - Site Development
SP-2 - Fences
SP-3 - Gates/Sally Ports
SP-4 - Exterior Lighting
SP-5 - Traffic Circulation and Parking

2.2 Other CSC document

Statement of Technical Requirements – Temporary Construction Fences at Medium and Maximum Security Institutions, Correctional Service Canada, Technical Services Branch – Electronic Systems, Issue 5, April 8, 2011.

2.3 National Master Specification section:

01 35 13 – Security Requirements (prior to 2004: 01003 – Security Requirements)
01 56 26 – Temporary Fencing
01 56 36 – Temporary Security Enclosures

3. PERFORMANCE CRITERIA

3.1 Type 1 Fence

This fence type shall be a self supporting welded mesh sectional fence typically available by rental ('Modu-loc' or similar). The height of the fence shall be no less than 1800 mm high but may be higher depending on local availability. The fence must be stable and self supporting. Welded wire mesh is considered to be non-climbable due to its mesh size which inhibits the insertion of foot to aid climbing. The top of the fence also has its vertical wire projecting over the top rail to discourage breach. Matching vehicle gates are padlocked after work hours. The temporary construction fence shall be removed from the institution by the contractor after construction is completed.

3.2 Type 2 Fence

This fence type shall be similar to the above but with a height of 2400 mm. This fence must not come in contact with the perimeter fence nor be closer than 12m to the perimeter fence so as not to interfere with PIDS camera viewing on the interior side of the institution. The temporary construction fence shall be removed from the institution by the contractor after construction is completed. Type 2 fence security can be enhanced by topping it with BTC rendering it an alternative to Type 3 fence which shall be considered as a measure to reduce project cost.

3.3 Type 3 Fence

This fence type shall be similar to a standard woven mesh interior fence, be 3.6m high, and be topped with BTC where required. This fence shall be installed on site with all posts set in concrete and with the ground surfaced with compacted gravel. Matching swing type vehicle gates shall be padlocked after hours. As for type 2 fence, this fence must not come in contact with the perimeter fence nor be closer than 12m. Truck access to this compound shall be via the Main entrance with all vehicles escorted. The temporary construction fence shall be dismantled by the contractor after construction is completed but parts such as the fabric may be left at the institution in accordance with the contract documents.

3.4 Type 4 Fence

This type of fence forms part of the perimeter and as such requires special provisions as follows:

3.4.1 This is a single fence of the same design as an Inner Perimeter Fence (see Plate SP-6-6) and conforms to Chapter SP-2 - Fences, performance criteria 4.1 except for anti-tunnelling which is achieved by compacted gravel surface for 1m distance on each side of the fence.

3.4.2 A Fence Detection System (FDS) is required and connected to the Main Communication Control Post (MCCP).

3.4.3 Cameras are required to monitor the fence line and connected to the MCCP and lighting may be required to enhance viewing.

3.4.4 A dedicated vehicular entrance is required similar to the main entrance Sally Port comprising three (3) gates (see Plate Sp-6-7, Detail 1):

a) Gate 1: Temporary gate for the outer perimeter fence,

b) Gate 2: Temporary gate for the inner perimeter fence,
c) Gate 3: Temporary gate in a temporary fence to form a vehicle Sally Port.

At any time, at least two gates of the temporary vehicular Sally Port are secured, with padlocks and keys under the control of a Commissionaire. A commissionaire's temporary hut is required within the Sally Port.

3.4.5 The fence must be clear of any building by 12 m but a shorter clearance may be considered since the compound is always protected by a double fence between it and the exterior of the institution.

3.4.6 The fence and systems must be dismantled and handed to the institution in accordance with the contract documents after the construction is completed. All systems must be reinstated to the original state and function.

4 RELEVANT SPECIFICATIONS

4.1 Type 1 Fence

Rental construction protection fence comes with welded wire mesh and components conforming to ASTM F2919 Welded Mesh Fence specification. Mesh is galvanized steel no larger than 50X150mm (vertically long rectangle) with vertical wire projecting and exposed at top. Fence must be at least 1800mm high and secured with pins inserted in the ground through the 'T' base support. Sections of fence must be securely clamped together to ensure that the each fence run acts as a continuous barrier which will resist lateral forces and separation. Sloped runs must be protected by mesh panels to ensure continuity of barrier from ground up.

4.2 Type 2 Fence

This fence is similar to Type 1 above but shall be 2400mm high. Ground along the fence run shall be surfaced with compacted gravel. 'Barbed tape concertina' (BTC) where required and used as an alternative to Type 3 fence shall be as per SP-2-4.2 except that it could be directly attached with galvanized twist ties or clips to the top rail or wire resting against the mesh on the threat side. Use of steel arms fastened to the posts may also be considered for the support of 2 barbed wires and BTC.

4.3 Type 3 Fence

This fence conforms to the criteria set out in SP-2 for perimeter fences. It shall be topped by steel arms supporting 2 strands of barbed wire and BTC. The arms shall have 2 strands of barbed wire with the BTC cradled between. Steel arms lean towards the threat side.

4.4 Type 4 Fence

The following pertains to a single fence extension of the inner perimeter fence:

4.4.1 This fence is continuous connected to the inner perimeter fence at each end. It shall conform to the specification for an interior fence as in "Chapter SP-2 – Fence, Conforming Specifications 4.1.8 and 4.2." and relevant plates; only exception being that the BTC needs to be installed only on the threat side at the first intersecting panel.

4.4.2 The three temporary construction gates must conform to "Chapter SP-3 - Gates and Sally Port, 5. – Fence Gates, 5.2 Vehicle Swing gates". Gate 2 (the gate on the Inner Perimeter Fence) requires FDS that can be masked during construction hours and unmasked for all other times. The gate FDS must connect to the MCCP.

4.4.3 Motion Detection System (MDS) cable exists within the No Man Zone between the fences. This cable has to be protected from heavy trucks and machinery at the crossing by installing an asphalt pad of 150 mm thick without disturbing the gravel surface over the MDS cables (see Plate SP-6-7). This material can be removed following construction. It is also important to limit the use of salt during winter months. Excess salt will drain to the sides and seep into the surrounding surface adversely affecting the MDS cable's RF field.

4.4.4 A temporary microwave system covers the vehicle crossing area within the No Man Zone.

4.4.5 Temporary gates may be installed between the perimeter fences at the Sally Port crossing to allow maintenance vehicles to circulate, these gates must be designed to not interfere with both the MDS and the temporary microwave systems.

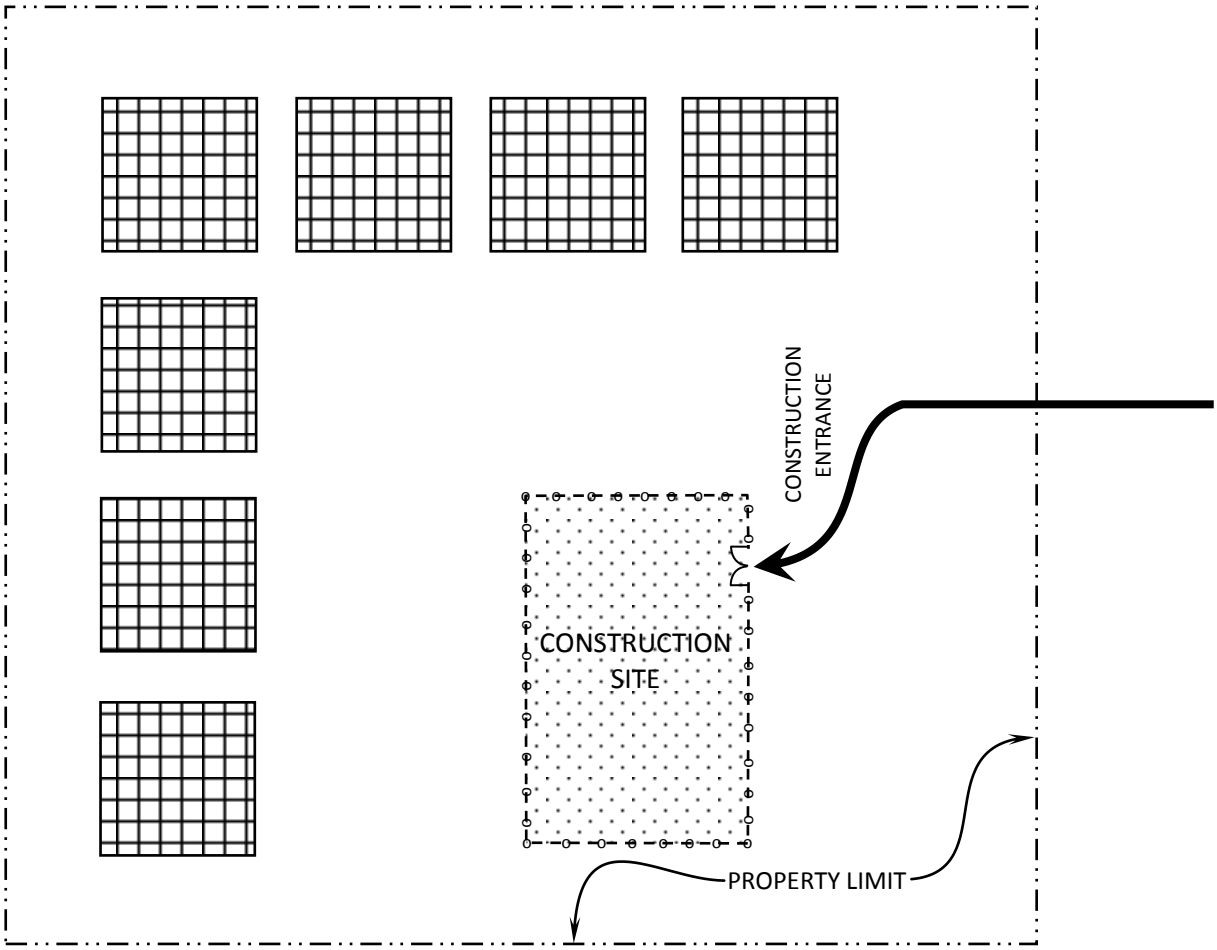


PLATE SP–6–1 – TYPE 1 FENCE

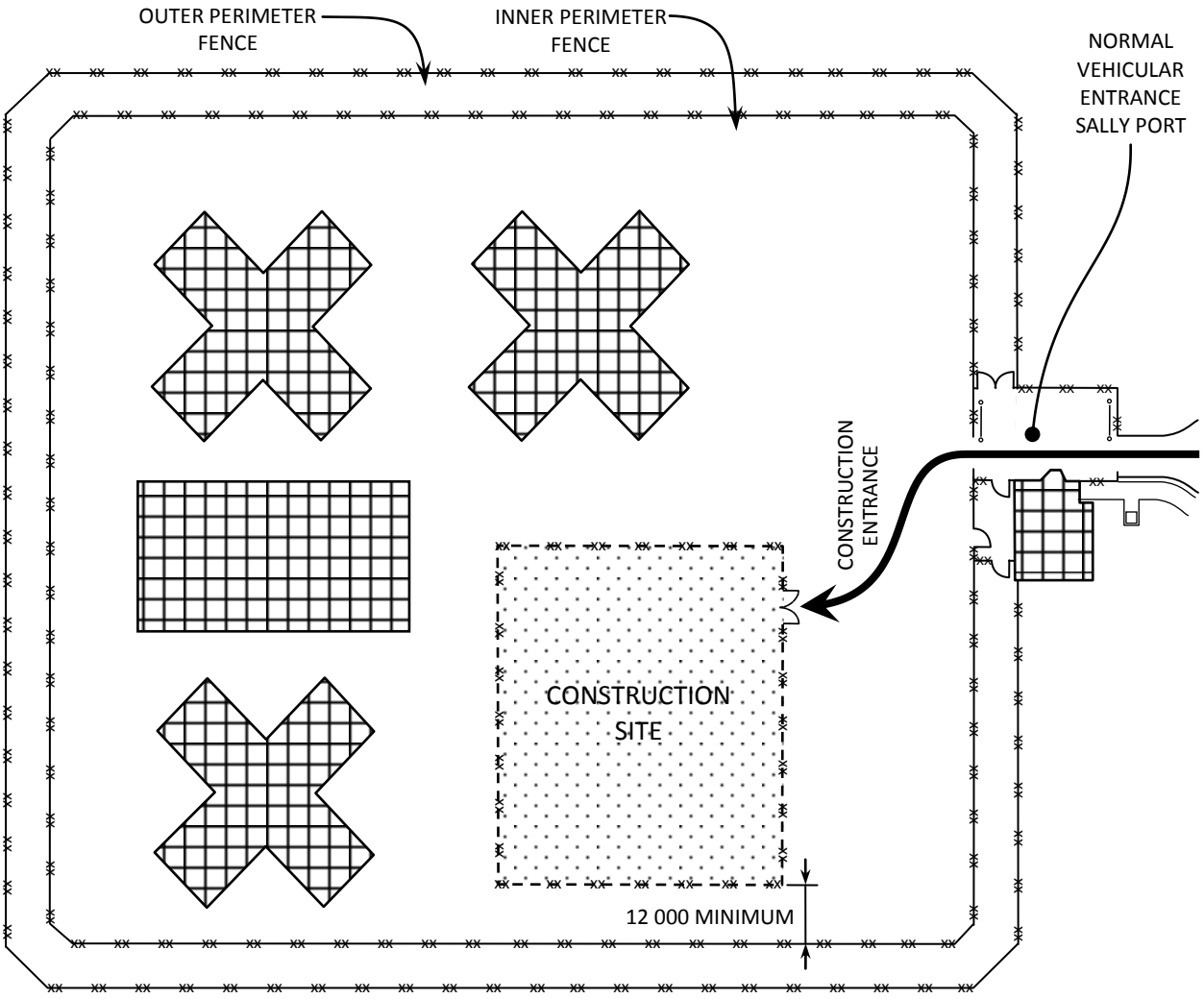
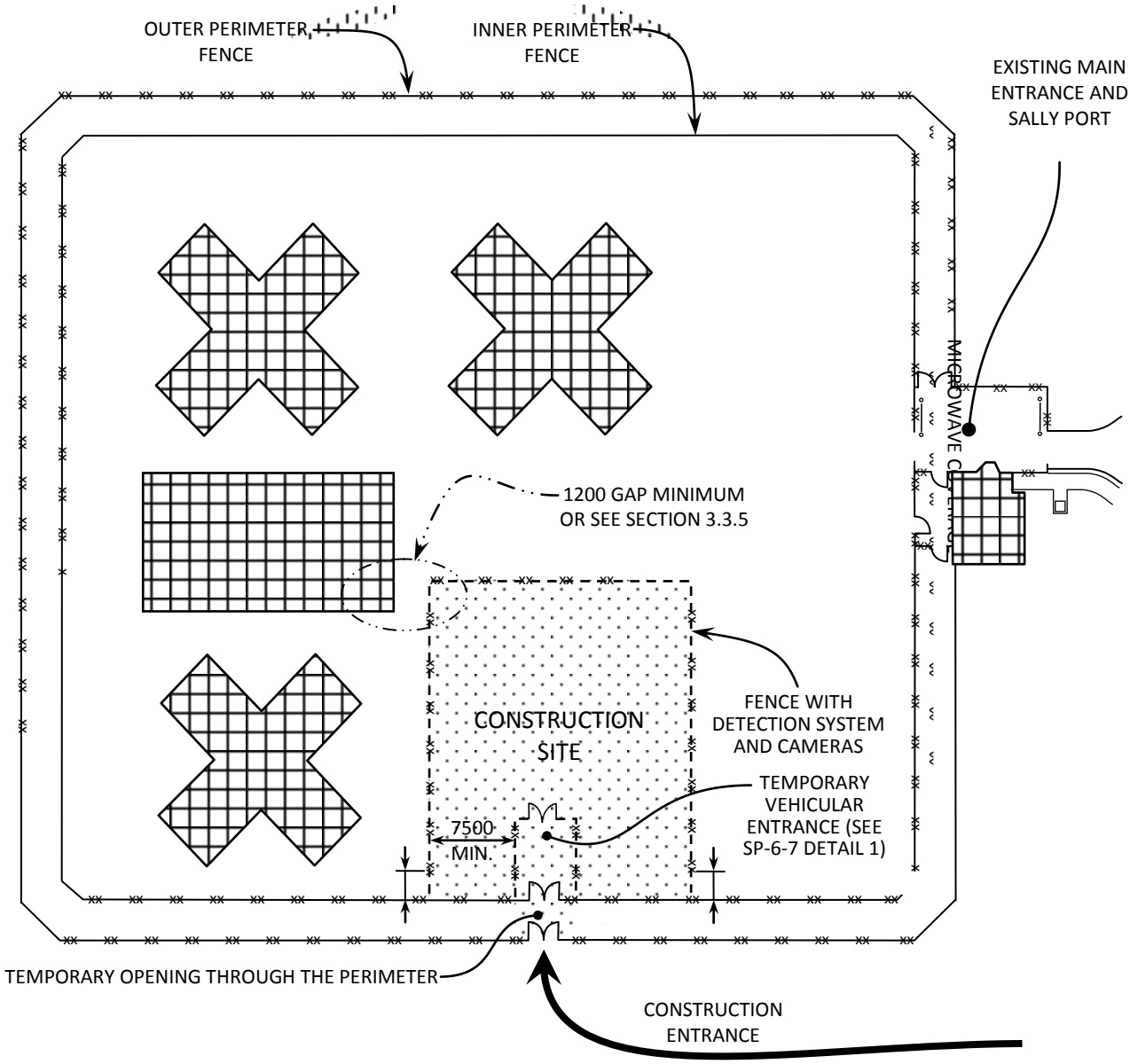
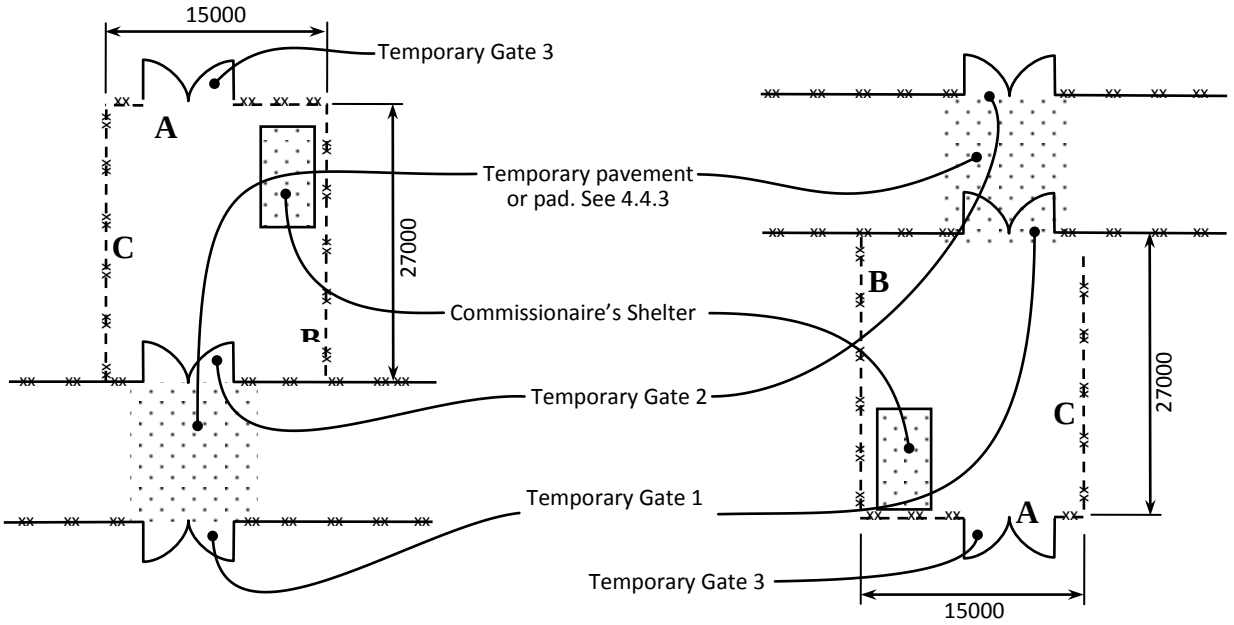


PLATE SP–6–2 – TYPE 2 AND 3 FENCE

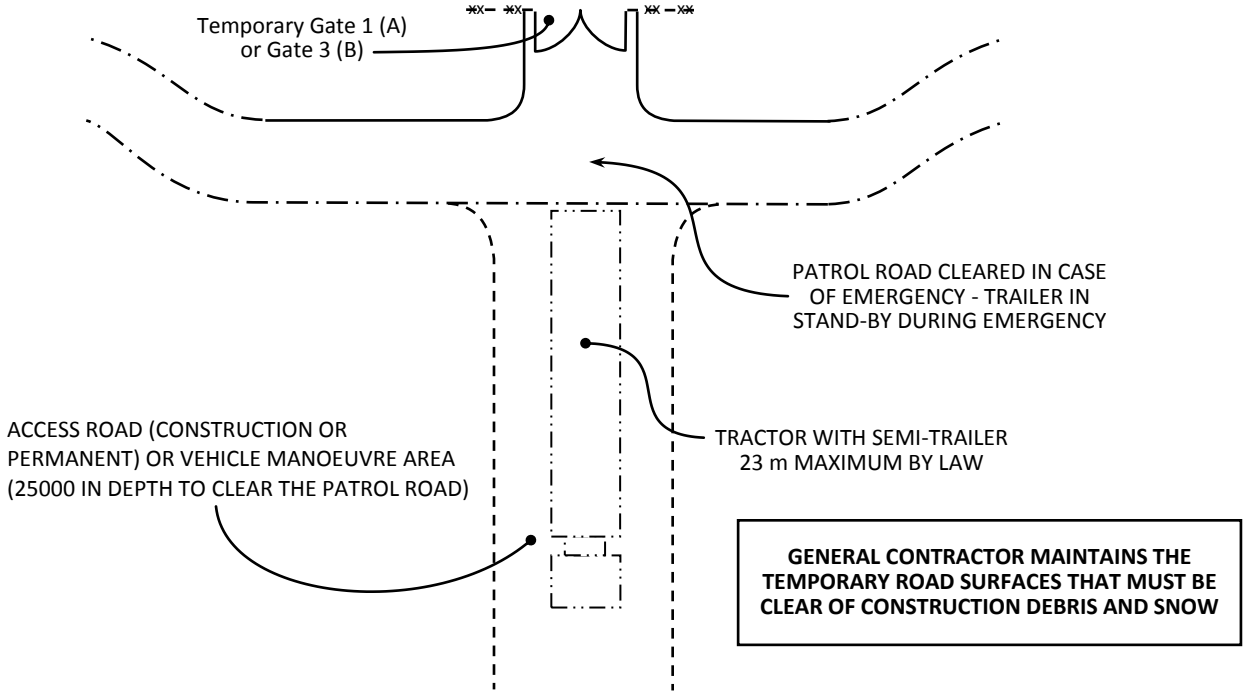
PLATE SP–6–3 – TYPE 4 FENCE





A – INSIDE THE INSTITUTION **B – OUTSIDE THE INSTITUTION**

SP–6–4 – TYPE 4 FENCE – ENTRANCE OPTIONS



SP–6–5 – TYPE 4 FENCES – VEHICLE ACCESS DETAIL

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LA SÉCURITÉ, LA DIGNITÉ ET LE RESPECT POUR TOUS

Technical Criteria for

Correctional Institutions

SECTION SU – SITE UTILITIES

Canada

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SU-1 SITE UTILITIES – STORM AND SANITARY SEWERS

1. SCOPE

This section sets out technical guidelines and criteria for storm and sanitary sewers serving CSC Institution properties.

2. RELATED SECTIONS

SP–1 – Site Planning and Development
SP–5 – Traffic Circulation & Parking
SU–2 – Wastewater (Sewage) Treatment
SU–3 – Water Utility
M–2 – Plumbing Requirements

3. DESIGN CONSIDERATIONS

3.1 General

Design of storm and sanitary sewers shall be based on good engineering practice and conform with all applicable codes, regulations and standards in the specific locality of the work. In addition, the following requirements of CSC shall be given special consideration:

3.1.1 Imminent and future development plans

3.1.2 Project specific security requirements

3.1.3 Operation and maintenance aspects as related to the special requirements of a C.S.C. institution.

Institution sewerage systems are often used by inmates to dispose of contraband, clothing and other bulky items which may block sewer pipes, manholes, pumps and treatment equipment.

Screening or comminution equipment must be installed at suitable locations in the collection system. Such equipment shall be power operated, automated (requiring minimum operator manipulation).

3.1.4 Separate sanitary and storm sewer systems will be used and, insofar as is feasible, sewers will be at such a depth as to admit contributing flows by gravity.

3.1.5 Pumping Stations

3.1.5.1 Consider the implications of power failure and of exceeding the pumping capacity.

3.1.5.2 Provide high and low sewage level alarms properly identified to the technical services work station and if this station is not manned on a 24 hour day basis, to the Main Communication Control Post (MCCP).

3.2 Estimation of Flow Quantities

Determine the quantity of wastewater based on the following as appropriate:

3.2.1 Storm - select a storm frequency consistent with the actual or anticipated land use, suggested:

3.2.1.1 50 year maximum for main conduits and high value areas

3.2.1.2 10 year for upstream connecting conduits.

3.2.2 Sanitary

3.2.2.1 The average daily domestic water consumption shall be based on the monitoring data collected by each institution. Where data is not available, the consumption shall be based on 550 ℓ/day/user. The total users shall be the total inmate population plus one third of the total institution staff.

Water requirements for food preparation and dishwashing are included in this allowance.

3.2.2.2 Water requirements for laundry and industrial shall be based on accepted practice,historical data and manufacturers' recommendations. Estimate the minimum and maximum flows where they cannot be measured using the following relationships:

- Maximum daily: Average daily x 2.50
- Minimum daily: Average daily x 0.75
- Peak: Mean rate during the maximum 15 minutes for any 12 month period. For CSC Institutions take at 4 times the average daily.

3.2.2.3 The population and industry estimates should be those anticipated during the design period, which should not be less than 25 years for sewer mains.

3.2.2.4 The above consumption may be modified in accordance with reliable historical data from existing similar institutions.

4. SECURITY CONSIDERATIONS

4.1 Surface Drainage

4.1.1 Inside Perimeter Fence

Minimize the use of open channels in areas within the perimeter. In general, surface drainage will be by buried storm sewers. The use of culverts must be submitted to C.S.C. for approval.

4.1.2 Outside Perimeter Fence

For the area 100 m outside the perimeter fence, open channels, wide and shallow rather than narrow and deep shall be used whenever practical. Where culverts are required they shall not permit the entry of an inmate as a possible hiding place. This may be achieved by the use of multiple small culverts rather than a single large size or the installation of metal bars at outlet.

4.2 Manhole Covers

In Medium and Maximum institutions all manholes and catch-basins within the perimeter fence shall be secured with special fastenings to prevent unauthorized entry. Specify standard covers and frames to be modified as follows: (See Figure SU-1-1)

4.2.1 Covers: Drill three equidistant 20 mm holes near the perimeter to receive 16 mm stainless steel hexagon head bolts. Countersink for washers and bolt heads to ensure a flush installation.

4.2.2 Frame: Drill and tap frame to receive the bolts from the cover. Specify lugs if necessary for this purpose.

4.3 Perimeter Fence Crossings

4.3.1 To prevent possible escape routes, minimize the number of sewer pipes larger than 350 mm OD within the perimeter fence by locating larger mains outside the fence with branch connector lines from within.

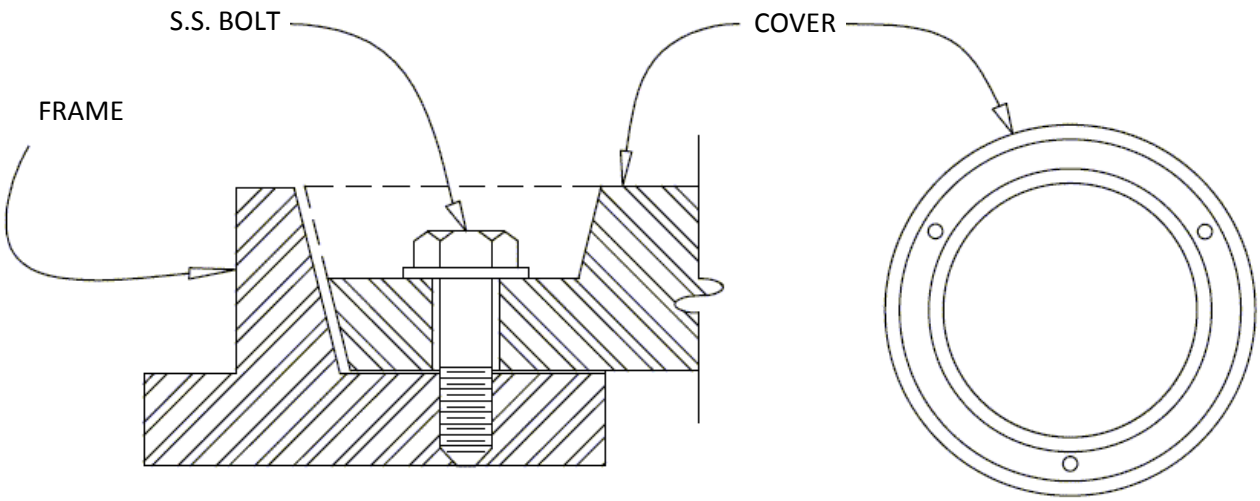
4.3.2 For a Medium and Maximum institution, if a sewer line larger than 350 mm OD is required to cross the perimeter fences, insure that it cannot be used as an escape route. An acceptable solution is to provide distributing manholes on both sides of the fences and run the required number of 350 mm OD (or smaller) pipes joining the two manholes. Refer to Plates SU-1-2 and SU-1-3 and table 1 for details.

4.4 Perimeter Intrusion Detection System (PIDS)

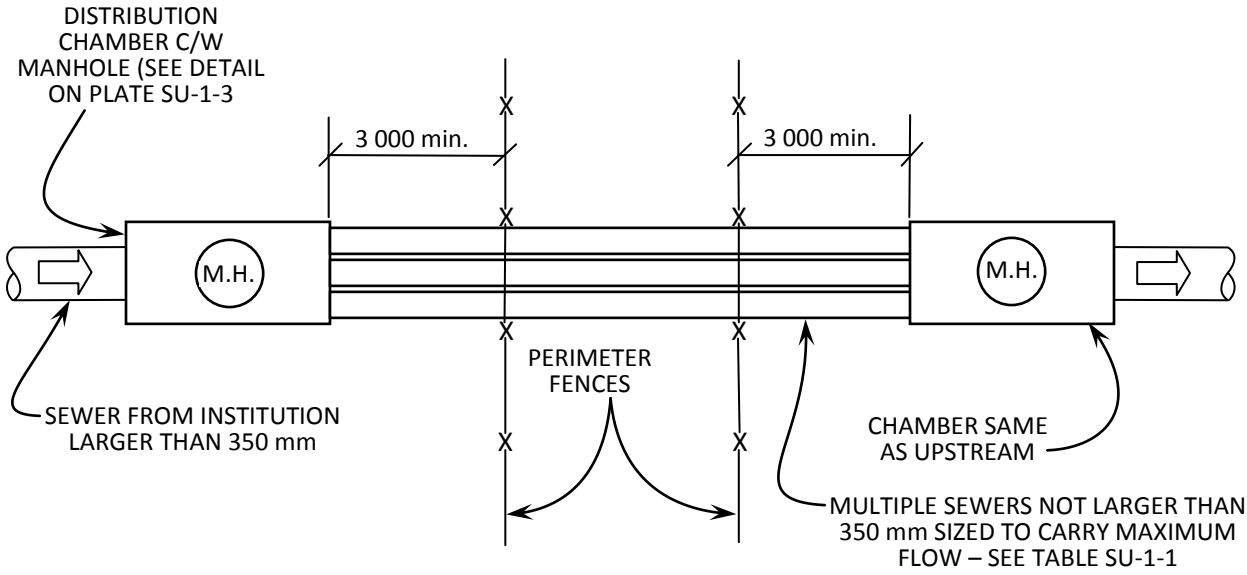
Requirements

4.4.1 Since the PIDS (Motion detection in-ground system) may be affected by both metal pipes and variable flowing liquids, all pipes crossing the perimeter fence for Medium and Maximum institutions shall be a minimum of 1.5 m below grade. This requirement need not be followed at the sally port.

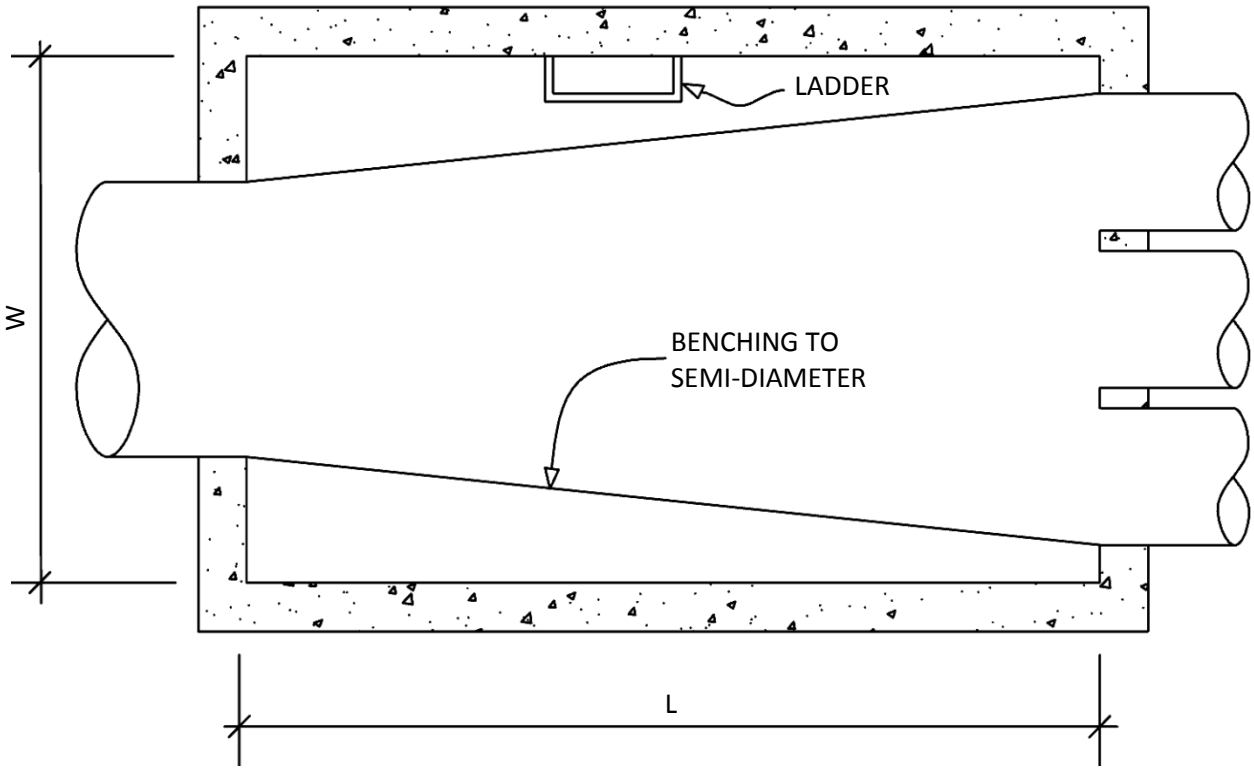
4.4.2 Any liquid flow with changing mass, such as varying flow in partly filled sewer or storm drainage pipes, must also be a minimum of 1.5 m below grade even if the pipes are non metallic.



SU–1–1 – SECURITY MANHOLE COVER



SU–1–2 – LARGE SEWERS CROSSING PERIMETER FENCES – GENERAL LAYOUT PLAN



SU–1–3 – LARGE SEWERS CROSSING PERIMETER FENCES – DISTRIBUTION CHAMBER DETAIL

TABLE SU–1–1 – DISTRIBUTION CHAMBER DIMENSIONS

INLET DIAMETER mm OD	NO. OUTLET PIPES	H mm	W mm			L mm
			1 Tier	2 Tier		
350 to 500	2	30	1 100			2.0 W
600	3	30	1 600			2.0 W
700	4	30	2 000			2.0 W
750	5 (3 + 2)	40		1 600		2.5 W
800	6 (3 + 3)	40		1 600		2.5 W
900	7 (4 + 3)	45		2 000		2.5 W

H = Difference in invert levels between inlet and lowest tier outlet
W = Chamber width internal
L = Chamber length internal

SU-2 SITE UTILITIES – WASTEWATER (SEWAGE) TREATMENT

1. SCOPE

The intent of this section is to set out technical guidelines and criteria for wastewater treatment facilities serving CSC Institution properties.

2. RELATED DOCUMENTS

This section should be read in conjunction with the following as applicable:

SP–1 – Site Planning and Development
SU–1 – Storm and Sanitary Sewers
SU–3 – Water Utility
M–2 – Plumbing Requirements

3. DESIGN CONSIDERATIONS

3.1 This section deals with property sanitary wastewater treatment systems including pre-treatment, (screening, comminution and grit removal), primary treatment, secondary treatment and the disposal of the products of treatment.

3.2 Storm water will not be treated unless there are exceptional environmental requirements.

3.3 All drainage infrastructure and wastewater treatment facilities shall be designed and constructed in accordance with CSC's CD 318-6[1], all applicable Federal, Provincial and local legislation, regulations codes and standards.

3.4 The quantity of wastewater to be treated shall be determined from potable water use data for each institution or from reliable data from existing similar institutions. The design period should not exceed 20 years.

3.5 All treatment plant shall be designed with a level of redundancy in each treatment components to allow for repair and maintenance without requiring bypass or shut down.

3.6 Loadings forecasts wastewater treatment systems may be based on reliable historical data from existing similar institutions or in the absence of such data use the following:

	Allowance per person	
	BOD	SS
Inmates/Patients	0.175 kg/day	0.20 kg/day

3.7 The minimum criteria for wastewater treatment shall meet the requirements as set out in CSC's Management of Wastewater Treatment Systems Guideline CD318-06, the Environment Canada Wastewater Systems Effluent Regulations and local (provincial/ municipal) discharge criteria.

3.8 Sewage systems discharging to on site lagoons shall include screening and will not rely solely on comminution.

3.9 High and low level sewage alarms shall be installed and properly transmitted to a station that is manned on 24 hours a day.

[1] CD 318 – Guidelines 318-6 – Management of Wastewater Treatment Systems (2003-06-11)

4. SECURITY

4.1 Treatment plant installations shall be designed so as to prevent unauthorized entry.

4.2 Suitable remote monitoring and warning devices shall be provided at the technical services work station and if this is not manned on a 24 hour basis critical alarms shall be run to the Main Communication Control Post (MCCP).

4.3 Assess the implications of power failure and where warranted connect to emergency standby power facilities. Redundant pump and other critical components shall have control systems that provide for automatic lead lag rotation and engagement in the event of failure of the primary unit.

4.4 It cannot be stressed too strongly that wastewater treatment at CSC Institutions is not the same as wastewater treatment under normal municipal circumstances. Inmate behaviour may lead to deliberate vandalism and misuse of system and must be considered. As such wastewater treatment technology used should be able to effectively deal with significantly higher plastic and fabric loads; shall be industry standard with wide industry usage and local serviceability.

SU-3 SITE UTILITIES – WATER UTILITY

1. PURPOSE

1.1 The intent of this section is to set out technical guidelines and criteria for domestic and fire protection water supplies serving CSC Institution properties.

1.2 This criterion is to be used to supplement Public Works Canada, , applicable plumbing, building and Fire code requirements. In particular, potable water systems shall be designed and constructed to meet Health Canada's Drinking Water Guidelines and to support the applicable system requirements specified in the most recent version Health Canada's publication *Guidance for Providing Safe Drinking Water in Areas of Federal Jurisdiction*[1].

1.3 Departures from this Document shall be supported by explanation and data satisfactory to CSC and all authorities having jurisdiction.

1.4 Design of the site fire protection systems are subject to the approval of CSC Engineering and Maintenance, Chief Fire Protection Engineer. All codes should be respected, but the Chief Fire Protection Engineer has the final decision.

2. RELATED DOCUMENTS

2.1 This section should be read in conjunction with the following TCD sections as applicable:
SP–1 – Site Planning and Development
SP–5 – Traffic Circulation and Parking
SU–1 – Storm and Sanitary Sewers
SU–2 – Wastewater Treatment
M–2 – Plumbing
M–3 – Fire Protection

2.2 In addition the following will be observed as applicable:
2.2.1 PWGSC Design and Construction Branch Standards and Guidelines
2.2.2 Government of Canada Master Specifications
2.2.3 Canadian Guidelines for Drinking Water Quality
2.2.4 Provincial Drinking Water Guidelines
2.2.5 Guidance for Providing safe drinking water in areas of federal jurisdiction
2.2.6 Local applicable codes and requirements

3. SCOPE

The scope of the design work of project water utility systems includes the following:

- Connections to the building systems 2 m outside the building
- Site distribution and metering
- Connections to public utility main(s)
- CSC owned and operated water supply and treatment system
- Domestic and fire protection water storage.

4. INSPECTION

Establish responsibility regarding payments and inspectional requirements to obtain final approvals by the authorities having jurisdiction.

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[1] Health Canada – Guidance for Providing Safe Drinking Water in Areas of Federal Jurisdiction - Version 1 – 2005, ISBN: H128-1/05-440E, Cat. No.: 0-662-41691-0
http://www.hc-sc.gc.ca/ewh-semt/pubs/water-eau/guidance-federal-conseils/index-eng.php

5. EMERGENCY POWER

All water treatment and supply equipment, alarm, controls, and accessories requiring electrical power should be supplied with emergency secondary power supply.

6. BASIC DESIGN REQUIREMENTS

Establish contact with local utility company, municipality environmental protection agency, and municipal fire department to obtain the following information:

6.1 Existing water main(s) location, size and elevation

6.2 Utility water residual pressure for the Project flow requirements.

6.3 Allowable, water capacity supplied by the utility company, and security of supply

6.4 Requirements relating to water metering system

6.5 Requirements relating to the division of responsibility with regard to the extent of work to be provided by the Utility and/or User.

6.6 Requirements relating to the type and quality of the materials utilized for the site water systems.

6.7 Requirements relating to the acceptable minimum and maximum sizes of the Project water connection(s) to the utility main(s).

6.8 Requirements relating to the acceptable type and process system of the water treatment and make up facilities, if required.

6.9 Requirements relating to the water disinfection system.

6.10 Location of the existing fire hydrants.

6.11 Thread standards for the site fire hydrant and fire department connections.

7. WATER DISTRIBUTION AND FIRE HYDRANT

7.1 Consider separate domestic and fire protection water distribution systems.

7.2 Site water distribution system should be designed forming sectionalized loops and providing at least two service connections to each major building.

7.3 Water meter assemblies should be located in pits or buildings, accessible to the utility company generally outside the perimeter fence.

7.4 Site distribution loop used for domestic water system only should be of the size required by consumption, but should not be smaller than 100 mm in diameter.

7.5 Site distribution loop used for domestic and fire protection water should be at least 200 mm in diameter. Give justification for any recommendation of main sizes larger than 250 mm.

7.6 Water pressure in the site distribution loop should not be less than 50 PSIG.

7.7 Design and specify adequate number of loop sectionalizing valves, as required by the building and loop layout.

7.8 All bends, fire hydrants and branch 'tees' in the underground distribution lines should be designed with the required trust blocks.

7.9 Valves controlling water supply, including sectional valves, with the exception of those controlling an individual hydrant, shall be the “Post Indication Type” sectional valves and shall be designed so that the majority of hydrants may remain in service during a water outage caused by a break or maintenance.

7.10 Except as otherwise stated in this document, hydrants (including associated piping and valves) shall be designed and installed per the requirements of NFPA 24 “Standard for the Installation of Private Fire Service Mains and their Apparatus”.

7.11 Fire department connections shall be located in supervised areas and accessible to fire department apparatus at all times.

7.12 Fire department connections shall be located so that the distance from a fire department connection to a hydrant does not exceed 45 m and is unobstructed.

8. WATER QUANTITIES

8.1 Domestic Water Consumption shall be based on the following:

8.1.1 The average daily domestic water consumption shall be based on existing potable water use data for the institution or existing similar institutions. Data must be verified for specific locations / institutions. A range for consumption may vary between 300-600 litres/day. The total users shall be the total inmate population plus one third of the total institution staff. Water requirements for laundries, food preparation and dishwashing are included in this allowance.

8.1.2 Water requirements for large scale laundry facilities, industrial and irrigation shall be added to the above amount and shall be based on accepted practice, historical data and manufacturers' recommendations.

8.1.3 Estimate the minimum and maximum flows where they cannot be measured using the following relationships:

- Maximum daily: Average daily x 2.50
- Minimum daily: Average daily x 0.75
- Peak: Mean rate during the maximum 15 minutes for any 12 month period. For CSC Institutions take at 4 times the average daily.

8.1.4 The above consumption may be modified in accordance with reliable historical data from existing similar institutions.

8.2 Water required for fire protection shall be as outlined in M-3:6 – SPRINKLER SYSTEM.

9. WATER SUPPLY

To guard against interruption of service the water supply shall meet the following requirements:

9.1 When available the water supply shall consist of two separate connections to different municipal utility mains with adequate quantity to meet fire protection requirements.

9.2 Where only one connection is practical from a municipal supply or if the quantity is not adequate to meet the fire requirements, supplement municipal supply with on site storage tanks or reservoirs and pumping system. See M-3:9 – FIRE PUMPS for fire pump requirements.

9.3 Where no municipal supply is available, provide a private supply and on site storage with pumping systems.

10. WATER TANK

10.1 The capacity of the water storage tank shall meet the requirements of both the domestic water supply and fire protection water unless non potable water supply is used for fire protection.

10.2 Domestic water storage shall be not less than 24 hours reserve of the average calculated water consumption.

10.3 Fire protection water quantity shall be as specified in M-3:6 – SPRINKLER SYSTEM.

10.4 Design system with at least two tanks or compartments and a separate pump well so that one compartment or tank can be cleaned or repaired while the other can continue to provide water service.

10.5 Water storage tanks shall include, as a minimum, flow through operations and consideration will be given to including active mixing technologies.

10.6 Any pumps or fittings in storage tanks, shall be designed and installed such that they may be serviced or replaced without having to drain or enter the tank.

10.7 All potable water storage tanks shall have securely locking access doors or lids. The lock shall be such that tampering will leave an indication.

10.8 Storage tanks located outside shall be located inside a chain link security fence with Bollards on all four corners.

11. PRIVATE WATER SUPPLY

11.1 General

11.1.1 Where a municipal water supply is not available, a private supply must be found and a thorough survey of all possible sources shall be made by a qualified hydrogeologist and certified well driller.

11.1.2 Where adequate supply of non potable water is available consider separate fire protection and domestic water supply and storage systems.

11.1.3 Prior to undertaking any groundwater investigations, the local authority responsible for granting groundwater permits shall be consulted

11.2 Wells

11.2.1 Prior to undertaking any groundwater investigations, communication with local authority responsible for granting groundwater permits is required.

11.2.2 All local (municipal or provincial) well drilling requirements, including reporting requirements, shall be followed.

11.2.3 The design and construction of a well shall follow the recommendations in Health Canada's *Guidance for Providing Safe Drinking Water in Areas of Federal Jurisdiction* (see footnote 1) in addition to applicable best management practices.

11.2.4 The design and construction of the well(s) shall be adapted to the geologic and the ground water conditions existing at the site of the well in order to provide a sufficient and safe water supply, and to conserve the ground water resource.

11.3 Water Treatment

11.3.1 Water treatment technologies will be designed based on the raw water analysis and results from a vulnerability assessment.

11.3.2 Treatment should aim to reduce corrosion in the distribution system while ensuring final water quality conforms to the Canadian Drinking Water Quality Guidelines.

11.3.3 Water sampling taps will be provided between each treatment technology to allow monitoring of treatment efficiency.

11.3.4 Disinfection will be applied to all finished water such that a disinfection residual in the distribution system conforms to the requirements listed in CD 318-10[2].

Water softening should be considered when calcium carbonate ($CaC0_3$) concentrations in the water exceed 150 parts per million or where required by authorities having jurisdiction.

[2] CD 318 – Guidelines 318-10 – Drinking Water Quality Management (DWQM) (2009-10-28)

11.3.5 When water softening is required consider designing a dual distribution system throughout the building, each with header type mains, i.e. a hard water and a soft water system. Connect water closets and urinals to the hard water system. Connect domestic hot water tank, boiler feed water, humidification systems, make up and fill, etc. to the soft water system.

SU-4 SITE UTILITIES – POWER SUPPLY AND ELECTRICAL POWER DISTRIBUTION

1. SCOPE

This section outlines the performance requirements and design guidelines for the electrical power supply and distribution system.

2. RELATED DOCUMENTS

2.1 This section should be read in conjunction with the following TCD sections as applicable:

SP–1 – Site Development
SP–4 – Site - Exterior Lighting
E–1 – General Electrical Engineering & Electrical Distribution

2.2 In addition, the Canadian Electrical Code Part I[1] will be observed as applicable:

2.2.1 Where this document is more stringent or contradicts a code or standard this document shall override. Approval from CSC must be obtained before any variations from this document are incorporated into any designs.

2.2.2 For the purpose of this document, "High Voltage" is 750 volts and above.

3. POWER SUPPLY AUTHORITY

3.1 The following details regarding the power supply available and point of connection shall be obtained from the local Power Authority.

3.1.1 System Data:

- Voltage, configuration, insulation level and neutral grounding arrangement.
- Available system short circuit present and ultimate future. Values should be both 3 phase bolted fault and line to ground fault.

3.1.2 System operating information:

- Voltage regulation.
- Operating procedures, capacitor switching
- Determine if re-closures are used and whether single or 3 phase.
- Restrictions or requirements with regard to maximum relay settings or fuse sizes at customers service for co ordination.
- Available records concerning history of failures, repair times, duration of power outages.

3.1.3 System connection information:

- Location and type of connection overhead or underground.
- Whether transformer vault required or desirable.

3.1.4 Metering information:

- Preferred method of metering primary or secondary.
- Rate structures, with allowances for high voltage connection, customer owned transformation.
- Special demand charges and power factor penalty.
- Acceptability of additive metering at more than one point on low voltage side of service, such as for dual or triple transformer station.
- Related additional charges, if any.

[1] CSA C22.1-09 – Canadian electrical code (21st edition), part I, safety standard for electrical installations

3.2 In addition to the above details, the following shall be investigated:

3.2.1 The availability of alternate supply connection.

- alternate feeder same route
- alternate feeder alternate route
- alternate feeder alternate station
- Identify power supply authority charges for any other of the above arrangements which are available.
- If available, obtain historical data concerning failure rates and repair times.

3.2.2 Study economics of customer owned versus utility owned transformer and connection voltages.

3.3 Obtain approval of the following from the local Power and Inspection Authorities having jurisdiction:

- Proposed service entrance equipment,
- Switchgear,
- Duct manhole systems,
- Direct buried or overhead systems,
- Transformers and associated equipment.

4. LOAD DETERMINATION

4.1 Carry out preliminary load study, including location of major load distribution centres.

4.2 Allow for 100% lighting load plus an appropriate demand factor on the remaining load, based on operating characteristics.

5. SERVICE LOCATION AND CONFIGURATION

5.1 Underground service is preferred.

5.2 For medium, maximum and multi security level projects underground service must be considered for voltages less than 50 kV.

5.3 Underground service is to start at least 75 meters from the compound fence. Overhead service should be limited to buildings outside the compound.

5.4 For minimum security level projects, service may be underground or overhead.

- Underground service should always be considered for voltages less than 35 kV.

5.5 High voltage main service switchgear and related distribution with or without large station transformation should be configured to recognize the following criteria:

- Minimize steps of transformation as governed by economics.
- Underground distribution is preferred between buildings and service points within the project.
- Medium, maximum and multi security level projects require all power distribution between buildings to be underground.
- in minimum security level projects, where long runs to load centre connection points occur, overhead distribution at high voltage should be considered, as dictated by economic factors.

5.6 Underground services from power supply connection to service location shall be conductors in reinforced concrete encased duct banks.

- In medium, maximum and multi security level projects, an underground distribution within the compound shall consist of conductors in reinforced concrete encased duct banks.

- Conductors shall be installed in reinforced concrete encased duct banks under all hard surfaces such as asphalt or concrete.
- Where practical, for long runs in "soft" landscaped areas of medium security projects, distribution feeder conductors between buildings or service connection points may be direct buried with suitable bedding.
- Spare ducts for future growth are a mandatory requirement. Minimum size of underground ducts should be 78 mm, with pull in ropes.
- Provide one spare duct for each pair of ducts required.
- Whenever services for medium, maximum and multi security level installations are routed under security fences, such services must be minimum 2 meters below ground level.
- Drainage of ducts and pull boxes is extremely important. Pull boxes should be connected to storm sewer drainage system.
- Underground Pull Box requirements for Power and Communications distribution should be outlined. Identify sizes, concrete, galvanized steel lids suitable for vehicular traffic, padlock able lids, identification. Wherever possible locate in non-vehicular areas.

5.7 Where service tunnels are provided for other utilities they should be used for electrical distribution wherever possible.

6. LINE CONSTRUCTION

6.1 Design and specify construction of underground service and distribution facilities and overhead lines in accordance with Canadian Electrical Code Part 3 "Outside Wiring Rules" which consist of the following CSA Standards:

- CSA C22.3 No. 1-10 – Overhead Systems
- CSA C22.3 No.3-98 (R2007) – Electrical Coordination
- CSA C22.3 No. 4-1974 (R2004) – Control of Electrochemical Corrosion of Underground Metallic Structures
- CSA C22.3 No. 7-10 – Underground systems

6.2 For wood poles reference CSA Specification Series:

- CAN/CSA-O15-05 (R2009) – Wood Utility Poles and Reinforcing Stubs
- CAN/CSA-O80 Series-08 – Wood Preservation

7. ELECTRICAL EQUIPMENT VAULTS

7.1 Where vaults for electrical equipment are required, design and specify in accordance with Canadian Electrical Code Part I and to suit local requirements of the electrical Inspection Authority.

7.2 Locate vaults for ease of access and equipment maintenance. Consider special security requirement for openings doors, vents, fences, etc.

8. EXISTING CONDITIONS

8.1 Consult available documents provided by Correctional Service Canada and locate all existing buried services shown such as electrical, telephone lines, water and sewer lines, gas mains, etc.

9. CABLES FOR OUTSIDE SERVICE

9.1 For underground, References are:

- CSA C22.2 No. 1 – Overhead Systems and Underground Systems (ie)
- CSA C68.2 – Concentric Neutral Power cables
- CSA C68.3 – Power cable with Thermoset Insulation
- CSA C22.2 No. 131 – Type Teck cable
- CSA C22.2 No. 124 – Mineral Insulated copper or aluminium Sheathed cables
- CSA C22.2 No. 51 – Armoured cables (2a, 1c)
- XLPE insulation preferred.

9.2 For overhead lines consult with the local power authority as to their specific requirements and also consider copper conductor, bare and weather resistant for low voltage, A.C.S.R. for high voltage.

9.3 References:

- I.C.E.A. P 51 432 – Copper conductor, bare and weather resistant.
- CSA C49.1 – Aluminium conductor steel reinforced (ACSR)
- CSA C49.2 – Compact aluminium conductor steel reinforced (ACSR)
- CSA C22.3 No.1-10 – Overhead systems and underground systems (ie)

10. CONDUCTOR TERMINATIONS

10.1 Specify compression connectors with bolted pad for interface to bus or aerial lug.

10.2 For high voltage cable specify outdoor type porcelain body factory produced slip on terminators, complying with *IEEE Standard 48-2009*[2].

11. CONDUCTOR TESTING

11.1 Specify that the following certified reports be supplied for all type of cables rated between 5kV and 46kV.

11.1.1 Partial discharge extinction level in accordance with *CSA Standard C68.3-97 (R2006)*[3].

11.1.2 Five minute high voltage AC test to be done in the factory in accordance with *CSA Standard C68.3-97 (R2006)* and *C22.2 No. 0.3-09*[4].

11.1.3 Insulation resistance test in accordance with C68.3-97 (R2006) and C22.2 No. 0.3-09 (see footnotes 3 and 4).

11.1.4 High voltage D.C. acceptance test for fifteen minutes after installation and before the cable is placed in regular service in accordance with C68.3-97 (R2006) and C22.2 No. 0.3-09.

11.2 Apart from the above test all conductors up to 46 kV shall undergo the other tests in accordance to their respective CSA Standard.

12. HIGH VOLTAGE SERVICE EQUIPMENT

12.1 For all high voltage service equipment specify:

- Metal enclosed switchgear assemblies in a switchboard or switchboards in accordance with CSA Standard *C22.2 No. 31-04 (R2009)*[5].

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[2] 48-2009 – IEEE Standard for Test Procedures and Requirements for Alternating-Current Cable Terminations Used on Shielded Cables Having Laminated Insulation Rated 2.5 kV through 765 kV or Extruded Insulation Rated 2.5 kV through 500kV

[3] CAN/CSA-C68.3-97 (R2006) – Shielded and Concentric Neutral Power Cables Rated 5-46 kV

[4] C22.2 No. 0.3-09 – Test methods for electrical wires and cables

[5] C22.2 No.31-04 (R2009) – Switchgear assemblies

- For more detailed definitions of components and assembly types refer also to *ANSI/IEEE C37.100-1992*[6].
- *Definitions for Power Switchgear*.

12.2 For large main station type configuration specify:

- Full compartmentalization for *Metal Clad Switchgear*.
- Draw out power circuit breakers.
- Copper bus.
- Main incoming switching devices un-fused load interrupter type.
- Provisions for high voltage (primary) metering by utility if agreed.
- Customer metering to include voltmeter, ammeter. Provision for connection of portable monitoring and/or metering in the field for kW (kilowatt), kWh (kilowatt-hour), Power factor, harmonics, etc.

12.3 Ensure adequate space, ventilation cleanliness and moisture free to ensure against tracking.

NOTE: Special treatment for bus will be required where run through compartment walls, i.e.: high voltage insulated sleeves or grommets.

12.4 For voltages 15kV and lower, where specifying dry type high voltage main transformers "Unit Substation" type construction is preferred.

- Refer to "Unit Substation" definition in *ANSI/IEEE C37.100-1992* (see footnote 6) and *EEMAC Standard G13-1, 1978*[7].

12.5 For high voltage breakers, preference is for:

- solid state type relaying with low power requirements in trip actuating circuit thus permitting effective use of current transformer output as source of tripping power and avoiding station battery.
- also consider manual operation.
- 15kV and below specify air circuit breaker or minimum oil type. Above 15kV use minimum oil.

12.6 For small distributed type services, consider fused load interrupter type switchgear and;

- Indoor unit substation configuration up to 15kV.
- If outdoor specify full height full voltage class equipment and ensure flexible high voltage connection between switchgear and transformer.
- Outdoor switchgear and transformer installed on concrete pad, surrounded with crushed stone.
- High voltage fuses, specify "Power Fuses" as defined in *ANSI C37.100-1992*[8] and in accordance with *ANSI C37.46-2000*[9], also refer *ANSI/IEEE C37.40-2003*[10] and *ANSI/IEEE C37.41-2008*[11].
- Use E rated fuses.

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6 C37.100-1992 – IEEE Standard Definitions for Power Switchgear

7 EEMAC G13-1, 1978 – EEMAC Standard for Unit Substations

8 C37.100-1992 – IEEE Standard Definitions for Power Switchgear

9 C37.46-2000 – American National Standard for High Voltage Expulsion and Current-Limiting Type Power Class Fuses and Fuse Disconnecting Switches

10 C37.40-2003 – IEEE Standard Service Conditions and Definitions for High-Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories

11 C37.41-2008 – IEEE Standard Design Tests for High-Voltage (>1000 V) Fuses, Fuse and Disconnecting Cutouts, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Fuse Links and Accessories Used with These Devices

NOTE: For grounding and fencing requirements refer to *CSA C22.2 No. 0.4-04 (R2009)*[12]

12.7 For station grounding design refer to Canadian Electrical Code Part I[13] and *IEEE Standard 80-2000*[14].

12.8 For all installations provide surge arrestors to protect power cable, switchgear and transformers. Select arrestor class and rating to suit system and voltage. Consult utility. Base selection on:

- *ANSI C62.2-1987*[15].
- Specify manufacture and testing in accordance with *ANSI/IEEE C62.1-1989*[16].

12.9 Allow for future expansion by using adequate space and access for addition of future equipment.

13. HIGH VOLTAGE TRANSFORMERS

13.1 For distribution within buildings for systems 400 kVA and over, secondary voltage normally preferred is 600 volt - 3 phase grounded wye.

- Secondary system may be 4 wires or 3 wires.

(NOTE: 4th wire or neutral should always be taken to main service switchboard and grounded. Some utilities may require the neutral for metering.)

Smaller systems may be lower voltage such as 208/120V 3 phases 4 wires subject to restrictions imposed by motor loads, etc. Unless clearly impractical 3 phase systems are preferred

13.2 When applying high voltage transformers refer to and specify in accordance with the following standards.

- Power Transformers: *CAN/CSA-C60044-5:07*[17]
- Distribution Transformers *CAN/CSA-C2.1-06* and *CAN/CSA-C2.2-06*[18]
- Dry type Transformers *C9-02 (R2007)*[19]

Apply transformer types in accordance with the following table:

Configuration	H.V. (primary)	L.V. (secondary)	Indoor	Outdoor
Main Stn.	Below 15kV	600V	Dry type C9	Power type C88
Dist. Stn.	Below 15kV	600V or lower	Dry type C9	Dist. Type C2
Main Stn.	15kV to 46kV	600V	LNAN C88	ONAN C88
Dist. Stn.	15kV to 46 kV	600V or lower	LNAN C2	ONAN C2
Main Stn.	15kV to 46 kV	600V or lower	LNAN C88	ONAN C88

[12] CAN/CSA-C22.2 No. 0.4-04 (R2009) – Bonding of Electrical Equipment
[13] CSA C22.1-09 – Canadian electrical code, part I (21st edition), safety standard for electrical installations
[14] 80-2000 – IEEE Guide for Safety in AC Substation Grounding
[15] C62.2-1987 – IEEE Guide for the Application of Gapped Silicon-Carbide Surge Arresters for Alternating Current Systems
[16] C62.1-1989 – IEEE Standard for Gapped Silicon-Carbide Surge Arresters for AC Power Circuits
[17] CAN/CSA-C60044-5:07 – Instrument Transformers – Part 5: Capacitor Voltage Transformers
[18] CAN/CSA-C2.1-06 – Single-Phase and Three-Phase Liquid-Filled Distribution Transformers
CAN/CSA-C2.2-06 – Pole-mounted, Single-phase Distribution Transformers for Electric Utilities
[19] C9-02 (R2007) – Dry-Type Transformers

13.3 Transformer winding and connection arrangement generally preferred is:

- H.V. primary – Delta
- L.V. secondary – grounded wye

However, refer to *ANSI/IEEE C57.105-1978 (R2008)*[20]. Particularly note and Review possibility of Ferro resonance for each application. Where necessary to guard against Ferro resonance use connections and winding arrangements such as:

- H.V. primary – grounded wye
- L.V. secondary – grounded wye

with common ground point for both windings.

NOTE: Requirement for additional loop in magnetic circuit to compensate for negative sequence current due to unbalanced loads and specify 4 or 5 legged core.

13.4 Select transformer size to suit load

- main service configuration
- distribution system size and configuration

For 600 volt secondary, transformer size should be selected to limit maximum let through RMS symmetrical short circuit current to 34,000 amperes which implies a maximum 2500 kVA transformer with 6.5 to 7.0% impedance.

Fan cooled rating would be 3300kVA.

Refer to details for distribution system size and configuration under Section E-2 Electrical Distribution.

13.5 Specify copper windings for high voltage and low voltage. Specify temperature rise tests on all transformers. Specify BIL tests on all dry type transformers.

13.6 Ensure transformers are installed with adequate ventilation.

Oil filled transformers should be installed in a secure enclosure constructed to protect for explosion and fire.

For liquid filled transformer installation refer to *IEEE C57.93-2007*[21] (filling the transformer *IEEE C57.91-1995*[22] and *IEEE C57.91-1995/Cor-2002*[23].

For dry type transformer installation refer to *CSA C9-02 (R2007) Appendix A* [24] .

[20] ANSI/IEEE C57.105-1978 – Guide for Application of Transformer Connections in 3-phase Distribution Systems
[21] C57.93-2007 – IEEE Guide for Installation and Maintenance of Liquid-Immersed Power Transformers
[22] C57.91-1995 – IEEE Guide for Loading Mineral-Oil-Immersed Transformers
[23] C57.91-1995/Cor 1-2002 – IEEE Guide for Loading Mineral-Oil-Immersed transformers Corrigendum 1
[24] C9-02 (R2007) – Dry-Type Transformers

14. COMMISSIONING

14.1 Specify preparation of a load study as part of the contract. The load study is to be reviewed and commented on by the design engineer. The study is then to be submitted to CSC.

14.2 The load study is to contain full load current readings of all feeders connected to 50 ampere circuit interrupting devices and larger. Currents are to be read at the line side of the feeders if possible.

14.3 The load study is to contain voltage readings taken at the load side of the feeders. Transformer taps shall be adjusted within 2% of rated voltage of equipment.

14.4 The load study is to identify loads i.e. are they motors, lighting or heating.

14.5 Specify balancing of loads.

14.6 Specify for contractor to demonstrate that systems operate as design intended them to operate and that contractor must be prepared to operate each device, such as switches, relays etc., to the satisfaction of CSC and PWGSC personnel involved in the acceptance procedure.

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Technical Criteria for

Correctional Institutions

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A-1 ARCHITECTURE – PROJECT AND DEFINITIONS

1. SCOPE

This section outlines the key considerations for the design of correctional projects.

2. PROGRAM REQUIREMENTS

A detailed program of requirements for the functional areas contained in a correctional project will be provided by CSC. The program contains the problem statement, the objective(s) to be realized, a budget and schedule for such work. The architect shall adhere to the program requirements and the stated objectives.

3. STYLE AND MATERIALS

New buildings or additions shall be compatible in scale and modest in form. The building shall be designed with the users well being in mind and be environmentally sustainable by employing current “green” best practices.

4. COST

The solution shall fulfill all program requirements and objectives in a cost efficient manner. If at any time it is apparent that there is a discrepancy between the program requirements, objectives and the approved budget, the matter shall be referred to CSC for resolution.

5. DEFINITIONS

Inmate Areas: Areas in an institution intended for inmate circulation and activities. These areas are periodically supervised by visual or virtual means and traffic to these areas may be scheduled and controlled by group size. Examples are: Inmate cell/bedroom, ranges, and program rooms.

Inmate Controlled Access Areas: Areas in an institution intended for limited inmate circulation and movement may be under escort. This also includes areas to which access is permitted for specific groups of inmates but denied for others. Examples are: Administration office areas, and aboriginal sacred ground.

Inmate Restricted Areas: Areas in an institution where inmate presence and circulation are prohibited. Examples are: Security posts, galleries, refuge areas and utility equipment spaces.

A-2 ARCHITECTURE – BUILDING CONSTRUCTION

1. SCOPE

This section outlines envelope requirements for correctional institutions and identifies specific functions requiring secure construction.

2. RELATED SECTIONS

A–3 – Grilles, Mesh and Screens
A–4 – Glazing, Windows and Assemblies
A–5 – Doors and Frames
A–6 – Detention Hardware
A–10 – Finishes and Modesty Screens
A–13 – Security Control Posts, Galleries & Routes
A–11 – Inmate Cells

3. CONSTRUCTION GUIDELINES

3.1 Standard

Where confinement and/or protection are not critical, building shall be constructed in accordance with normal practices and the National Building Code (NBC)[1] for the appropriate use and occupancy. Offices within inmate controlled access areas may use standard office partition systems. For openings, standard commercial windows, doors and hardware are used unless otherwise specified.

3.2 Secure

Where confinement and/or protection are critical, the building envelope shall be constructed to resist penetration by physical force. The type of envelope construction is outlined below and the locations for each are identified in Table A-2-1.

Note: Where there is any question concerning the suitability of materials for a specific use, the approval of CSC issuing authority shall be obtained.

4. PERFORMANCE REQUIREMENTS FOR SECURE CONSTRUCTION

4.1 Secure construction is designed to resist penetration and serves to frustrate attempts at breach with the use of impact and other instruments by means of either covert or overt assault. The construction type provides for a varying degree of resistance related to the risk of assault and the gravity of the outcome.

4.2 Materials used for walls, floors and ceilings shall provide equal resistance to doors and windows where these elements in combination form a secure enclosure.

4.3 Exterior wall materials of a façade of a building where security is at issue shall not facilitate climbing.

4.4 The façade design of a building where security is at issue shall not offer any opportunity for concealment from normal observation. Alcoves and recesses shall be avoided.

4.5 Joints of surface materials and the material itself shall not offer any opportunity for hiding of contraband for later retrieval.

4.6 Materials selected shall provide a relatively high level of resistance to vandalism and dismantling.

[1] National Building Code of Canada 2010, National Research Council, 2010, ISBN 0-660-19976-4
http://www.nrc-cnrc.gc.ca/eng/ibp/irc/codes/2010-national-building-code.html

4.7 Specific areas of an institution requiring secure construction are listed in Table A-2.1. The type of secure construction typically differs by institutional security level or by degree of threat risk and is identified as secure construction 1, 2, or 3 with increased performance in ascending order. Walls, floors, and ceilings are described below while matching envelope elements such as doors, windows, and hardware follow in Table A-2-2.***Secure Construction 1 – Commercial Enhanced***

For walls and partitions, higher performance is required than offered by simple gypsum board on stud construction.

4.7.1.1 Expanded metal mesh, woven wire mesh or plywood used as a substrate to gypsum board and fastened to the studs are acceptable materials. Alternately, standard concrete masonry of 150mm width may be used with hollow core and no vertical reinforcing other than what is required to meet the NBC or structural requirements.

4.7.1.2 Partitions shall extend and be secured to the structural ceiling or be capped under the joists with an equally secure ceiling.

4.7.1.3 Exterior stud wall construction using masonry cladding or pre-formed metal cladding of thickness no less than 0.635mm (24 ga) do not require added security within the stud wall.

4.7.1.4 Floors and ceilings due to structural requirements provide for acceptable protection on combustible or non-combustible construction.

4.7.2 Secure Construction 2

Walls and partitions require 200 mm hollow concrete block, vertically reinforced at 800 mm centres with all hollows concrete filled. Alternate construction may be acceptable providing equal performance and economies can be met. Floors and ceilings require reinforced cast in place slab, pre-cast concrete (e.g. hollow core slab) or a metal deck concrete filled. Where gaps in joints are exposed, these shall be caulked with epoxy grout to eliminate direct through passage.

4.7.3 Secure Construction 3

Walls and partitions are fully reinforced cast in place or pre-cast concrete of 150 mm thickness with vertical reinforcing at 300 mm on centre. Masonry construction may also be used comprising 200 mm hollow concrete block having all hollows concrete filled and vertically reinforced at 400 mm. An ‘H’ cast block offers generally a better performance to that of a standard block and shall be specified similarly reinforced if locally available. Steel blocks may be integrated with masonry construction at specific points to facilitate welding steel furniture and other appurtenances. Floors and ceilings are made of reinforced cast in place slab, pre-cast concrete (e.g. hollow core slab) or metal deck concrete filled. Any exposed gaps in joints and honeycombs in poured concrete shall be appropriately filled to eliminate direct through passage.

TABLE A-2-1 – Specific Areas of an Institution Requiring Secure Construction

On exterior and interior contiguous with inmate accessible areas NA = Not applicable

For construction security requirements of Control posts refer to Chapter A-13

DEPARTMENT / FUNCTION		INSTITUTION SECURITY CLASSIF.		
		MIN	MED	MAX
A1	Management Centre	NA	1	2
A2	Finance	NA	1	2
	– Vault	1	2	2
A3	Staff Services and Training	NA	1	2
A4	Administration & Central Registry	NA	1	2
	– Central File Storage Room	1	2	2
A5	Case and Sentence Management	NA	1	2
A6	Parole Board Hearing	NA	1	2
	– Inmate Waiting Room	NA	1	2
B1	External Control (Gatehouse)	NA	2	2
	– Perimeter Line, Vestibules & Interior Partitions	NA	2	2
	– Main Communication Control Post (MCCP)	NA	3	3
	– Search/Holding /Interview Room	1	2	2
B2	Emergency Response Team	NA	2	2
	– Security Equipment Room	1	1	1
B2	Armoury	NA	3	3
B3	Security Administration	NA	2	2
	– Interior Partitions	NA	1	1
	– Key Room	NA	2	2
B4	Admissions & Discharge	NA	2	2
	– Waiting/Holding Rooms	1	2	2
	– Inmate Effects Storage	1	1	1
C1	Social Programs & Leisure Activities	NA	NA	2
	– Multi-Purpose Rooms	NA	NA	2
	– Canteen	1	2	2
C2	Arts & Crafts	NA	NA	2
	– Workshops	NA	NA	2
	– Raw and Finished Material Storage	1	2	2
C3	Private Family Visiting	NA	NA	NA
C4	Visits & Correspondence	NA	1	2
	– Open Contact Visits	NA	1	2
	– Restricted Visits (Inmate side only)	NA	2	2
	– Office	NA	1	2
C5	Recreation	NA	NA	2
	– Interior Partitions	NA	NA	2
D1	Chaplaincy	NA	1	2
D2	Aboriginal Services	NA	NA	2
E1&E2	Small Group Accommodation and Minimum Security Units	NA	NA	NA

DEPARTMENT / FUNCTION		INSTITUTION SECURITY CLASSIF.		
		MIN	MED	MAX
E3	Responsibility Units (medium security only)	NA	2	NA
	– Apartment Envelope	NA	2	NA
	– Apartment Interior Partitions	NA	NA	NA
	– Entry Vestibule and Circulation Core Partitions	NA	2	NA
	– Staff Office Area Envelope	NA	1	NA
E4	Direct Observation Units (medium security only)	NA	2	NA
	–Range & Central Circulation Area Envelopes	NA	2	NA
	–Cell, Shower and Entry Vestibule Partitions	NA	2	NA
	– Staff Office Area Envelope	NA	1	NA
E5	Maximum Security Units	NA	NA	3
	– Range, Common Area & Circulation Core Envelopes	NA	NA	3
	– Cell, Shower and Entry Vestibule Partitions	NA	NA	3
	– Staff Office and Program Area Envelope	NA	NA	2
	– Program Area Interior Partitions	NA	NA	1
E6	Segregation Unit	NA	3	3
	– Cell, Shower and Circulation Area Partitions	NA	3	3
	– Entry Vestibule Envelope	NA	2	2
	– Staff Office and Program Area Envelope	NA	2	2
F1	Health Care Centre	NA	2	2
	– Clinical Treatment and Staff Support Area Interior Partitions	NA	NA	2
	– In-Patient Area Interior Partitions	NA	1	2
	– Entry Vestibule	NA	1	2
	– Medication Room, Dispensary, Medical and File Storage	1	2	2
F2	Mental Health	NA	1	2
	–Interior Partitions	NA	NA	1
	–File Storage Room	1	2	2
G1	Maintenance	NA	NA	1
	–Volatile Material, Tool and Equipment Storage Rooms	1	2	2
G2	Food Services	NA	1	2
	– Food Storage Areas (Bulk, Coolers, Freezers)	1	2	2
	– Cafeterias/Dining Halls	NA	1	NA
G3&G4	Institutional Services and Material Management	NA	1	1
	–Volatile Materials and attractive items Storage Areas	1	2	2
H1	Occupational Development Programs/CORCAN	NA	NA	1
	– Raw, Finished and Volatile Material, Tool & Equip. Storage	1	2	2
J1,J2&J3	Education; Correctional Programs; and Library	NA	NA	2
	– Multi-Purpose Room Partitions	NA	NA	1
	Circulation separating restricted and inmate controlled access	NA	2	2
	Storage of volatile or other hazardous material or equipment	1	2	2
	Building service areas to be reviewed by CSC issuing authority			

TABLE A-2-2 – Envelope Elements

SECURE CONSTRUCTION	DOOR	WINDOW	HARDWARE
1	CD*	CW3**	BH
2	DD1, DD1p	DW1, DWb	DH1
3	DD2, DD2s, GL	DW2	DH2, DH2sl

* Glazing in doors upgraded from monolithic to laminated glass

**Windows where added security is required may be fitted with exterior grilles or mesh

See Chapter A-4, section 5 (A-3:5) for windows type definition.
See Chapter A-5, section 6 (A-5:6) for door type definition.
See Chapter A-6, section 3 (A-6:3) for hardware type definition.

A-3 ARCHITECTURE – GRILLES MESH AND SCREENS

1. SCOPE

This section identifies the requirements for all grilles, mesh, and screen types used in correctional institutions.

2. RELATED SECTIONS

2.1 Technical Criteria Document sections:

A–4 – Glazing, Windows and Assemblies
A–5 – Doors and Frames
A–6 – Hardware
A–11 – Inmate Cells
A–13 – Security Control Posts, Galleries and Routes

2.2 Standards

2.2.1 ANSI/BHMA – American National Standard

- A156.4-2008 – Doors Controls – Closers, Oct. 2008
- A156.14-2007 – Sliding and Folding Door Hardware, Sept. 2007

2.2.2 ASTM Standards

- A627-03 – Test Methods for Tool-Resisting Steel Bars, Flats, and Shapes for Detention and Correctional Facilities
- F2322-03 – Test Methods for Physical Assault on Vertical Fixed Barriers for Detention and Correctional Facilities

2.2.3 NAAMM DEMA – Detention Equipment

- 111900-09 – Guide Specification for Basic Detention Equipment Requirements, 11, Dec. 2009

3. DEFINITIONS

Tool Resistant Homogenous and Composite Steel: Grade 3 Homogenous or composite Tool-Resisting Steel as described in *ASTM A627-03*. Tool resistant steel is mild steel which had been subjected to having its total surface heat tempered to achieve a greater resistance to cutting by approximately 6X over that of mild steel. Inserts of tungsten carbide in mild steel surface form a composite steel which render it rod saw resistant increasing its cutting resistance by approximately 72X over that of mild steel. Both steels have equal resistance to impact and bending as the mild steel core is left unchanged. Tempering or hardening serves to render the mild steel more brittle. Once hardened steel is welded, the welded area loses its resistance to cutting.

Structural Quality Steel (mild steel): Steel rods, flats and shapes, including tubing, conforming to *CAN/CSA G40.20-04/G40.21-04 (R2009)*[1], Grade 300W or to *ASTM A36/A36M-08*[2]. A sub-group, hollow structural section (HSS) steel tubing is typically used for window bars as it provides not only structural stiffness (square HSS is efficient for multiple-axis loading) but also a hollow interior for inserting a bar of tool resistant homogenous steel or composite rod saw resistant steel as specified.

[1] CAN/CSA G40.20-04/G40.21-04 (R2009) – General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
[2] ASTM A36/A36M-08 – Standard Specification for Carbon Structural Steel

4. GRILLES AND MESH

Grilles and mesh are used for containment and protection in windows and to control traffic in corridors and other specified areas (See A-5) where unobstructed visibility is paramount.

4.1 Window Grille and Mesh

Steel grilles or mesh are mounted on the exterior wall over a conventional window to resist forced entry or egress.

4.1.1 Light weight security mesh for moderate resistance

This type of window protection provides a moderate resistance to attack but allows for clear evidence of any deliberate tampering. Mesh must be securely anchored preferably to the window opening face of the wall in solid material to better resist prying. Mesh may be of galvanized steel as in fence fabric using a woven or welded wire of 4.88mm (6 ga) typically 50mm X 50mm or of stainless steel; using finer and closer strands typically 12 X12 wires per 25mm squared and of 0.6mm wire diameter. The latter option is better suited for air conditioned areas with fixed windows since for operable windows the screen will significantly reduce air flow to 52%.

4.1.2 Structural steel grille for confinement and intrusion protection

Plates A-3-1 and A-3-2 illustrate two examples of steel grilles to be mounted on the exterior wall over a conventional window to resist attack and maintain confinement. The combination of a well anchored steel grille with a window unit satisfies Detention Level 1 (DW1) requirements (A-4:5.4.8).

Other designs with different opening shapes are possible provided that no opening is larger than 125mm in one direction and 610mm in the other direction. Another acceptable design is a square or near square clear opening of a maximum of 250mm by 250mm. No other dimension is permissible without the approval of the TCD issuing authority.

4.1.2.1 The use of this type of grille for inmate cell windows is acceptable as a replacement for similar existing grilles in older institutions where existing windows are to be retained.

4.1.2.2 For other than cells, this type of grille is suitable for windows in supervised areas where containment and intrusion protection is at issue.

4.2 Movement Control Grille Barrier

Movement Control Grille Barriers are used in corridors for separating functional zones or for limiting group size. Grille barriers may also be used for containment in specified areas listed in chapter A-5. Grille barriers are located close to Control Posts to facilitate observation of movement and for control of the barrier gate as well as to allow long views down the corridor.

4.2.1 Grille Barriers are fabricated using Structural steel either of hollow steel sections (HSS) or rods and flats welded together.

4.2.2 Grille Barriers combine fixed grilles and grille gates which slide or are hinged designed to similar configuration and quality of steel. Grilled swing gates are provided with closers while sliding grille gates have a maximum force set by the manufacturer. When moving in either direction and at any point in travel the

force is 133 N (30 lbf)[3]. This indicates that the grille gate could be stopped when in motion and forced in the opposite direction.

4.3 Grilles Test

Grilles shall be resistant to deformation and fracture by screw jack or by impact. Tests shall conform to the following:

4.3.1 Screw Jack Test – Resistant to 30 mm screw jack turned by a 350 mm wrench.

4.3.2 Impact test – ASTM *A673/A673M-07*[4].

5. INSECT SCREENS AND PASS THROUGH RESTRICTORS

Insect screens shall be of commercial grade with standards regulated by the Screen Manufacturer Association (SMA) conforming to *SMA 6001-2002*[5].

5.1 All insect screens for windows are commercial grade applied over the operable portion of the window. In the case of their use in minimum housing where restrictions for egress apply but grilles or mesh are not permitted, they shall be screwed to the frame with security screws to facilitate detection of tampering.

5.2 For Detention Level 1 (DW1) windows, insect screens are commercial grade heavy duty applied over the operable part of the window. Screens are of aluminum using 18 X 16 mesh with frames secured to the window or bars to facilitate detection of deliberate tampering. A pass through restrictor to prevent 'fishing' shall not be used at the medium security level without the approval of the TCD issuing authority. It is critical that materials and components used reflect a gradation of severity consistent with the level of security.

5.3 For Detention Level 2 (DW2) windows in addition to the insect screen, the operable part of the window shall be fitted with a pass though restrictor either of perforated steel plate or of a type which pivots and forms the operable part of the window. The restrictor shall be robust enough to prevent damage by physical attack or dismantling (see chapter A-4 for cell window assemblies).

[3] ANSI/BHMA A156.10-2005 – Power Operated Pedestrian Doors
CAN/CSA-C22.2 NO. 247-92 (R2008) – Operators and Systems of Doors, Gates, Draperies and Louvres;

[4] ASTM A673/A673M-07 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel

[5] SMA 6001-2002 – Specifications for Metal Protection Screens

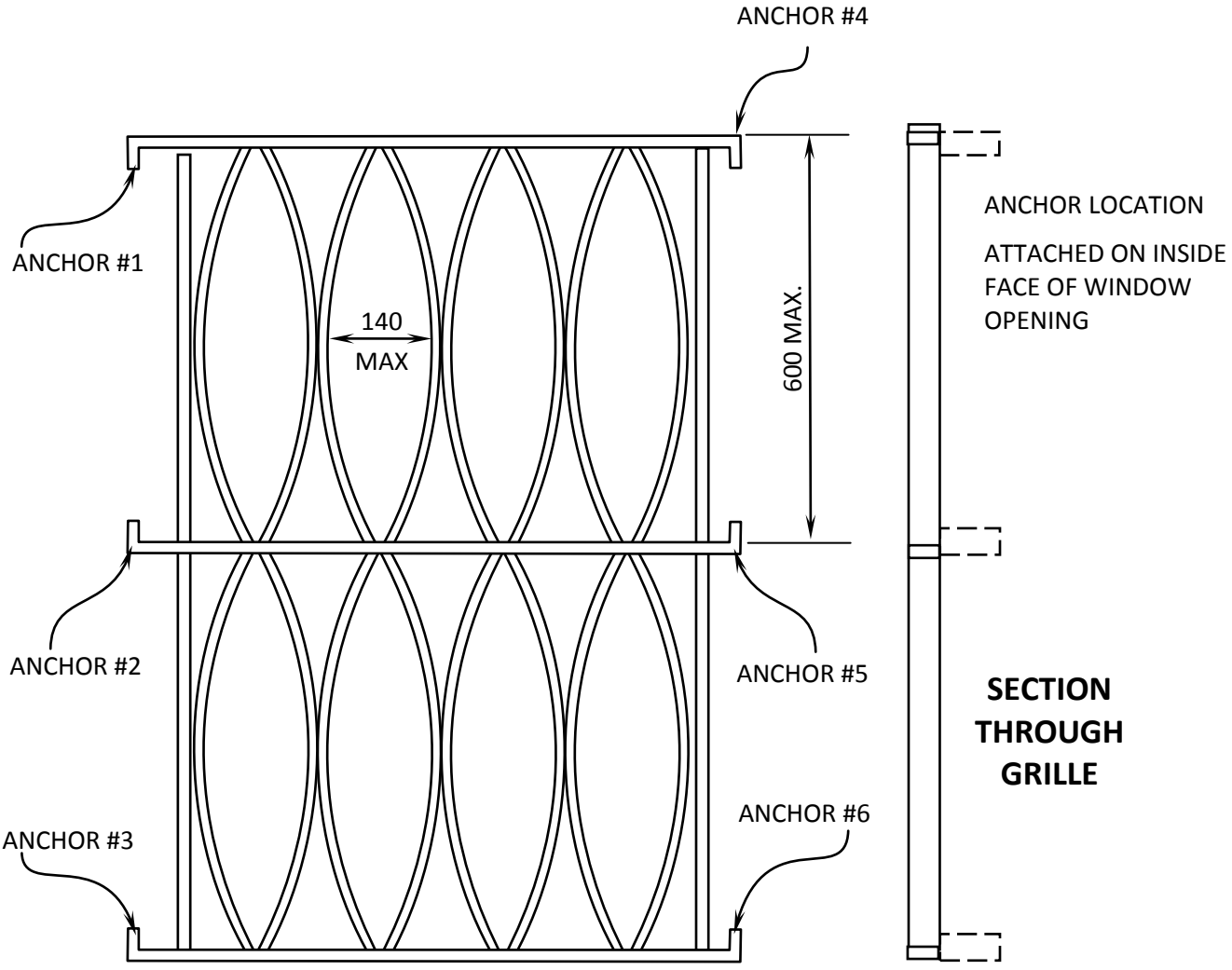


PLATE A–3–1 – GRILLE WINDOW DESIGN AND DETAILS

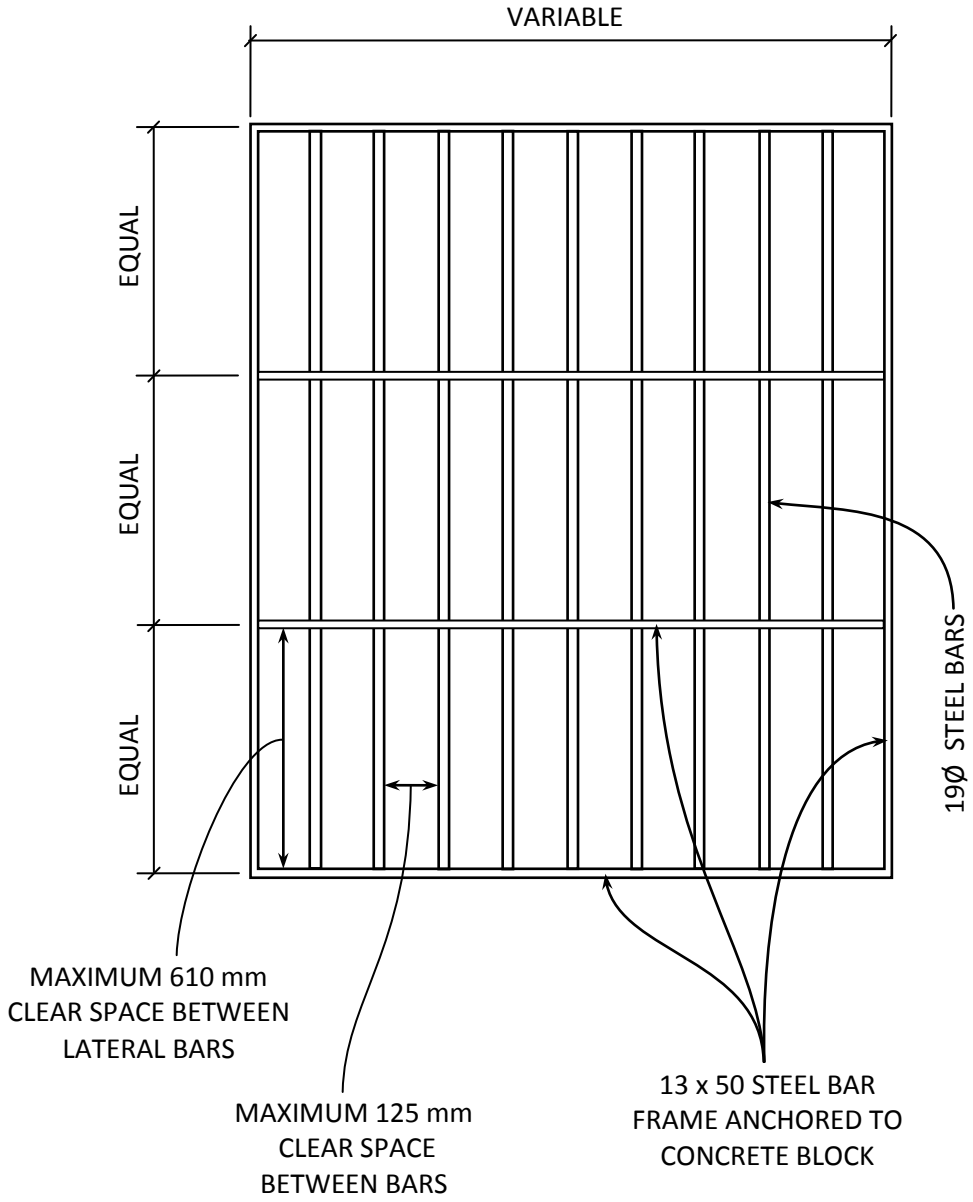
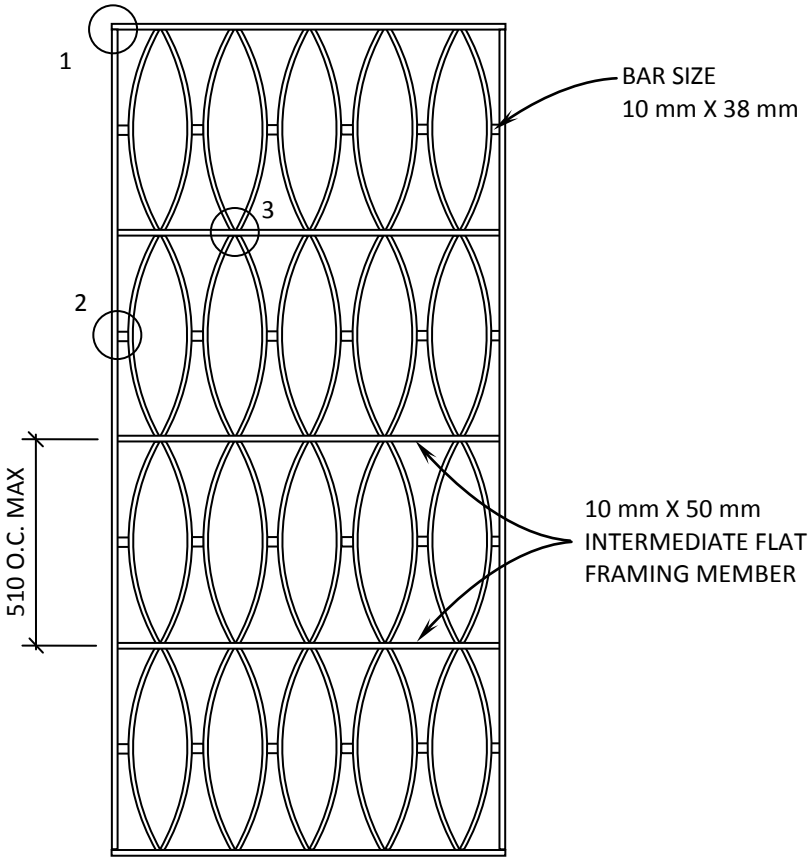
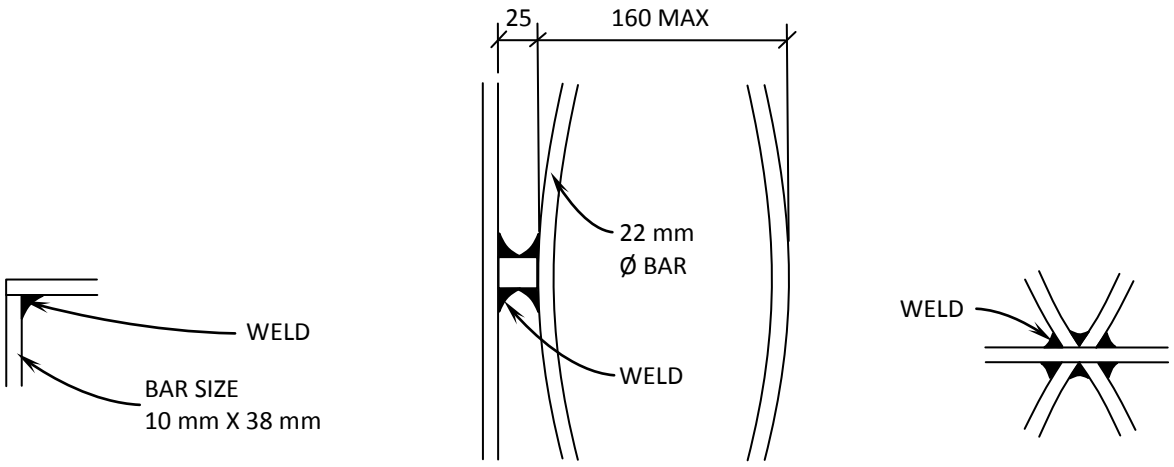


PLATE A–3–2 – GRILLE WINDOW DESIGN ALTERNATIVE



ELEVATION



DETAIL 1 **DETAIL 2** **DETAIL 3**

PLATE A–3–3 – DOOR AND FIXED GRILLE

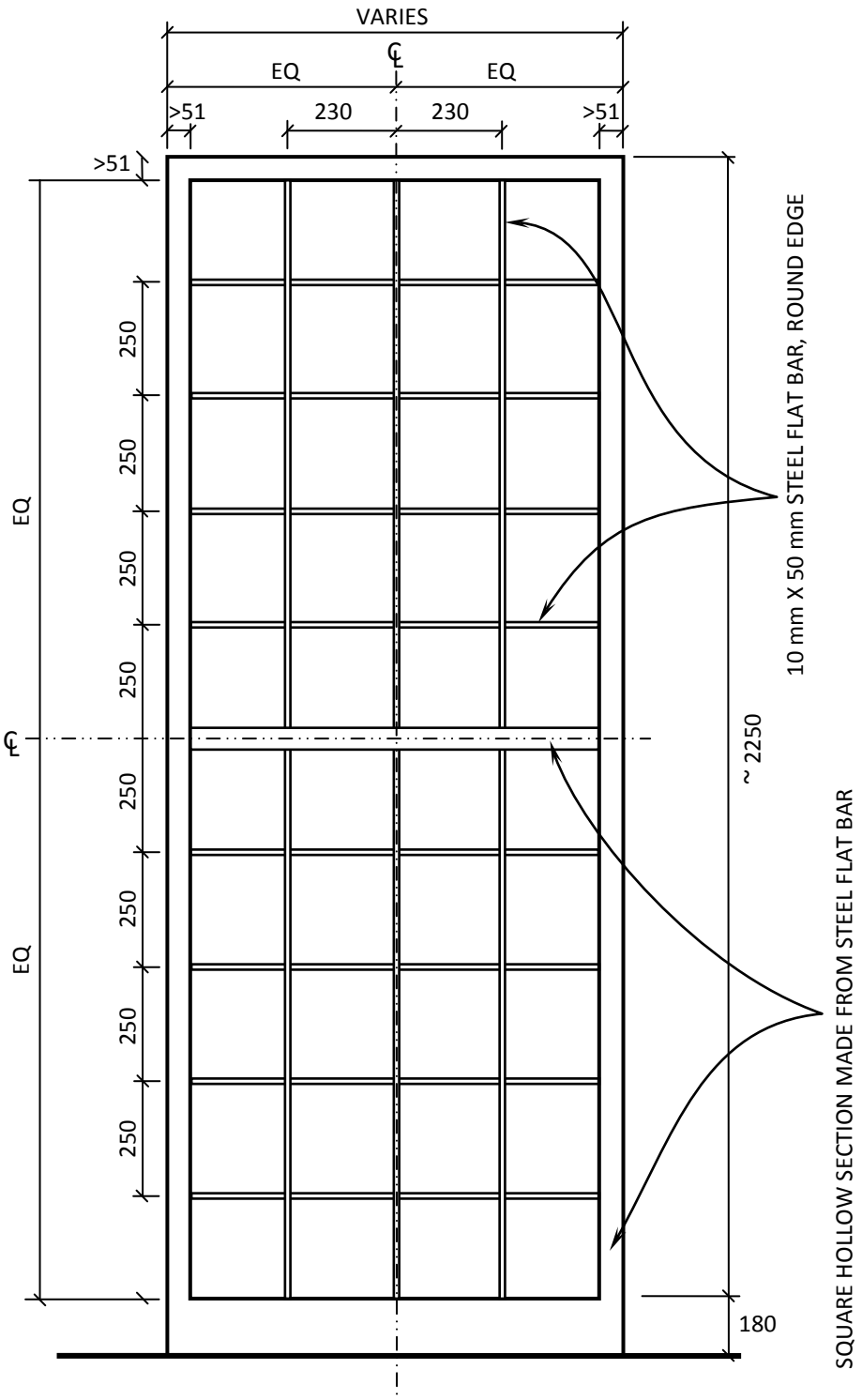


PLATE A–3–4 – DOOR AND FIXED GRILLE ALTERNATIVE

Design Shown is less than 1050 in width

A–4 ARCHITECTURE – GLAZING, WINDOWS AND ASSEMBLIES

1. SCOPE

This section defines the various types of windows for CSC institutions on the exterior and interior except for Control Posts and Weapons Dedicated Routes which are covered in section A–13. Whereas the previous section A-3 dealt with steel grilles and mesh which may be superimposed on exterior of windows, this section deals with a total window assembly designed to achieve a required level of security.

2. RELATED SECTIONS

2.1 Technical Criteria Document sections:

A–2 – Building Construction
A–3 – Grilles, Mesh and Screens
A–5 – Doors and Frames
A–11 – Inmate Cells
A–13 – Security Control Posts, Galleries and Routes
ST–1 – Guard Towers

2.2 CSC/NMS Specifications (NMS–CSC Masterformat 2010 Sections)

08 56 63 Detention windows (Prior to 2004: 08581 – Detention windows)
08 88 53 Detention and Security glazing
11 19 00 Detention equipment

2.3 Standards

2.3.1 ASTM Standards

- A627-03 – Test Methods for Tool-Resisting Steel Bars, Flats, and Shapes for Detention and Correctional Facilities
- A673/A673M-07 – Standard Specification for Sampling Procedure for Impact Testing of Structural Steel
- F1592-05 – Std. Test Methods for Detention Hollow Metal Vision Systems
- F1915-05 – Standard Test Methods for Glazing for Detention Facilities

2.3.2 NAAMM DEMA – Detention Equipment

- 111900-09 – National Association of Architectural Metal Manufacturers – NAAMM – Guide Specifications for Basic Detention Equipment Requirements
- 111950-09 – National Association of Architectural Metal Manufacturers – NAAMM – Guide Specifications for Detention Fixed Exterior Windows

2.3.3 Canadian Standards Association (CAN/CSA)

- A440-00/A440.1-00 (R2005) - CAN/CSA-A440-00, Windows
- A440.1-00, User Selection Guide to CSA Standard CAN/CSA-A440-00, Windows
- A440S1-09 – Canadian Supplement to AAMA/WDMA/CSA 101/I.S.2/A440
- A440.4-07 – Window, Door, and Skylight Installation
- A440.2-09/A440.3-09 – Fenestration energy performance + User guide
- AAMA/WDMA/CSA 101/I.S.2/A440-08 NAFS - North American Fenestration Standard / Specification for Windows, Doors, and Skylights

2.3.4 Canadian General Standards Board (CAN/CGSB)

- 12.1-M90 – Tempered or Laminated Safety Glass
- 12.2-M91 – Flat, Clear Sheet Glass
- 12.3-M91 – Flat, Clear Float Glass
- 12.4-M91 – Heat Absorbing Glass
- 12.8-97 – Insulating Glass Units & 12.8-97 AMEND – Insulating Glass Units
- 12.10-M76 – Glass, Light and Heat Reflecting
- 12.11-M90 – Wired Safety Glass
- 12.12-M90 – Plastic Safety Glazing Sheets

3. DEFINITIONS

Tempered glass: Glass that has been processed by controlled heat or chemical treatment to increase its strength compared to float and untreated glass. Heat tempered glass if fractured breaks into rounded grains rather than sharp shards. This glass is approximately three times more resistant to impact than untreated glass for a thickness of 6mm but less for thinner sheets. It is also more resistant to breakage than chemically tempered glass though the latter if fractured breaks up into shards. Heat tempered glass however due to its heat treatment and resulting surface tension is vulnerable to fracture when impacted by a pointed object or struck at the edge or scratched by a harder mineral such as quartz or a 'precious' stone. Heat tempered glass cannot be cut.

Safety glass: A laminate of two or more sheets of glass adhered to one another with the use of a plastic interlayer. The type of glass used in laminates can differ but if fractured it remains secured to the plastic interlayer (typically PVB or polyurethane minimally 0.78mm thick (30mil) or multiples of this thickness). Depending on the glass type, the breakage pattern will differ but sharp shards are unlikely to be obtained since by impacting the fractured area, the glass will progressively break up into smaller pieces.

Plastic Polycarbonate and Acrylic sheet: Plastic materials which are clear, tough, and shatterproof but are more affected by UV rays than glass. Polycarbonate, a thermoplastic polymer (commonly known by the trademark 'Lexan'), is the softer of the two materials, more resistant to impact but less to abrasion though it could be hard coated to improve abrasion resistance. Acrylic (commonly known by the trademark 'Plexiglass') is harder and therefore more apt to crack under impact but is more resistant to abrasion. This material, commonly used for light diffusers, is not normally found in detention application due to its inferior performance against physical attack. Sheets of polycarbonate can be laminated together using polyurethane as an interlayer to enhance their performance against physical or ballistic attack. Polycarbonate will burn when exposed to continuous flame but if the flame is withdrawn, it chars and rapidly extinguishes itself.

Composite translucent material: Glass combined with polycarbonate in multiple layers to improve performance against physical or ballistic attack while achieving enhanced resistance to chemicals, fire or abrasion. Glass is typically applied on the exposed sides but may be only on 1 side if a threat from ballistics requires that the protected side be spall free. The interlayer used in composite glazing is typically polyurethane due to the two materials having a different coefficient of expansion.

Fire resistant applications: Glass in fire separations is usually comprised of wired glass, tempered glass or glass blocks subject to area and location limitations. Ceramic glass technology is also becoming increasingly popular. Other usages of glass in fire separations consist of combinations with window sprinkler treatments and include specific framing restrictions.

4. PERFORMANCE CRITERIA

The following applies to the use of windows in correctional environments:

4.1 Glazed windows for exterior and interior locations are used in combination with other measures or components to achieve the required security. The measures may include restricted openings, attack resistant glazing or security bars / grilles / or mesh.

4.2 The extent of the exterior window clear glass opening to be provided in all bedrooms and cells shall be 5% of the net room area.

4.3 Windows in bedrooms and cells shall have an operable sash to allow for fresh air controlled by the inmate. The unobstructed ventilation area[1] of the window shall be sized minimally at 125mm in the narrow dimension.

4.4 Windows on a given project shall be of equal size to the extent possible in order to reduce manufacturing costs and to simplify the stocking of glazing materials.

4.5 Glass in windows in minimum security institutions including that which is used in interior areas does not need to be treated to prevent shards when broken except where required by the NBC. Glass in windows in medium and maximum institutions including that which is used in interior spaces shall be heat tempered or safety (laminated) type to prevent shards when broken.

4.6 Tinting films for one way viewing shall not be used on glazing except as indicated in Chapters A-13 and ST-1 for Observation galleries and Guard towers respectively.

4.7 Curtains (and blinds at minimum security institutions) may be used on exterior windows for reasons of comfort and upon request. Curtains in windows at medium and maximum may be attached using 'Velcro'.

4.8 Skylights, where provided, shall meet the same level of performance as that required in wall openings except where they are inaccessible and located in supervised areas.

4.9 For medium and maximum security institutions bars or grilles shall be used on windows to achieve confinement or intrusion protection. The bars shall be spaced to form a clear opening between bars of 125 mm and shall be designed to minimize the effect of "tunnel vision". Bars shall be located on the interior side of the window to be protected from exposure to weather and to assure adequate anchoring to the interior side wall material which typically is reinforced masonry or monolithic concrete. A grille fabricated from mild steel or screens of galvanized steel mesh or stainless steel generally applied on the exterior of the window, do not achieve the security performance of that of a bar.

4.10 Windows used along with bars may have varied configurations to respond to suspension point concerns. For medium security cells, the fixed window sash may span the full opening and be set away from the bars. Bars in this case must be set on the vertical and have no intermediate horizontal members in order to lower the height of potential suspension points to the window sill. For maximum security cells and for segregation and observation cells, the bars shall be in contact with the window glass or window mullions. The window mullion or glass shall be sealed or caulked to each bar to prevent feeding a line behind the bar to achieve a suspension point. As such, windows for maximums and segregation units can have bars set in either vertical or horizontal direction. It should be recognized that suspension prevention is only achieved when the glass is intact. An inmate intent on committing suicide can break the glass on each side of a bar to allow wrapping a ligature around the exposed bar. Closed and secure control posts contribute to sound attenuation preventing hearing glass breaking within a cell.

4.11 Openings for natural ventilation by means of operable sashes or pass through restrictors shall be equipped with insect screens.

4.12 Glazed partitions or wall assemblies for interiors where Security Construction 2 or 3 is required, shall use glass which does not break into shards in combination with grilles or mesh or alternately polycarbonate or composite glazing without the use of grilles or mesh. For secure construction 1, laminated glass may be used to offer a degree of

[1] National Building Code of Canada 2010, 13th Edition 2010, National Research Council, Vol. 2, Section 9.32.2.2

protection. Where fire rated construction is required, NBC compliance shall dictate the choice of materials.

4.13 Window accessories shall not be easily removable or dismantled. The use of vertical sliders in other than minimum security must not incorporate sash balances; instead, sash bolts shall be used.

4.14 Glass used in required fire separations:

4.14.1 Glass used in fire separations must be carefully selected for its use, size, location, type as well as security requirements to ensure that there are no conflicting requirements.

4.14.2 Wired glass and glass blocks shall conform to the requirements of the NBCC with respect to testing, size and area.

4.14.3 Ceramic glass products shall conform to the requirements of CAN4-S106-M "Fire Test of Window and Glass Block Assemblies" for the required rating of the assembly.

4.14.4 Where ceramic glass products are used, these shall be subject to the same area limitations of the NBCC for wired glass unless the material is also tested to limit temperature rise (exposure to radiant heat) at which point the product's listing shall govern.

4.14.5 Window sprinkler applications (protection of glazing using listed sprinklers) shall only be permitted if a specific listed assembly is selected and installed based on ULC/ORD-C263.1-99.

4.14.5.1 A window sprinkler protected glazed wall assembly shall not be installed in:

4.14.5.1.1 Fire separations requiring a fire resistance rating of more than 2 hours,

4.14.5.1.2 A firewall,

4.14.5.1.3 A high hazard industrial occupancy, or

4.14.5.1.4 Any part of an exit serving a high building, a care and detention occupancy (Group B), or a residential occupancy.

5. WINDOW TYPES

General

Window design may be subject to an examination of a mock-up and / or certification of compliance to standards for critical components by an independent laboratory.

5.1 Commercial Level 1 (CW1) – Applicable at Minimum Institutions only

Conventional window conforming to medium duty standards outlined in *CSA A440-8*[2]. This window is not intended to resist forced passage. The thermal unit glazing is medium duty float glass. All windows in housing units shall provide for detection of unauthorized egress or deliberate tampering. This is achieved by using stops on the operable sash to limit the opening to 125 mm or by affixing the screens with security screws to the window frames.

[2] AAMA/WDMA/CSA 101/I.S.2/A440-08 – NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights

5.2 Commercial Level 2 (CW2) – Applicable at Medium and Maximum Institutions

Conventional window conforming to medium duty standards outlined in *CSA A440-8*[3] but with a glazing type which does not form shards when broken. The thermal unit glazing is medium duty heat tempered glass. For secure applications, this window is used in combination with grilles, mesh or bars which provide for containment or intrusion protection.

5.3 Commercial Level 3 (CW3) – For Secure Construction 1 application

Conventional window conforming to medium duty standards outlined in *CSA A440-8* (see footnote 2) but having safety glass as one layer of the thermal unit, the other being heat tempered. This window is intended to delay and frustrate a breach attempt and to provide evidence of breach attempts (e.g. broken glass). Window comes with the outside glass of the thermal unit made of two layers of 6 mm float glass held by minimally a 0.78mm (30mil) interlayer of polyvinyl butyral (PVB).

5.3.1 For window retrofits, security films are acceptable provided they are installed on the interior glass covering the entire glass area below the bite or covering the glass and returned and anchored onto the frame.

5.3.2 This type of window may not be appropriate for non-supervised areas where heightened security is required. In this case a combined CW2 window with exterior grilles or mesh should be considered.

5.4 Detention Level 1 (DW1) – For Secure Construction 2 application

This refers to a combination CW2 window combined with bars which limit the opening between bars to a maximum, in one dimension, of 125 mm (5”) to achieve containment. Plate A-4-1 illustrates an example of a security window meeting the requirements of a Detention Level 1 (DW1) window. This window has the following characteristics:

5.4.1 Resistance to bending, jacking, impact and cutting achieved by the steel bars (as defined in *ASTM A627-03*[4]) using Hollow Structural Steel Section with an interior tool resistant steel rod. The rod may be mounted freely to enable rotation using dimples at both ends and a spacer ring to keep from leaning. See Partial Plan View of Plate A-4-1 and Plate A-4-2.

5.4.2 The bar assembly is cast into the adjacent masonry, welded to a rod or a bracket (wall anchor[5]) cast in masonry or fabricated off site with a precast concrete surround which is anchored to the masonry wall. Bars shall always be set on the interior side of the window.

5.4.3 Sashes are to be removable from the exterior side on account of the interior bars obstructing access.

5.4.4 Window assembly is not intended to prevent suspension points hence is only acceptable for medium security cells other than segregation.

5.5 Bar-less Detention Window (DWb) – For Secure Construction 2 application

A bar-less detention window (DWb) is a security window which maintains forced entry or penetration resistance achieved by a security glazing held in a secure frame assembly.

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[3] AAMA/WDMA/CSA 101/I.S.2/A440-08 – NAFS - North American Fenestration Standard/Specification for Windows, Doors, and Skylights

[4] ASTM A627–03 – Standard Test Methods for Tool-Resisting Steel Bars, Flats, and Shaped for Detention and Correctional Facilities

[5] See the wall anchors as shown on figure 1b of ASTM F1592-05 – Standard Test Methods for Detention Hollow Metal Vision Systems and on figure 4 of ASTM F1450-05 – Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention and Correctional Facilities

This window type is used primarily for control posts or within glazed panels such as for sidelights and doors separating areas requiring containment or intrusion protection and unobstructed vision.

5.5.1 The frame is hollow metal conforming to *ASTM F1592-05*[6] Grade 3 anchored to the wall system or a detention door.

5.5.2 The glazing type used for windows and large glazed panels in doors in supervised areas or for control posts is described in the Control post Chapter A-13. Conforming glazing is a monolithic polycarbonate of 12.7 mm thickness protected by tempered glass or Georgian wired glass.

5.5.3 For applications where inmates are only periodically supervised as for cell windows or glazing in door panels as for Observation cells, a higher performing glazing is required in order to withstand a surreptitious or sustained brute force attack as per criteria set out in Chapter A-11. Conforming glazing shall meet physical attack standards ASTM 1915 Grade 2 or HP White level II. Glazing type meeting these performance standards is a multi-layered polycarbonate glazing with a trademark name 'Lexgard MPC-500'. This glazing is protected by abrasion resistant film on the cell side and tempered glass on the corridor side. See Chapter A-12 for Observation cells.

5.5.4 For exterior windows, the security glazing set in its own steel frame shall be used in combination with a separate thermal unit type CW2 to be located on the weather side.

5.5.5 For optimal security, exterior DWb windows shall not have any openings (e.g. for ventilation) and as such they are suitable for air-conditioned environments.

5.6 Detention Level 2 (DW2) – For Secure Construction 3 application

This refers to a combination CW2 window along with bars which limit the opening between bars to a maximum, in one dimension, of 125 mm (5") to achieve containment. Plate A-4-3 illustrates an example of security window meeting the requirements of a Detention Level 2 (DW2) window.

As illustrated, the mullion locations mimic the bars and are sealed to the bars to prevent the bars from being used as a suspension point. As such these windows are prescribed only for cells at maximum and all segregation units where the threat of suicide is at the highest. Given that the glass of the thermal unit can be broken; this window cannot achieve absolute prevention of suicide.

5.6.1 Forced Entry resistance by bending, jacking, impact and cutting with homogenous tool resistant steel or composite steel (as defined in *ASTM A627-03*, see footnote 3). See 5.4.2 for a typical bar design. In addition, the ventilation opening is covered with a perforated steel plate front with a movable vent sash. A non-removable vent sash controller protrudes without offering a suspension point. See Plates A-4-3 and A-4-4.

5.6.2 The window frame is cast into the adjacent masonry or welded to a rod or a bracket (wall anchor, see footnote 4) cast in masonry.

5.6.3 Fixed sashes are to be replaceable in situ with glazing stops affixed with security screws.

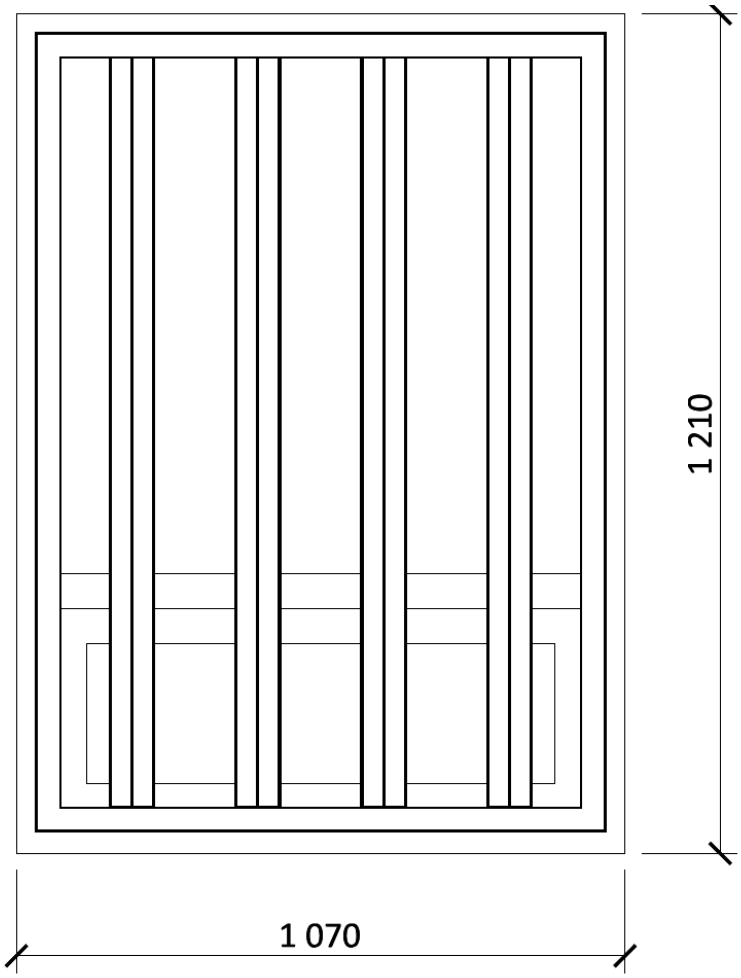
[6] ASTM F1592–05 – Standard Test Methods for Detention Hollow Metal Vision Systems

6. WINDOWS SELECTION

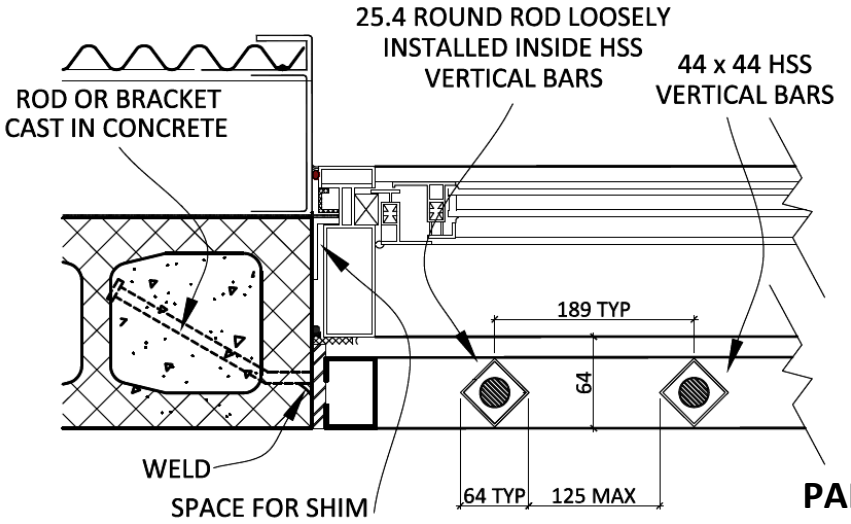
6.1 See Section A-2, Table A-2-2 for windows selection.

6.2 Multi-Level institutions

For housing units where medium and maximum classified inmates share the same housing unit but are in separate ranges, follow Table A-2-2 for the areas intended for the specific security level. For other than housing units, follow the Medium security level for the respective functions as maximum classified inmates will be more restricted in their movement and access to programs.



ELEVATION



PARTIAL PLAN VIEW

PLATE A–4–1 – TYPICAL DW-1 WINDOW

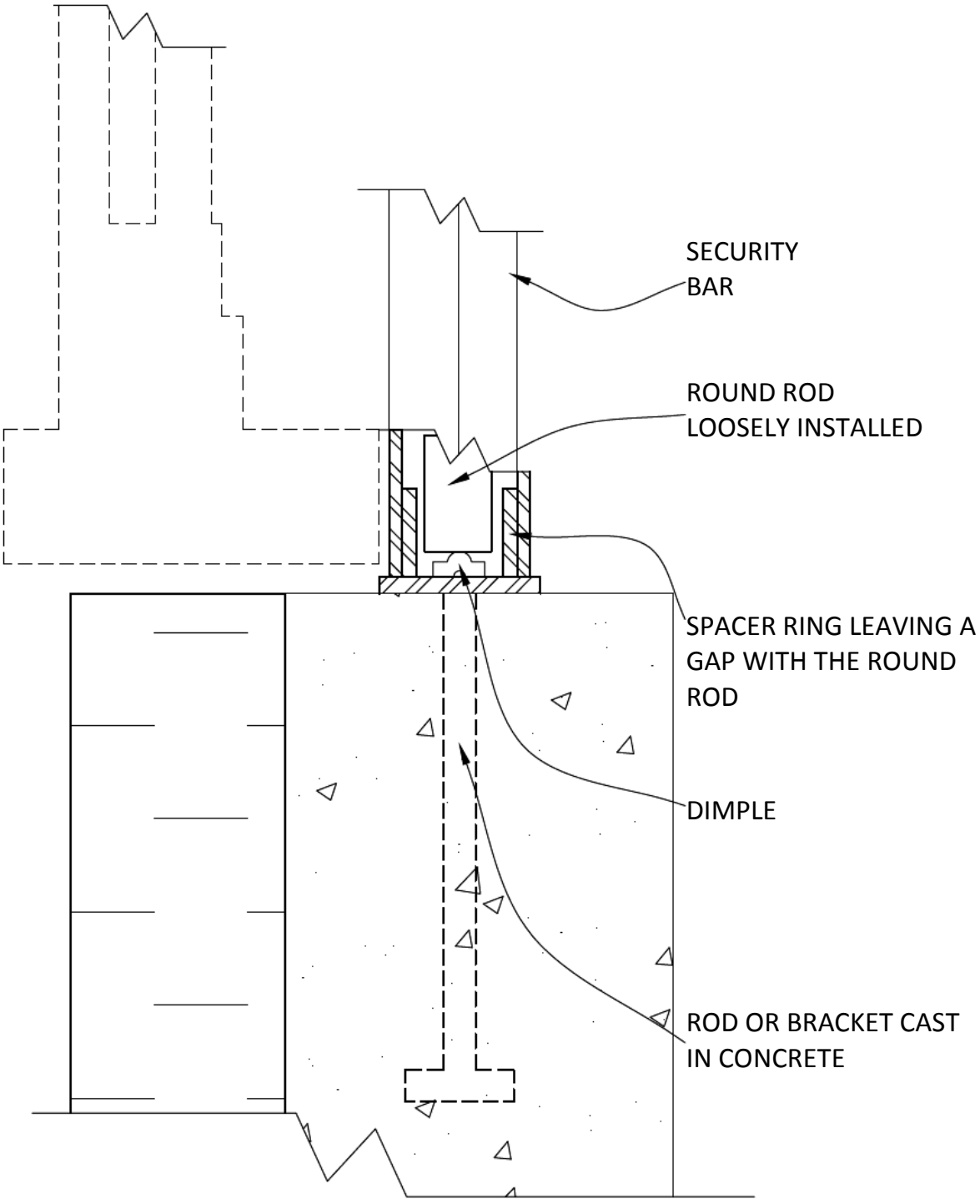


PLATE A–4–2 –INTERNAL ROD DETAIL

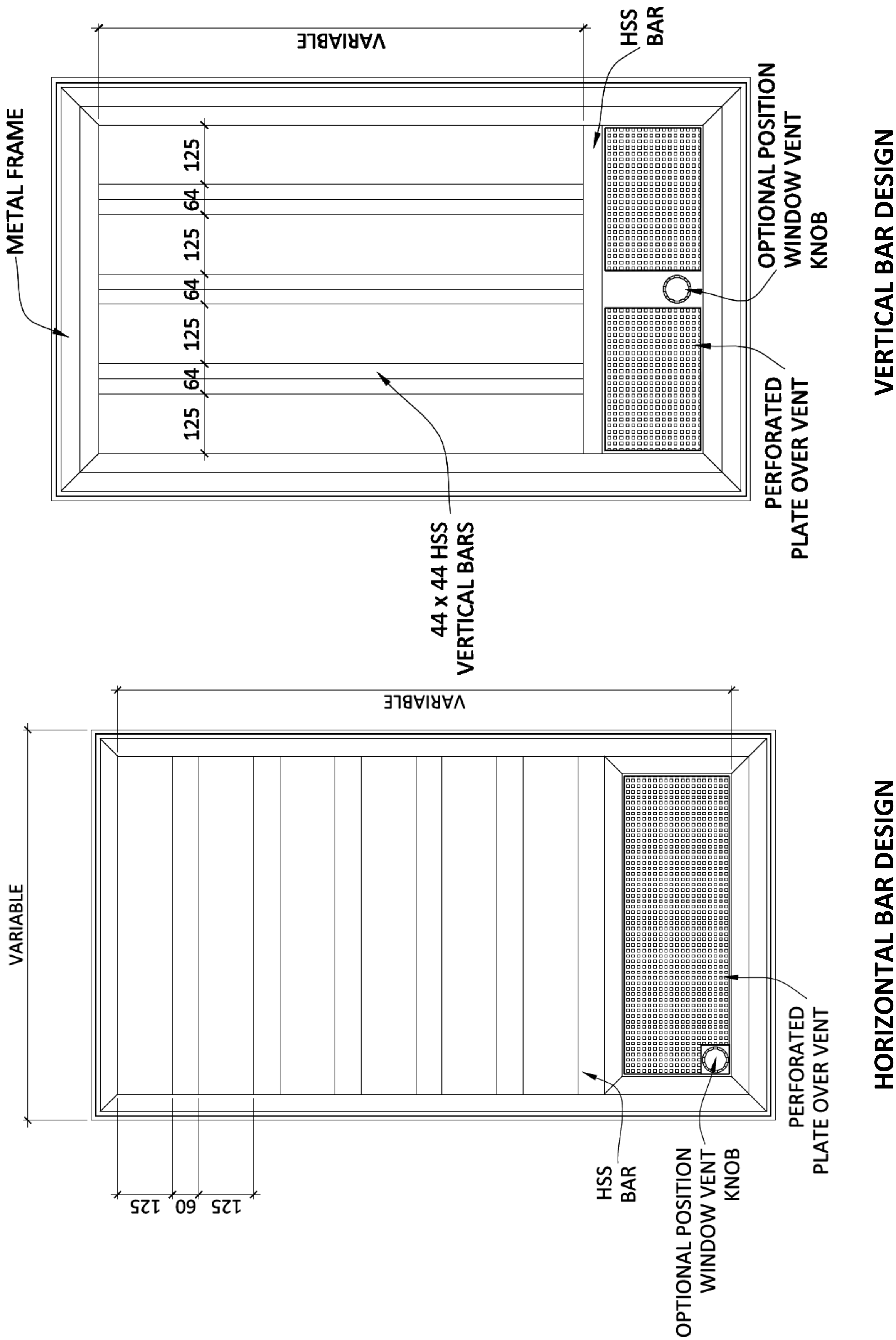


PLATE A–4–3 – DW-2 WINDOW

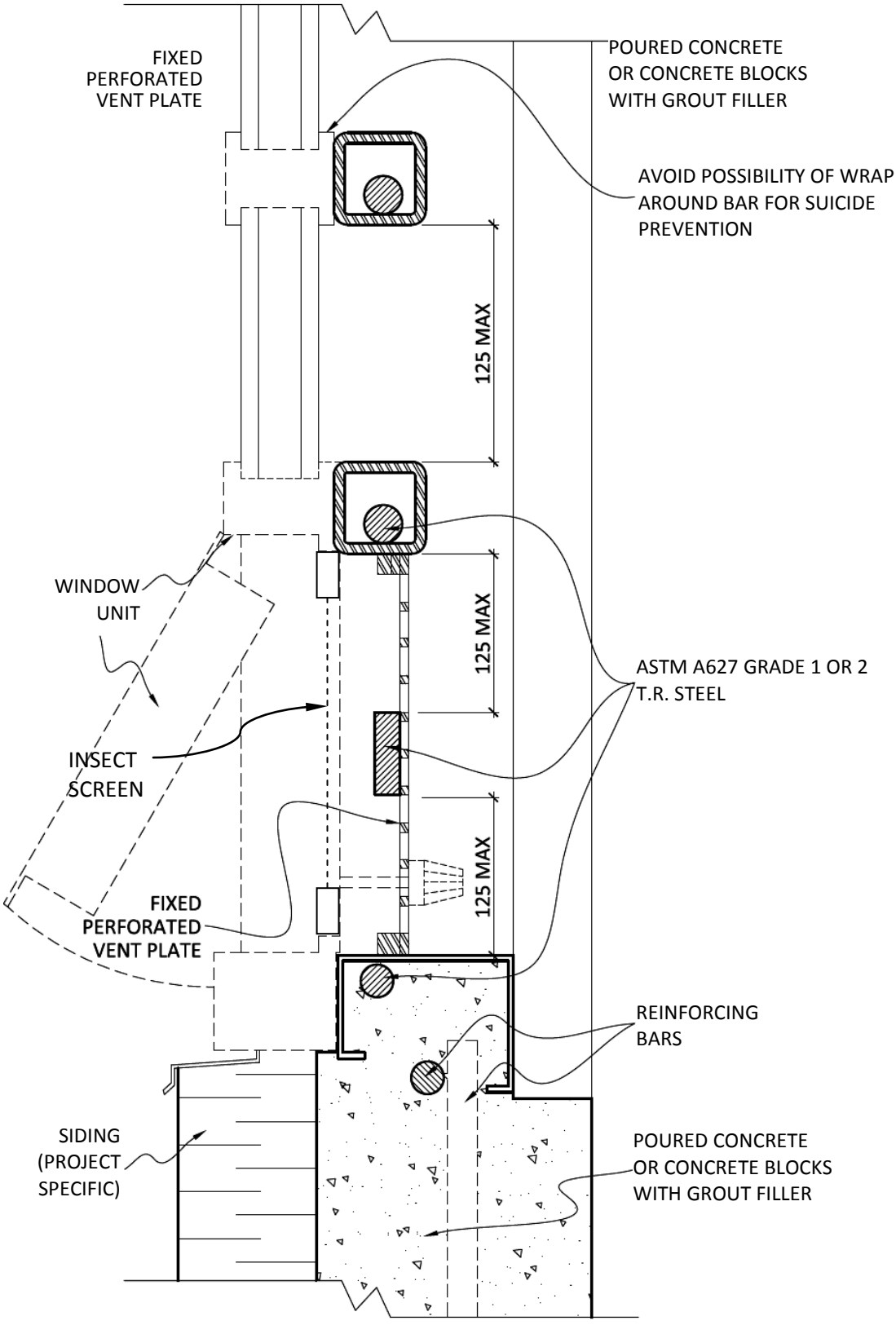


PLATE A–4–4 – DW-2 WINDOW – HORIZONTAL BAR DESIGN – DETAIL

A–5 ARCHITECTURE – DOORS & FRAMES

1. SCOPE

This section identifies the requirements for all doors and frames used in correctional institutions.

2. RELATED SECTIONS

2.1 Technical Criteria Document sections:

A-2 – Architecture – Building Construction
A–3 – Grilles, Mesh and Screens
A–4 – Glazing, Windows and Assemblies
A–6 – Hardware
A–11 – Inmate Cells
A–13 – Security Control Posts, Galleries and Routes

2.2 CSC/PWC Specifications

08 34 63 Detention hollow metal frames, doors, and door frames (11193 before 2004)
08 34 63.13 Steel Detention Doors and Frames
08 34 63.16 Steel Plate Detention Doors and Frames
08 34 63.33 Detention Door Frame Protection
08 71 63 Detention Door Hardware (11192 before 2004)
11 19 13 Detention Pass-Through Doors

2.3 Standards

2.3.1 ANSI/BHMA – American National Standard

- A156.4-2008–Doors Controls – Closers, Oct. 2008
- A156.14-2007–Sliding and Folding Door Hardware, Sept. 2007

2.3.2 NAAMM HMMA – National Association of Architectural Metal Manufacturers

- 801-05–Glossary of Terms for Hollow Metal Doors & Frames, 8d, 2005
- 802-07–Manufacturing of Hollow Metal Doors & Frames, 8d, May 2007
- 803-08–Steel Tables, 8d, December 2008
- 805-10–Recommended Selection and Usage Guide for Hollow Metal Doors & Frames, 8d
- 810-09–Hollow Metal Doors, 8d
- 820-08–Hollow Metal Frames, 8d
- 830-02–Hardware Selection for Hollow Metal Doors & Frames, 8d, Jan. 2002
- 831-97–Hardware Locations for Hollow Metal Doors & Frames, 8d, May 1997
- 841-07–Tolerances and Clearances for Commercial Hollow Metal Doors & Frames, 8d, June 12, 2007
- 850-00–Fire-Rated Hollow Metal Doors & Frames, 3rd Edition, 8d, Feb. 2000
- 861-06–Guide Specifications for Commercial Hollow Metal Doors & Frames, 6th Edition, 8d, December 5, 2006
- 862-03–Guide Specifications for Commercial Security Hollow Metal Doors & Frames, 8d, August 26, 2003
- 863-04–Guide Specifications for Detention Security Hollow Metal Doors & Frames, 8d, January 26, 2005
- 867-06–Guide Specifications for Commercial Laminated Core Hollow Metal Doors & Frames, 8d, March 27, 2006
- 890-06–Technical Summary Hollow Metal

2.3.3 ASTM Standards

- F1450-05–Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities *(under revision - 2011)*
- F1577-05–Test Methods for Detention Locks for Swinging Doors

- F1592-05–Test Methods for Detention Hollow Metal Vision Systems
- F1643-05–Test Methods for Detention Sliding Door Locking Device Assembly
- F1758-05–Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors
- F1915-05–Test Methods for Glazing for Detention Facilities

2.3.4 NAAMM DEMA – Detention Equipment

- 111900–09–Guide Specification for Basic Detention Equipment Requirements, 11, Dec. 2009

3. DOOR CLASSIFICATIONS

3.1 Commercial Doors and Frames (CD)

Commercial doors and frames are of heavy duty commercial grade and have no special detention requirements. Interior doors used in S-2 and S-3 inmate apartment suites shall be of lighter construction. Commercial doors on exterior or interior exits from a suite of spaces generally denote free egress occupancy. Interior commercial doors may however be used within an impeded egress occupancy as for offices, classrooms and other occupational or group activity areas.

3.2 Detention Doors and Frames (DD)

Detention doors and frames exceed heavy duty commercial grade construction and are used to restrict or control the movement of persons for security reasons. Detention doors are used generally on the envelope of areas requiring containment and impeded egress. There are four types of Detention Doors, namely:

3.2.1 DD1–Detention Door Medium Swing
3.2.2 DD1p–Detention Door Pivot (for special application)
3.2.3 DD2 sliding–Detention Door Maximum
3.2.4 DD2 swing–Detention Door Maximum

3.3 Grilles (GL) Swing or Sliding

Grilles are metal lattice screens used to control movement of persons while permitting visual surveillance. See Section A-3.

4. DOOR STYLE

TABLE A–5–1 – DOOR STYLES

(as illustrated on Plates A-3-3 and A-3-4 for grilles, A-5-1 and A-5-2 for doors)[1]:

Style	Name	Location examples
A	Two Half Lights	• Main Entrance • Observation cells (suicide watch)
B	Half Light	• Offices (Alternative 1) • Corridors • Control Post • Health Care
B2	Sidelight Frame Flush	• Offices (Alternative 2)
C	Narrow Light	• Inmate cells and bedrooms • Rooms requiring visual checks i.e. utility and storage rooms
D	Two Narrow Lights	• Security exterior entrances

1 Using terminology from NAAMM HMMA 810-09, 8d, Hollow Metal Doors

Style	Name	Location examples
		• Stairways
E	Flush	• Service shafts • Washrooms • Mechanical rooms • Armoury
F	Dutch Door	• Counter service[2]
G	Grille	• Security Barrier in corridors or showers in segregation and maximum security ranges.
H	Overhead	• Shipping/Receiving, shop supply, areas requiring high openings for clearance

4.1 Door Light

4.1.1 For all security levels, all offices and areas of inmate/staff contact other than locations requiring an E style door must be observable from the adjacent circulation space through either a window in a door or an adjacent sidelight. The maximum height for the bottom edge of any light is 1300 mm from the floor (not accounting for the undercut which shall be 12 +/- mm).

4.1.2 Curtains, draperies and other decorative materials including textiles and films (i.e. reflective films) are not permitted in door lights except for :

4.1.2.1 Observation Cells (A) where it may be required to cover the extent of glass in the door to allow the cell to be used for other than observation purposes. In this case, a fabric could be held in place by 'Velcro'. Other glass covering options may be considered.

4.1.2.2 Bedroom doors in Women's minimum and medium security housing units. In this case privacy curtains on the corridor side of the door that allow control of the curtain by staff during security patrols and counts, and are made of fire resistant fabric held in place by 'Velcro' are permitted due to long standing practice at Women's Institutions that is in accordance with *Creating Choices.*

5. DOOR FUNCTIONS

5.1 Movement

5.1.1 A swing (**SG**) movement is achieved with the use of hinges or pins. The swing of doors shall be in accordance with good architectural practice when security is not a consideration. Cell doors shall swing outward into the corridor with a 180° swing. For free egress bedrooms, doors swing into the bedroom.

5.1.2 A pivot (**PV**) movement allows a door to rotate on a vertical axis at the centre line of the wall width. Under routine operations, the door swings into the room with a 90° swing, but can be made to swing into the corridor with a 90° swing by removing the door movement blocker. A door with this movement is not recommended for cell use since it does not sit within a frame and as such has gaps on both jambs and head. These gaps contribute to excessive light and sound penetration and potentially allow objects or liquids to pass to the

2 Fire resistance rating of the room is to be considered in terms of latching and locking.

outside. It also poses certain problems when used with standard cell locks as the latch bolt is exposed on the cell side and any tampering is not readily visible.

5.1.3 A slide (**SL**) movement allows a door to slide to one side of its opening along the face of the wall. Sliding doors are moved by an electric motor and chain drive or by a pneumatic system.

5.1.4 Refer to *NAAMM/HMMA 801-05*[3] for further terminology.

5.2 Locking

5.2.1 A Manual Lock (**LM**) operates mechanically by key one lock at the time.

5.2.2 A Remote Controlled Lock (**LR**) operates electromechanically or pneumatically from a control post. Locks are also mechanically keyed at the door and may be equipped with a local electric unlock when activated at the control post console.

5.2.3 There is no requirement for any locks or locking devices to have a mechanical gang release.

5.3 Operation

5.3.1 Manual (**M**) operation indicates that the opening or closing of a door is manually executed by staff or inmates.

5.3.2 Motorized (**MO**) operation indicates that the opening and closing of a door is achieved by a remote electric (or pneumatic) system.

6. TECHNICAL REQUIREMENTS

6.1 Commercial Doors (CD)

6.1.1 Commercial doors shall be of aluminum, solid core wood or composite, or hollow metal. All pressed steel hollow core metal doors and frames shall be of a minimum of 1.27mm (18ga) steel.

6.1.2 Glazing on doors or sidelights shall meet NBC requirements except for doors in medium and maximum security institutions where glazing shall be 6 mm tempered glass.

6.1.3 Door frames shall be compatible with the door for which they are intended. Reference is made to the *NAAMM/HMMA 820-08*[4] – Hollow Metal Frame regarding frames for hollow metal door.

6.1.4 Commercial doors and frames shall have a minimum clear opening (door or hardware cannot interfere) of 810 mm x 2100 mm, unless specified otherwise[5].

6.2 Detention Doors – Swing (DD1)

6.2.1 DD1 doors and frames shall have a minimum clear opening (door frame element or hardware cannot interfere with the clear opening) of 810 mm x 2100 mm, unless specified otherwise[5].

6.2.2 DD1 doors shall be constructed of 2.0 mm (14ga) sheet steel both sides with total thickness of 50 mm. See standard *NAAMM/HMMA 863-04*[6], specification CSI 08 34 63.13 – Steel Detention Doors and Frames (NMS 08 34 63)[7] for additional details.

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3 ANSI/NAAMM HMMA 801-05 – Glossary of Terms for Hollow Metal Doors and Frames

4 NAAMM/HMMA 820-08 – Hollow Metal Frame

5 Examples: Doorways in a public corridor or access to exit may be required to have a clear width 850 mm for detention or care occupancies (NBCC 3.3.3.4.(1)). Doorways through which it is necessary to move patients in bed shall have a clear width of at least 1050 mm (NBCC 3.3.3.4.(2)).

6 ANSI/NAAMM HMMA 863-04 – Guide Specifications for Detention Security Hollow Metal Doors and Frames, Fifth Edition, 8d January 2005. This standard has an Appendix with a thickness conversion table (page A-1). Measurement in the present document are all in mm, use this table for Imperial conversion.

7 Specifications 08000, 11190 & 11193 before 2004

6.2.3 DD1 doors of type C or D using narrow lights shall have 6 mm clear tempered glass. For larger glazing panels on detention doors, follow Section A-13 Control Post, Level B.

6.2.4 DD1 doors and frames are to be constructed as required in standard *NAAMM/HMMA 863-04* (see footnote 6) and specification CSI 08 34 63.13 – Steel Detention Doors and Frames (NMS 08 34 63). In addition, test reports shall be submitted from an independent testing laboratory certifying the following minimum performance of a typical Detention door, 860 x 2100 mm. Doors certified under *ASTM F1450–05*[8] are acceptable. The following tests are applicable to DD1 and DD2 doors with minor differences in deflection as noted:

6.2.4.1 ***Static Load***: Centrally apply load of 4000 kg at quarter points on door. Maximum deflection must not exceed 30 mm (15 mm for DD2). Permanent set not to exceed 10.0 mm (2 mm for DD2) after release of load (see Plate A–5–9).

6.2.4.2 ***Rack Test***: Concentrate load of 2645 kg on one unsupported corner of door. Door must not fail. Deflection must not exceed 50 mm (35 mm for DD2) (see Plate A–5–10).

6.2.4.3 ***Impact Load Test***: The door is mounted in a frame as in a normal cell setting. The door is subjected to a series of impact loads of 271 Joules following a pattern of targets from a pendulum ram (see Plate A–5–11). Impacts are delivered on the push side of the door[9]. The number of impacts for a DD-1 and DD-2 doors are:

- 200 lock or strike impacts (target 1)
- 75 hinge impacts (targets 2, 3 & 4)
- 100 corner panel impacts (target 5)

6.2.4.4 The door must remain operable after the test.

6.2.5 Plate A–5–3 illustrates typical DD1 swing door details.

6.3 Detention Doors – Pivot (DD1p) [Not recommended for cell use]

6.3.1 DD1p door size must account for pivot and 90° swing as well as the removable door stopper to achieve a minimum clear opening of 810 mm x 2100 mm.

6.3.2 DD1p doors shall be constructed of 2.0 mm (14ga) sheet steel both sides. See standard *NAAMM/HMMA 863-04*[10], specification CSI 08 34 63.13 – Steel Detention Doors and Frames (NMS 08 34 63)[11] for additional details[12].

6.3.3 DD1p doors shall be type C as illustrated on Plate A–5–1. Narrow light glazing shall be 6 mm clear tempered glass.

6.3.4 DD1p pivot hardware is a pin/rod extending at both ends of the door. Bottom receiver is inserted in the floor during the pour of the slab. Top receiver is inserted in the door sill and has a removable housing to allow the door to be removed. Assembly must ensure rigidity of door (see note 10).

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8 ASTM F1450 – 05 Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities

9 Procedure as with section 7.2.4 of ASTM F1450-05 Standard Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities

10 ANSI/NAAMM HMMA 863-04 – Guide Specifications for Detention Security Hollow Metal Doors and Frames, Fifth Edition, 8d January 2005. This standard has an Appendix with a thickness conversion table (page A-1). Measurement in the present document are all in mm, use this table for Imperial conversion.

11 Specifications 08000, 11190 & 11193 before 2004.

12 There is no provision relating to pivot hardware in the NAAMM/HMMA standards.

6.3.5 DD1p doors are constructed in accordance with DD1 door requirements as noted in 6.2.4

6.3.6 Plate A-5-4 illustrates typical DD1p pivot door.

6.4 Detention Doors Maximum Slide (DD2)

6.4.1 The minimum clear opening for DD2 doors is 810 mm x 2100 mm. Door frame element or hardware must not infringe on the clear opening.

6.4.2 DD2 doors shall be constructed of 2.8 mm (12ga) sheet steel both sides with total thickness of 50 mm (see standard *NAAMM/HMMA 863-04* [see footnote 9]), specification CSI 08 34 63.13 – Steel Detention Doors and Frames (NMS 08 34 63) for additional details.

6.4.3 DD2 doors type C or D as illustrated on Plates A–5–1 and A–5–2 shall have narrow lights of 9 mm clear tempered glass. For larger glazed panels refer to Sections A-4 and A-12, Special Observation Cells, for glazing requirements where sized to enable passage.

6.4.4 DD2 cell doors have Food Pass/Cuff Port installed (see Plate A–5–8 for details).

6.4.5 DD2 doors and frames are to be constructed as required in standard HMMA 863-04[13] and specification CSI 08 34 63.13 – Steel Detention Doors and Frames (NMS 08 34 63) and specification CSI 11 19 13 – Detention pass-through doors. In addition, test reports shall be submitted from an independent testing laboratory certifying the conformity to the tests outlined in section 6.2.4 for DD2 doors sized at 860 x 2130 mm. Manufacturer certified performance in accordance with ASTM F1643–05[14] is also acceptable.

6.4.6 A 50 mm notch shall be provided in the door frame of sliding doors for emergency pry bar use. See Plates A–5–5 and A–5–7. The depth of the notch shall be sufficient to expose the edge of the door to allow the insertion of a pry bar to force the door open in the case of an emergency.

6.4.7 Plates A–5–5 illustrates typical DD2 sliding door and corridor arrangement and Plates A–5–6 and A–5–7 illustrate sliding door details.

6.5 Detention Doors Maximum Swing (DD2) [not for cells]

6.5.1 Swing DD2 doors and frames shall have a minimum clear opening of 810 mm x 2100 mm unless specified otherwise[15].

6.5.2 Swing DD2 doors shall be constructed of 2.8 mm (12 ga) sheet steel both sides with total thickness of 50 mm. See standard *HMMA 863-04*[16], specification CSI 08 34 63.13 – Steel Detention Doors and Frames (NMS 08 34 63)[17] for additional details.

6.5.3 Swing DD2 doors type C or D as illustrated on Plates A–5–1 and A–5–2 shall have narrow lights of 9 mm clear tempered glass. For larger glazed panels as in doors

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13 ANSI/NAAMM HMMA 863-04 – Guide Specifications for Detention Security Hollow Metal Doors and Frames, Fifth Edition, 8d January 2005. This standard has an Appendix with a thickness conversion table (page A-1). Measurement in the present document are all in mm, use this table for Imperial conversion.

14 ASTM F1643 – 05 Standard Test Methods for Detention Sliding Door Locking Device Assembly

15 Examples: Doorways in a public corridor or access to exit may be required to have a clear width 850 mm for detention or care occupancies (NBCC 3.3.3.4.(1)). Doorways through which it is necessary to move patients in bed shall have a clear width of at least 1050 mm (NBCC 3.3.3.4.(2)).

16 ANSI/NAAMM HMMA 863-04 – Guide Specifications for Detention Security Hollow Metal Doors and Frames, Fifth Edition, 8d January 2005. This standard has an Appendix with a thickness conversion table (page A-1). Measurement in the present document are all in mm, use this table for Imperial conversion.

17 Specifications 08000, 11190 & 11193 before 2004

for level 'A' control posts, glazing shall match that of the control post envelope as outlined in Section A-13 Security Control Posts.

6.5.4 Swing DD2s doors and frames are to be constructed as required in standard *HMMA 863-04* (see footnote 15), specification CSI 08 34 63.13 – Steel Detention Doors and Frames (NMS 08 34 63) and specification CSI 11 19 13 – Detention pass-through doors. In addition, test reports shall be submitted from an independent testing laboratory certifying the conformity to the tests outlined in section 6.2.4 for DD2 doors sized at 860 x 2130 mm. Manufacturer certified performance in accordance with ASTM F1643–05[18] is also acceptable.

6.6 Grilles (GL) Swing or Sliding

See section A-3.

6.7 Control Post Doors

See Section A-13–Security Control Posts, Galleries and Routes: Level A and B Control Post doors.

6.8 Service Chase Access Doors between cells

All access doors for service shafts between cells shall be DD1 sized at 900 mm X 2100 mm to facilitate repair and maintenance.

18 ASTM F1643 – 05 Standard Test Methods for Detention Sliding Door Locking Device Assembly

7. DOOR SELECTION

Table A-5-1 coding is defined in Legend following table.

Inmate bedroom doors in S2 and S3 housing units swing into the room. All cell doors swing out.

TABLE A–5–1 – DOOR SELECTION

LOCATION	MEDIUM	MAXIMUM
Inmate Cell (Not applicable to free egress bedrooms where doors are CD)	DD1-SG-LE-M	DD2–SL–LE[19]–MO
Apartment entry and fire exit doors	DD1-SG-LE-M	N/A
Service chase doors	DD1-SG-LM-M	DD1-SG-LM-M
Housing Unit and Segregation Entrance and fire exit doors	DD1-SG-LE-M	DD2-SG-LE-M
Housing Unit Office Suite Entry and fire exit doors	DD1-SG-LE-M	DD2-SG-LE-M
Segregation cell doors	DD2–SL–LE–MO	DD2–SL–LE–MO
Health Unit Entrance and fire exit Pharmacy / Dispensary Nursing Station Patient room doors	DD1–SG–LE–M DD1–SG–LE–M CD-SG-LM-M CD-SG-LM-M	DD1-SG-LE-M DD1-SG-LE-M DD1-SG-LE-M DD1-SG-LE-M
Partitions, Corridors	GL–SG–LM–M GL–SL–LE–MO	GL–SG–LM–M GL–SL–LE–MO
Inmate Program rooms and offices Program and Admin Area Entrance	CD–SG–LM–M DD1–SG–LE–M	CD–SG–LM–M DD1–SG–LE–M
V & C Entry	CD–SG–LM–M DD1–SG–LE–M	CD–SG–LM–M DD1–SG–LE–M
Gatehouse: Vestibule Doors on both ends. Exterior door on outside of institution may be commercial type.	DD1–SG–LE–M	DD1–SG–LE–M

LEGEND FOR TABLE A–5–1

Classification

CD – Commercial Doors

DD1 – Detention Doors Swing

DD2 – Detention Doors Maximum Sliding or Swing

GL – Grilles Sliding or Swing

Movement

SG – Swing

PV – Pivot

SL – Slide

Locking

LM – Manual Lock

LE – Electric Lock

Operation

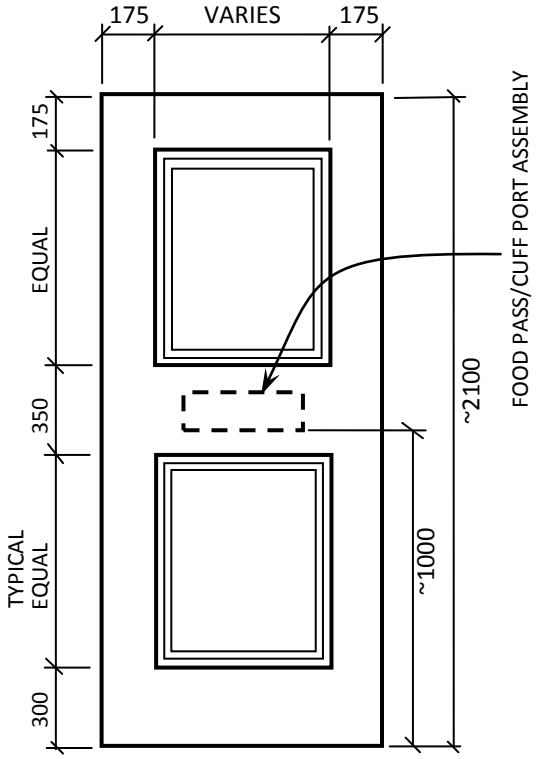
MO – Motorized

M – Manual

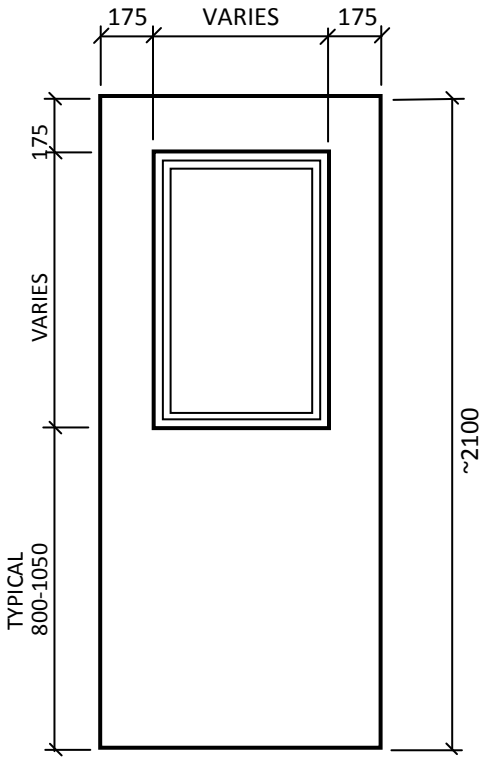
19 Doors are locked locally mechanically or by remote control of selected cell/cells. Doors lock in closed or open position

8. DOOR CONTROL

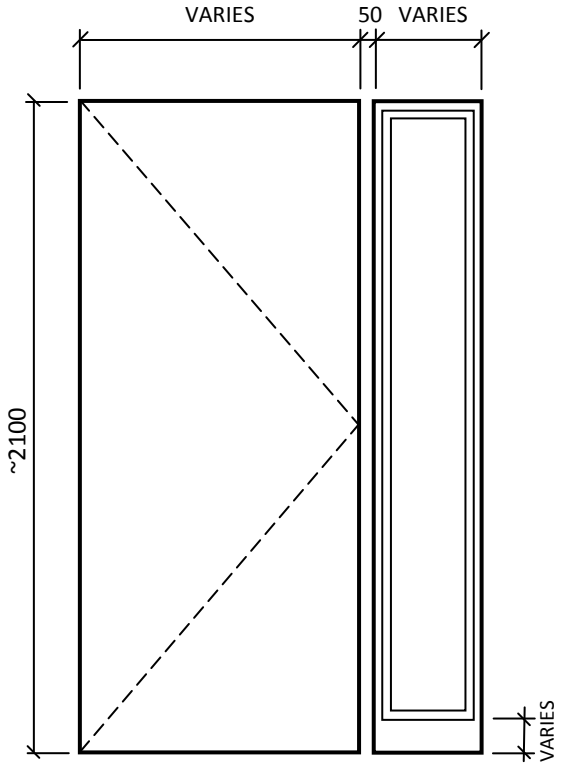
8.1 Door control for living unit doors may be integrated with other functions to be displayed graphically showing a representational floor plan on a touch screen type monitor in the control post. The design of the console /monitors and its functions is part of the security electronics specification and will be made available to the consultant as part of the Project Brief where applicable. Assistance by CSC experts will also be available during the development of these systems. Plates A–5–12 and A–5–13 are included only for illustration purposes to be tailored for a given project.



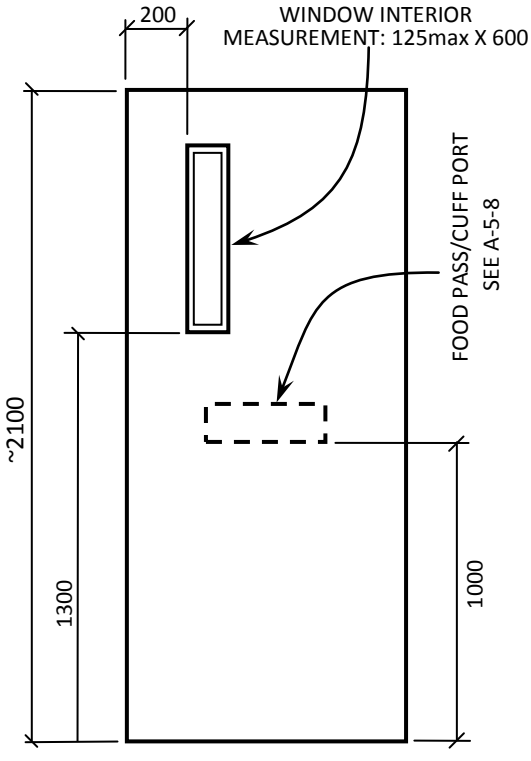
STYLE A – TWO HALF LIGHTS



STYLE B – HALF LIGHT

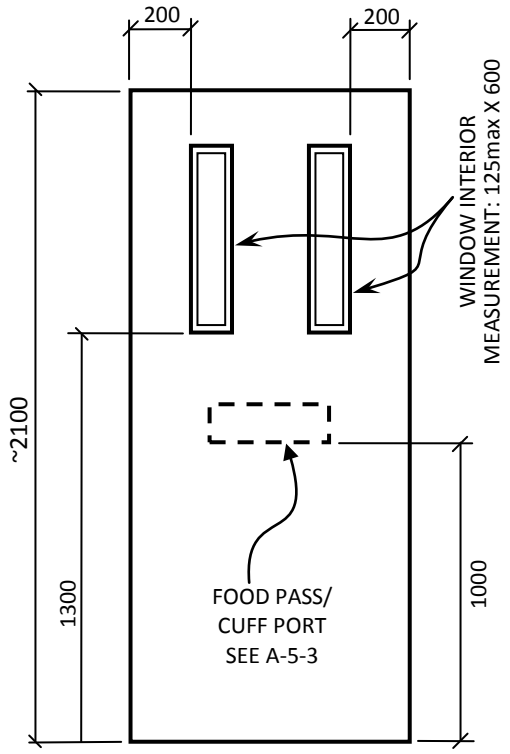


STYLE B2 – SIDELIGHT FRAME FLUSH

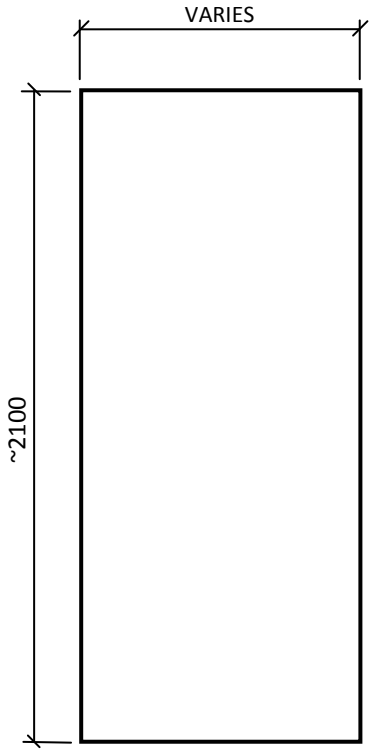


STYLE C – NARROW LIGHT

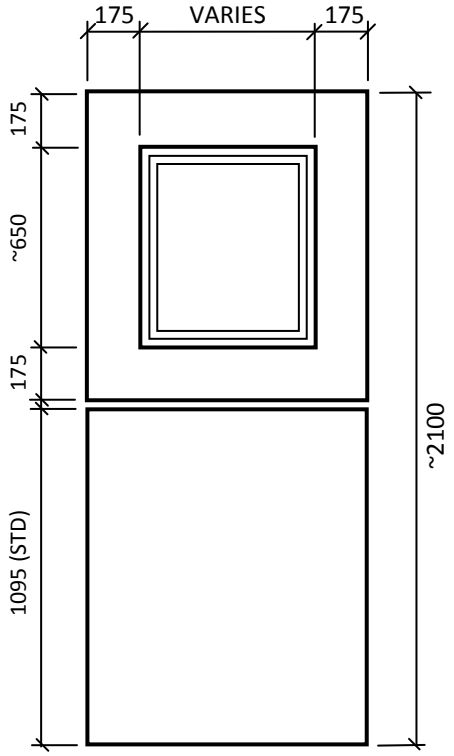
PLATE A–5–1 – DOOR STYLES – EXAMPLES OF APPLICATION PART 1



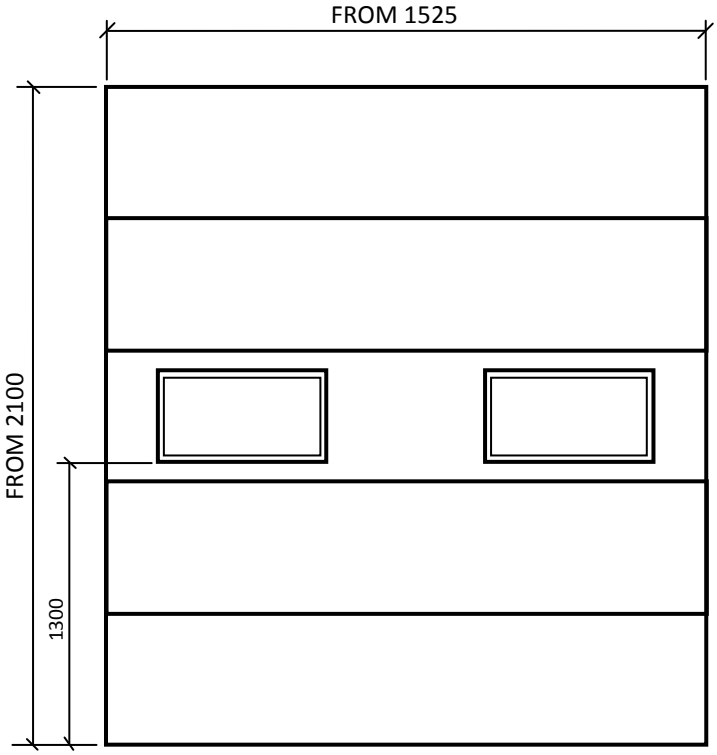
STYLE D – TWO NARROW LIGHTS



STYLE E – FLUSH

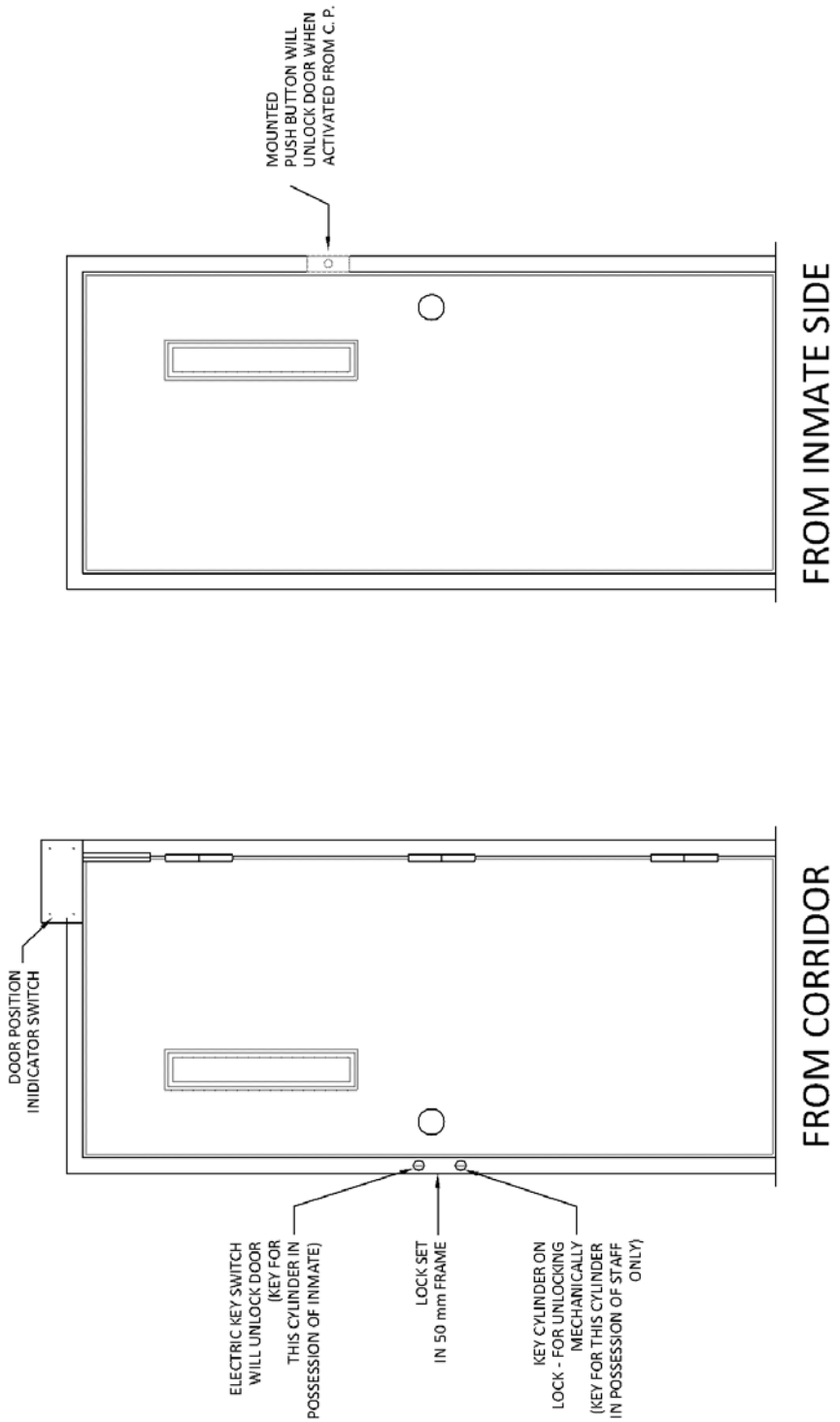


STYLE F – DUTCH DOOR

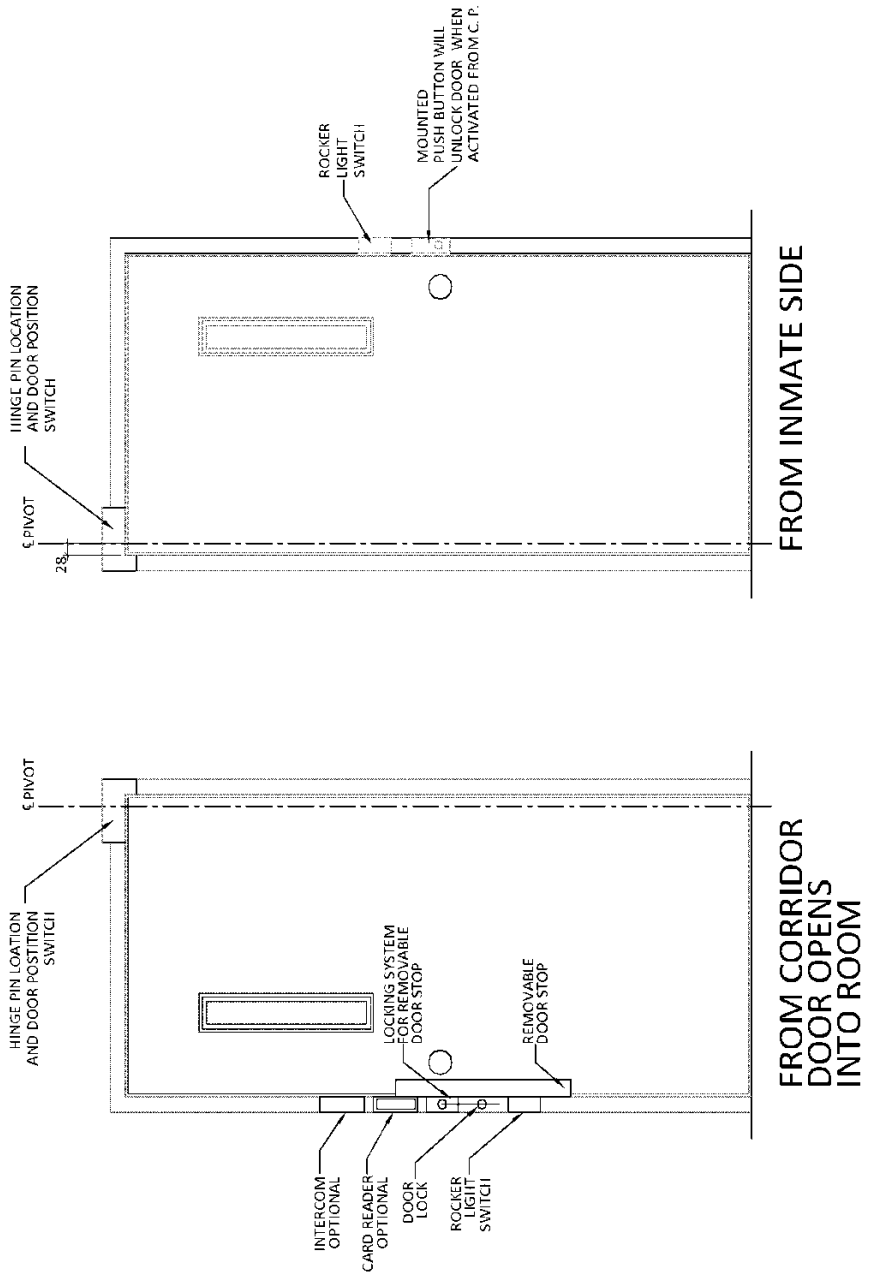


STYLE H – OVERHEAD

PLATE A–5–2 – DOOR STYLES – EXAMPLES OF APPLICATION PART 2



A–5–3 – ELEVATION OF DD1 SWING DOOR



A–5–4 – ELEVATION OF DD1p PIVOT DOOR

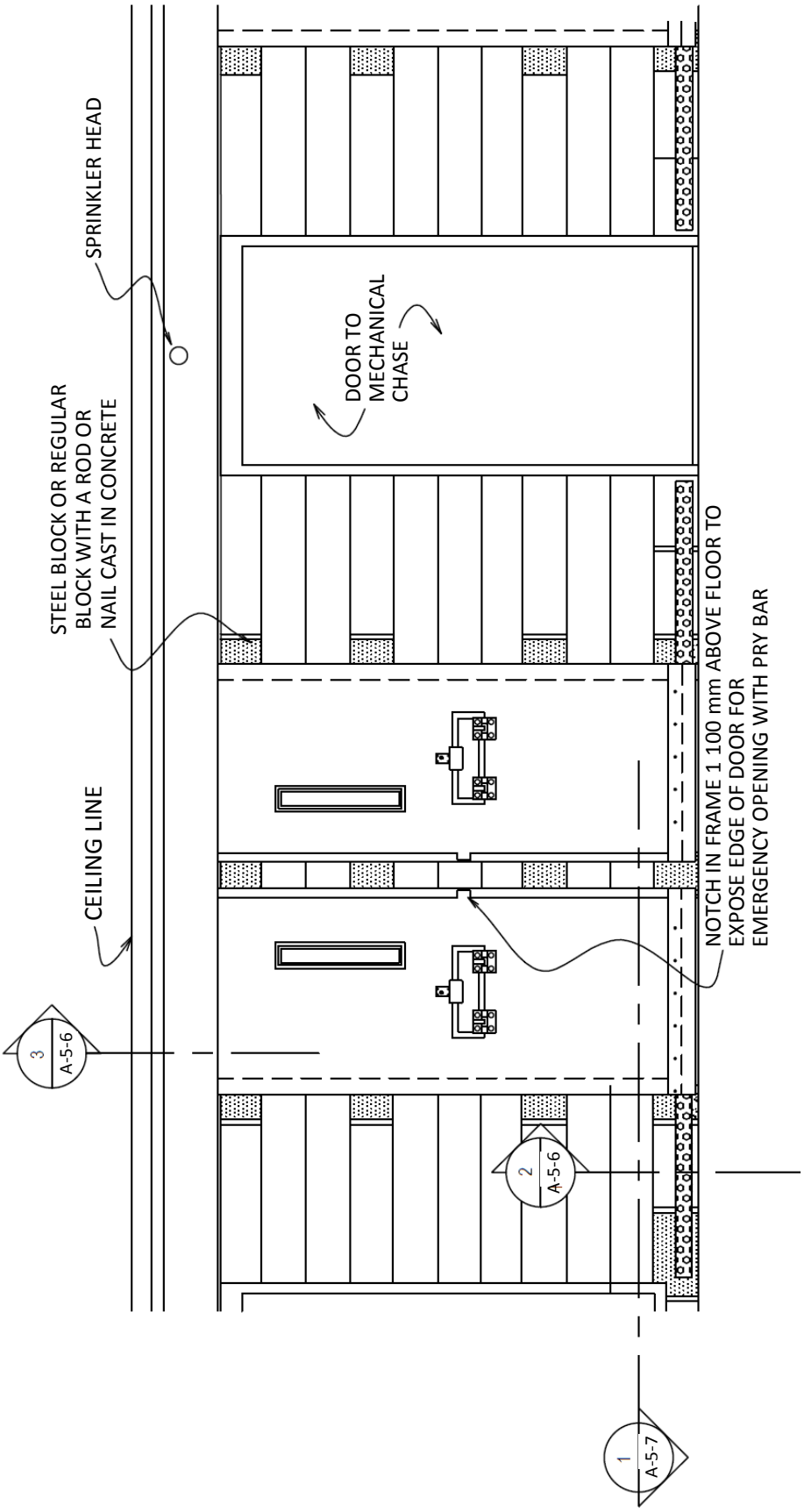
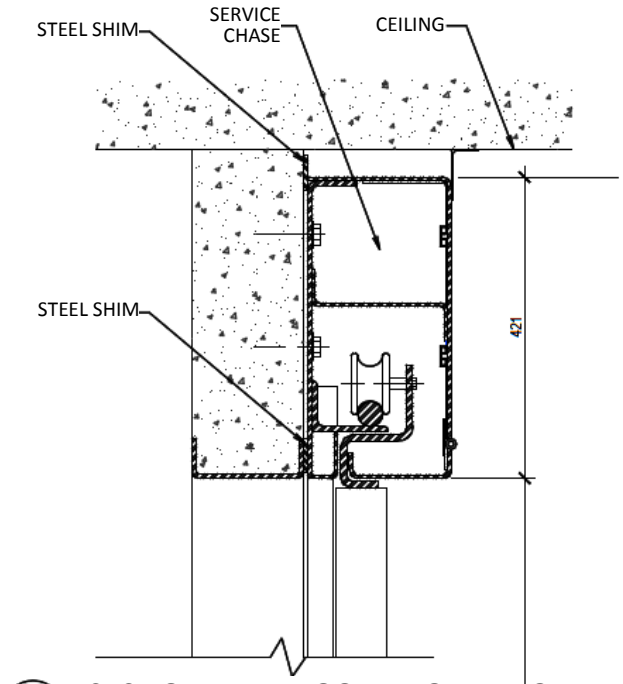
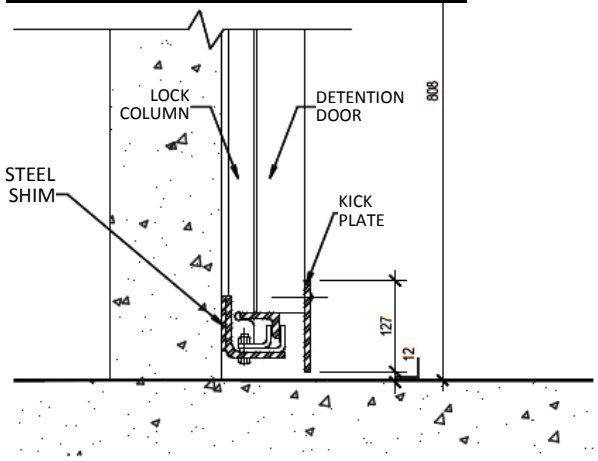


PLATE A–5–5 – CORRIDOR ELEVATION OF TYPICAL DD2 SLIDING CELL DOOR

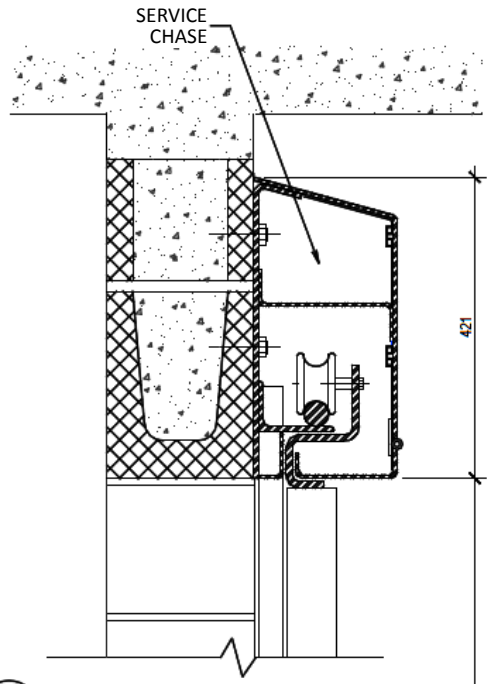


3 / A-5-6 **SECTION THRU DOOR AT OPENING**

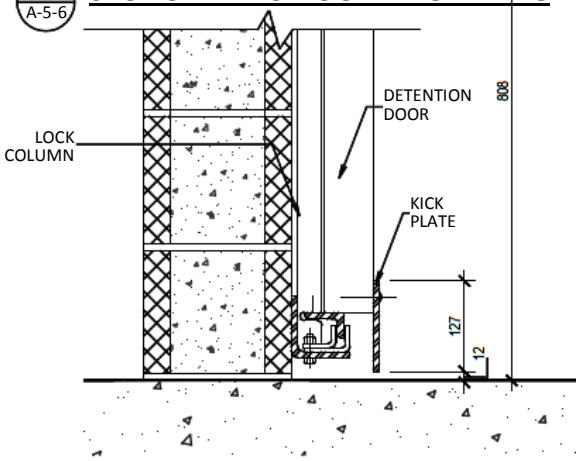


2 / A-5-6 **SECTION THRU DOOR BEYOND OPENING**

SLIDING DOOR MOUNTED ON
150mm REINFORCED CONCRETE WALL
WITH LOW CEILING CONDITION



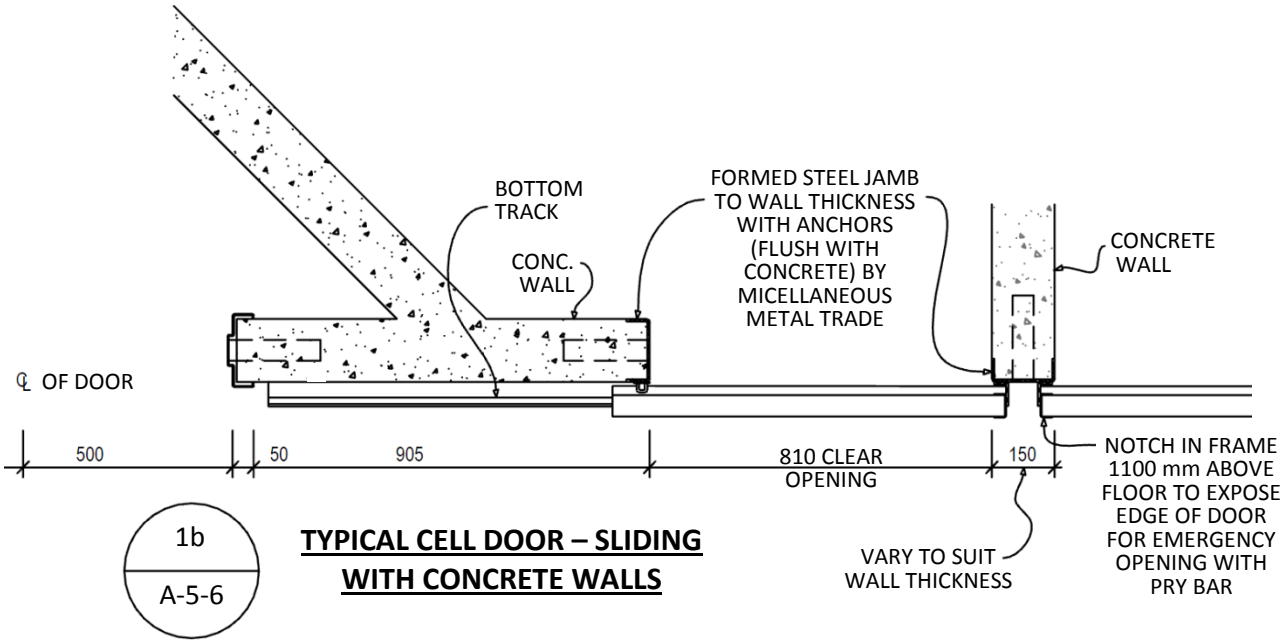
3 / A-5-6 **SECTION THRU DOOR AT OPENING**



2 / A-5-6 **SECTION THRU DOOR BEYOND OPENING**

SLIDING DOOR MOUNTED ON
200mm REINFORCED CONCRETE
BLOCK WITH STEEL BLOCKS @
SELECTED LOCATIONS

PLATE A–5–6 – TYPICAL DD2 SLIDING CELL DOOR – DETAILS 1



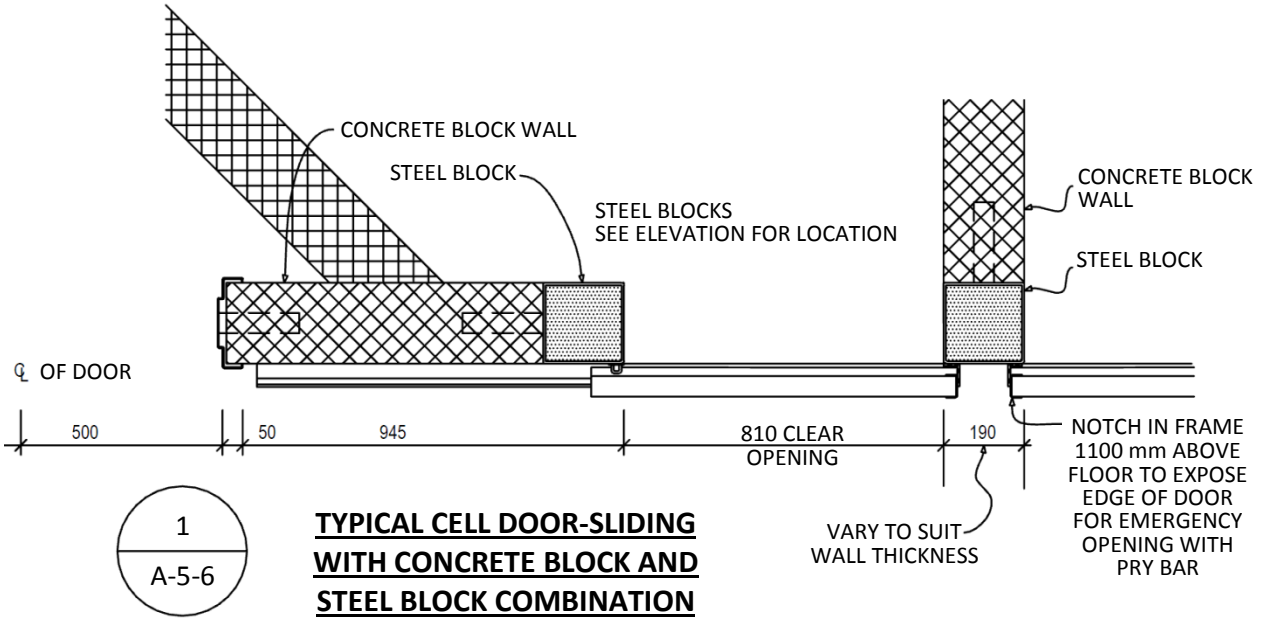
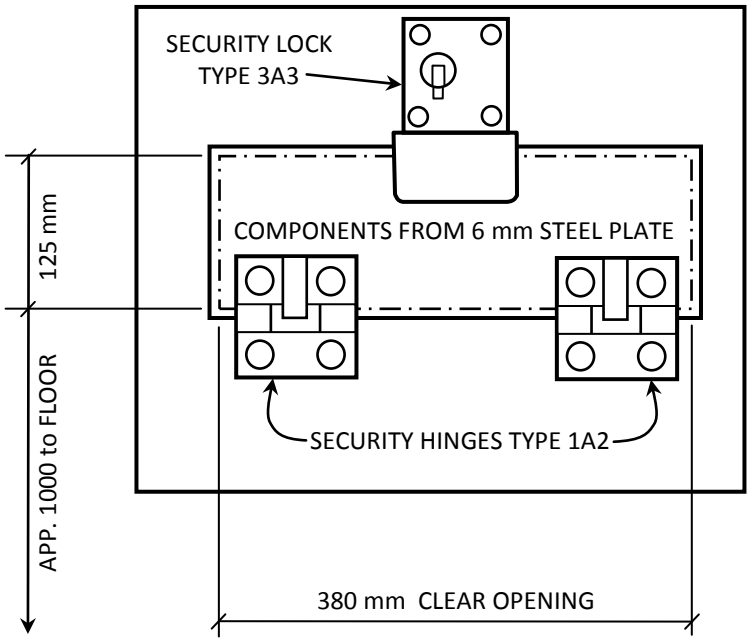
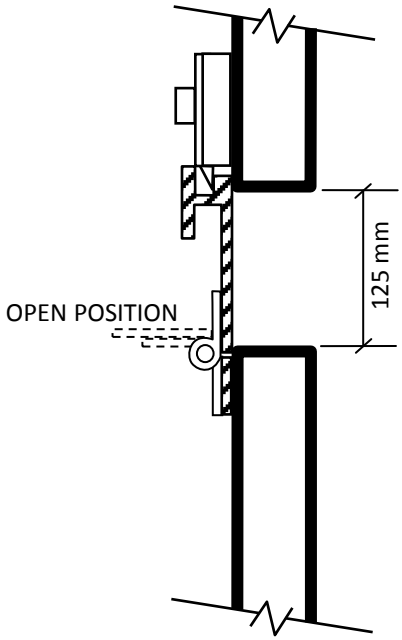


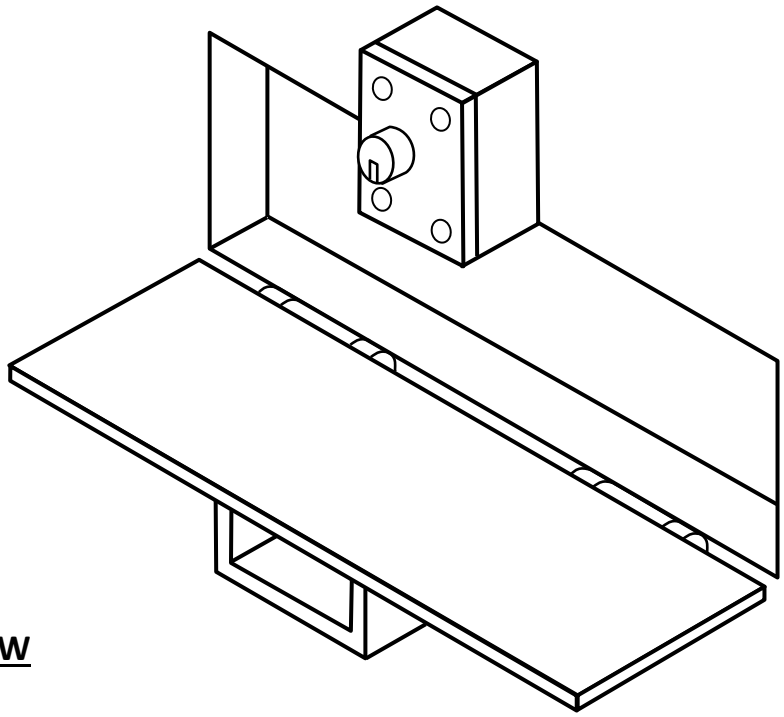
PLATE A–5–7 – TYPICAL DD2 SLIDING CELL DOOR – DETAILS 2



ELEVATION

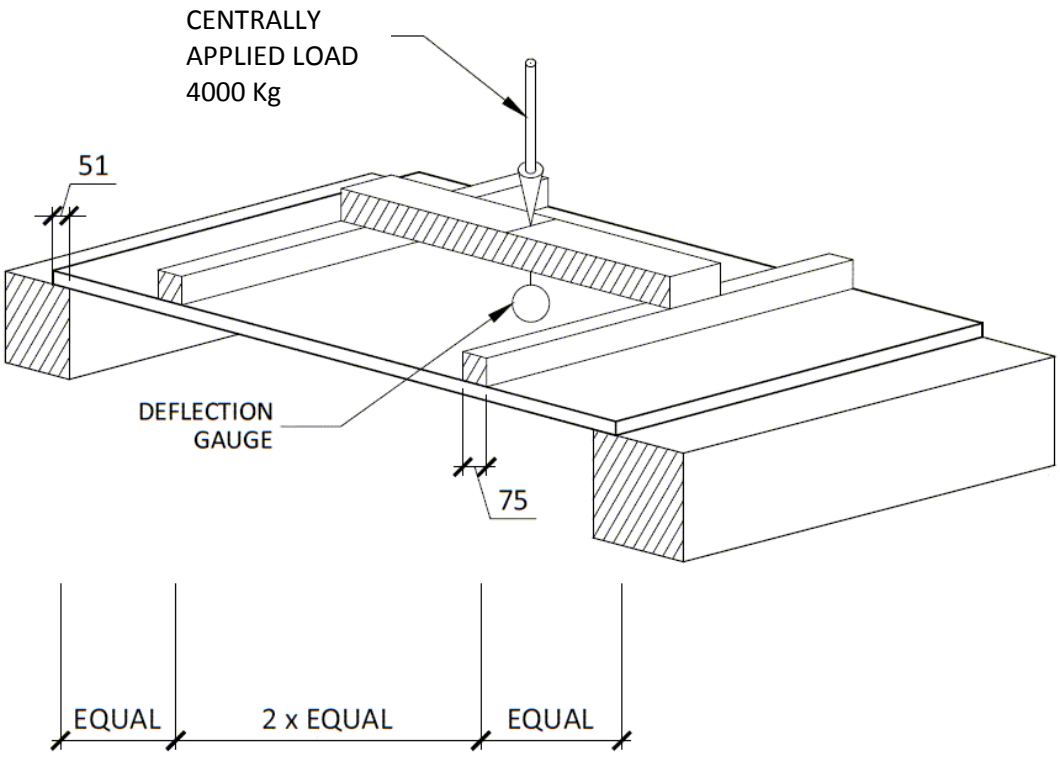


SECTION

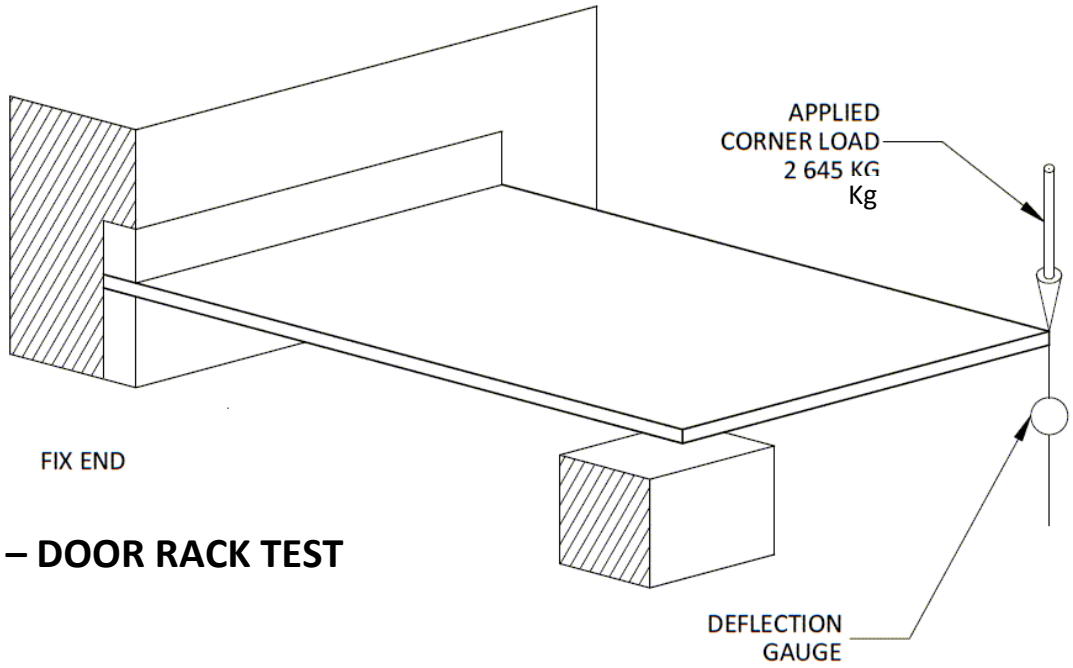


ISOMETRIC VIEW

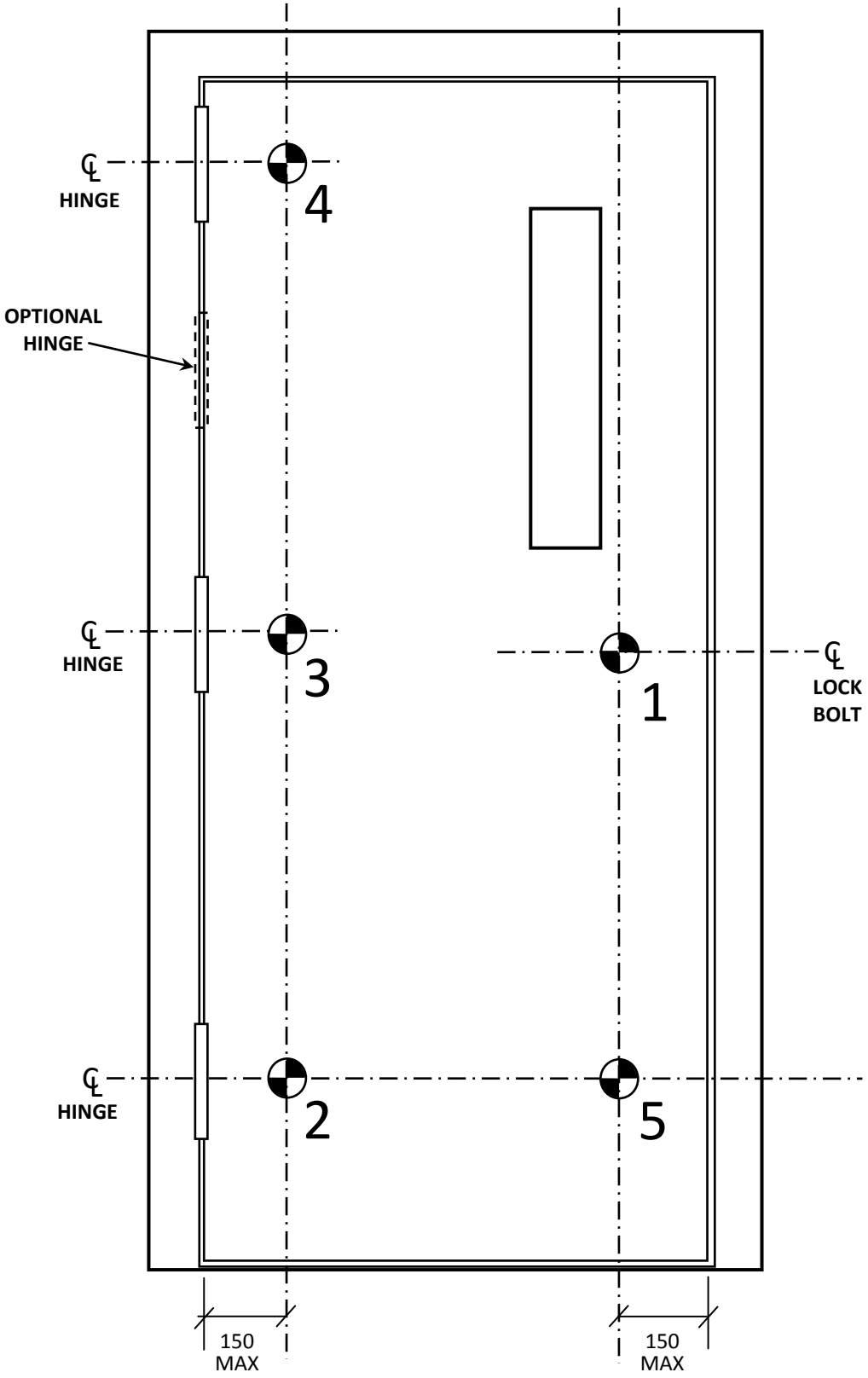
A–5–8 – FOOD PASS/CUFF PORT ASSEMBLY FOR DD2 DOOR



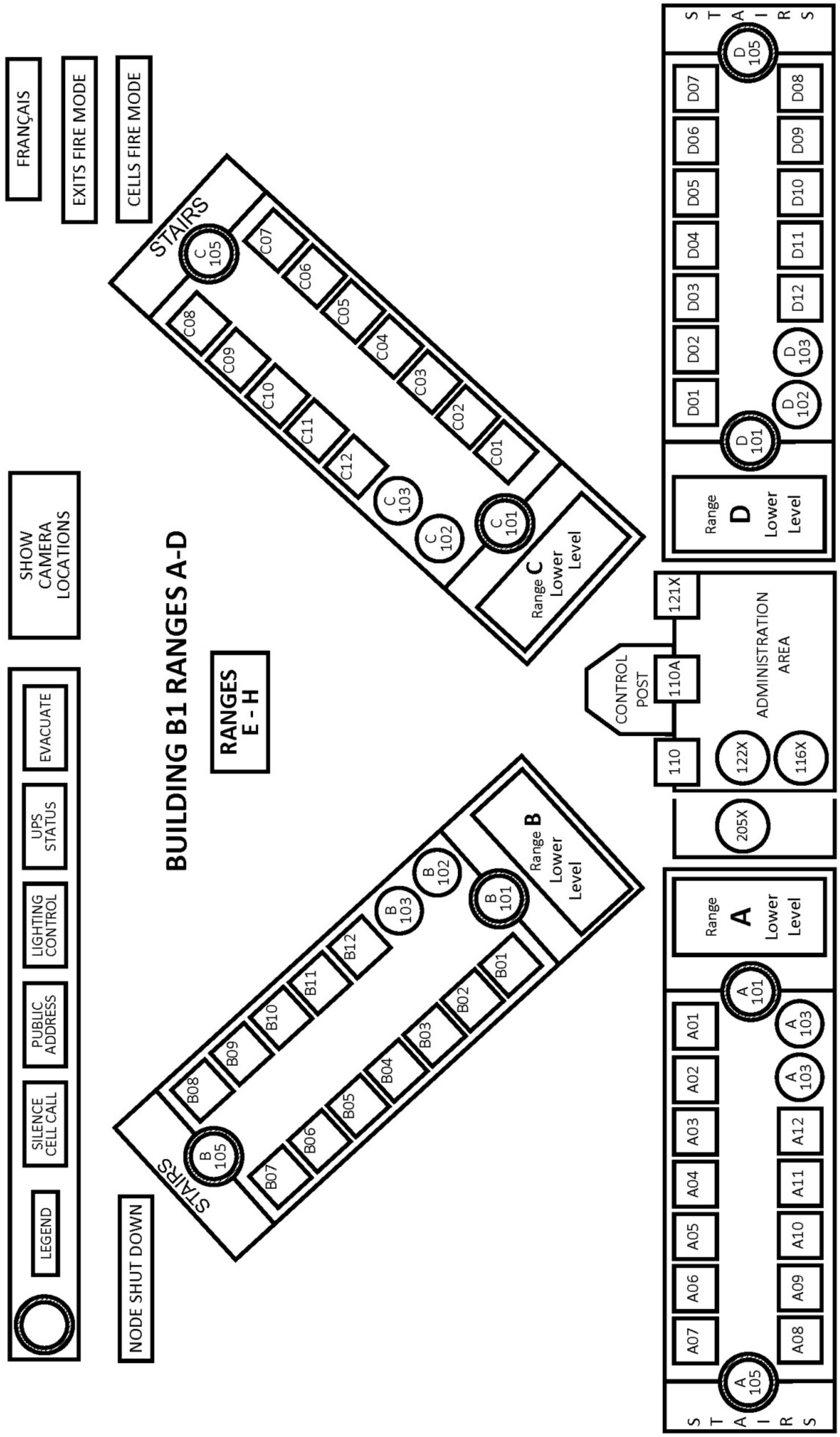
A–5–9 – DOOR STATIC LOAD TEST



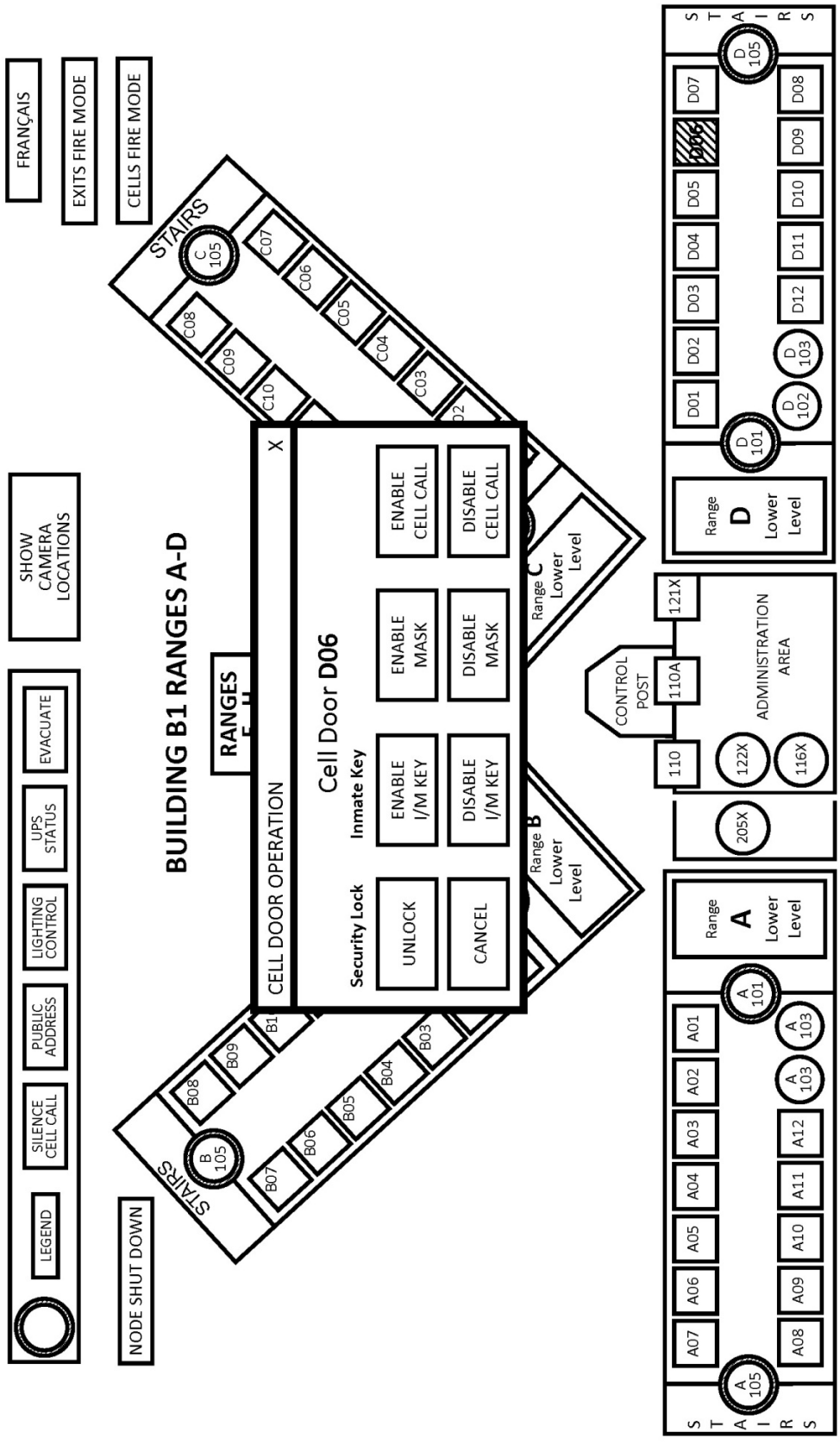
A–5–10 – DOOR RACK TEST



A–5–11 – DOOR ASSEMBLY IMPACT TEST



A–5–12 – CONSOLE – HOME



A–5–13 – CONSOLE – SINGLE DOOR CONTROL

A-6 ARCHITECTURE - HARDWARE

1. SCOPE

This section is a guide for the selection and specification of all hardware for correctional institutions.

2. RELATED SECTIONS

2.1 Technical Criteria Document

A–5 – Doors and Frames

A–13 – Security Control Posts, Galleries and Routes

2.2 CSC/PWGSC Specifications (NMS–CSC Masterformat2010 Sections)

08 34 63 – Detention hollow metal frames, doors, and door frames[1]

08 34 63.13 – Steel Detention Doors and Frames

08 34 63.16 – Steel Plate Detention Doors and Frames

08 34 63.33 – Detention Door Frame Protection

08 71 63 – Detention Door Hardware[2]

2.3 Detention Hardware Testing Standards

ASTM F1450–05 – Test Methods for Hollow Metal Swinging Door Assemblies for Detention Facilities

ASTM F1577–05 – Test Methods for Detention Locks for Swinging Doors

ASTM F1643–05 – Test Methods for Detention Sliding Door Locking Device Assembly

ASTM F1758–05 – Test Methods for Detention Hinges Used on Detention-Grade Swinging Doors

3. DEFINITIONS

3.1 ***Builder Hardware (BH)***: Heavy duty commercial Grade 1 hardware which is used to provide a degree of security and long use. It includes, but is not limited to: latch and lock sets, hinges, door pulls, door closers, door stops, silencers, kick plates etc. Hardware used for bedrooms and other rooms within free egress small group living suites do not require the same level of performance. Residential type shall be used. Lock functions for specific rooms shall comply with Builder hardware standard.

3.2 ***Detention Hardware (DH)***: Hardware used for containment and to withstand sustained and surreptitious forced intrusion at medium and maximum institutions. Such hardware is fabricated, supplied, and installed by specialty detention equipment manufacturers and contractors and meets applicable standards. Detention hardware shall be used with detention doors and grilles. Detention Hardware is categorized as:

DH1 – for swing doors at medium security institutions

DH2 – for swing doors at maximum security institutions and mediums in specific locations

DH2sl – for sliding doors or grilles at maximum security institutions and mediums in specific locations.

4. BUILDER HARDWARE

4.1 Standards

All finish hardware shall conform to the following ANSI/BHMA Standards[3]:

[1] Previous version (<2004): Section 11193 – Detention Doors, Panels and Frames

[2] Previous version (<2004): Section 11192 – Detention Hardware

- ANSI/BHMA A156.1–2006 – Standard for Butts and Hinge
- ANSI/BHMA A156.4–2000 – Standard for Door Controls – Closers
- ANSI/BHMA A156.14–2002 – Standard for Sliding and Folding Door Hardware
- ANSI/BHMA A156.13–2005 – Standard for Mortise Locks & Latches

4.2 Staff Controlled Doors

Doors equipped with locks and locksets controlled by staff shall be heavy duty cylindrical or mortise type and shall have a latch or bolt of no less than 19 mm. Power locksets used for fire exit doors shall be **fail-safe** on power outages and be linked to the fire alarm system to permit emergency egress.

4.3 Door Alarms

Exterior doors used in free egress facilities and in particular living units, are equipped with contact alarms to signal unauthorized egress. These alarms are activated during curfew hours from a 24 hour duty station. The contact alarms shall be triple bias type meeting UL-634 Level 1 and 2 high security switches.

4.4 Inmate Controlled Doors

Interior doors for free egress living units with locks controlled by both staff and inmates such as for bedrooms and main entrance doors to apartments shall be residential cylindrical type.

4.5 Keying

All builder locks shall be under a master key system. Key cylinders for use by staff shall be 7 pin type or alternates offering equivalent security. Where keying is permitted to inmates, key cylinders shall be 5 pin type. Two keys shall be provided for each lock and for each master key system.

4.6 Finish

All latch and lock sets, handles, pulls, kick plates and other door hardware shall be dull stainless steel (C32D), or dull chrome plate (C260).

5. DETENTION HARDWARE

5.1 Door Hardware

Door hardware except Finish hardware as noted above, shall be detention type selected to match the door type. As an example, hinges for DD2 doors shall be heavier duty than those for DD1 doors. Three hinges shall be used per door.

5.2 Mechanical Lock types

Detention Locks are available for hollow metal doors, grilles and flat plate in openings such as for food passes in cell doors. For hollow metal doors, locks are inset in the door as in a mortise mount. For plate openings they are surface mounted as is the bolt keeper. Locks come either with a latch which slam locks upon closure or with a deadbolt which requires to be retracted on closure and extended to lock. Slam locks are generally used in corridors, entry to program areas and for emergency egress doors often with doors equipped with closers. Deadlocks are used for storerooms, mechanical rooms and service chases where it may be desirable to leave the door ajar. These doors are not equipped with closers. Either lock requires to be opened locally by key and keys cannot be retracted until the latch or deadbolt is fully extended.

[3] The following standards have all been replaced by the ANSI/BHMA standards in the list: CGSB 69-GP-1M, CGSB 69-GP-2M, CGSB 69-GP-6M, 69-GP-9M, 69-GP-10M & 69-GP-11M, CGSB 69-GP-13M

5.3 Remote Controlled Lock Types

Remote controlled locks or locking devices are equipped with door indication switches to signal status of door. One switch is located at the head of the frame to monitor door position, the other switch is in the lock to monitor if latch bolt is extended or retracted. When door is fully closed and the latch bolt fully extended, the latch bolt is deadlocked triggering a secure status mode on the console. All locks are **fail-secure** on power outages and are not linked to the fire alarm system. The remote controlled lock types are as follows:

5.3.1 **DH1** locks used on swing doors (DD1) at medium security institutions shall be slim line which fit within a standard 50mm wide door frame. Locks are either electromechanically or pneumatically remote operated by motor or solenoid as well as mechanically and locally by key. Motorized locks are favoured for cells due to their quiet operation. Locks used for cell doors shall provide a separate keyway for use by the occupant to operate the door by electric switch when this function is activated from the housing unit control post. Key cylinders used for mechanical unlock shall be heavy duty commercial. Key cylinders used by inmates shall be light duty commercial / residential.

5.3.2 **DH2** locks used on swing doors (DD2) at maximum security institutions and (DD1) doors at specific locations as for exit doors at mediums, shall be of a higher security grade requiring a 150mm wide pocket within the frame. Locks are either electromechanically or pneumatically remote operated by motor or solenoid as well as mechanically and locally by key. Solenoid locks are effective for corridor doors as the bolt retraction clicks to alert persons to pass. Key cylinders used for mechanical unlock shall be mogul type. These locks do not normally come equipped with local electric switch unlock function.

5.3.3 **DH2sl** locking devices for sliding doors (DD2) at maximum security institutions are integrated within the sliding door assembly which incorporates tracks and guides, wheels, motorized drive and door locking mechanism and housing to protect all moving parts. Installation of sliding doors and assembly require plumb surfaces necessitating extra care during construction. Doors are chain driven moved by a motor or by a pneumatic system. They are locked at top and bottom of door either in open or closed position by remote control. Doors may be mechanically released and opened with the use of a special tool at an overhead location or by electrical switch operated by key. Mechanical gang unlock shall not be provided. Sliding door devices shall not be made to stop mid stream to allow for cuffing of inmates, instead, food/cuff passes shall be used for this purpose. A door when ajar subjects an officer to potential assault by ejected objects or liquids on all body parts.

5.4 Lock Mounting

Lock mountings shall be used for all Detention locks as recommended by the manufacturer. Key cylinders are set near flush to the lock face plate or shielded by a solid threaded ring. Where they protrude by more than 8 mm, they may be at risk of compromise enabling cylinder removal and manipulation of internal parts. Therefore in the case of excessive protrusion, key cylinders must be protected by a pipe collar attached to the lock face plate by a continuous weld.

5.5 Pneumatic Locks

Pneumatic locks and locking devices require power as well as air to secure or release the lock. Air tubing, compressors, dryers must be integrated with the installation. Compressors and dryers require secure locations and noise separation. These systems must be engineered by the lock supplier even though described within the mechanical specification and not the lock specification on project contract documents.

5.6 Keying

All locks shall be keyed individually and shall have a maximum of three keys supplied for each lock. Each key shall be stamped with a code number and date; all keys for Detention hardware locks shall be delivered in a sealed container to the designated CSC representative – typically the Security Maintenance Officer. Separate construction key cylinders shall be used by the contractor until substantial completion of the building.

5.7 Fastening Devices

Fastening devices used in inmate areas shall include security screws, security nuts, rivets, spanner screws or other equally secure devices, depending on the particular installation or level of security required.

5.8 Finish Hardware for Detention Doors

5.8.1 Detention doors equipped with Detention hardware may be supplemented by finish hardware items such as door closers, silencers, kick plates etc. All such hardware shall minimally be heavy duty commercial grade.

5.8.2 Door closers shall be installed in a manner which will prevent dismantling.

5.8.3 All double doors to have astragals and/or lock guard plates to prevent saw blades from being used on latches or deadbolts.

5.9 Key Cabinet

5.9.1 One key cabinet in each Control Post shall be provided to hold keys used in any functional area to be controlled by a security guard.

5.9.2 One key cabinet for a duplicate set of all keys shall be located with the Deputy Warden operations or designated staff member.

5.9.3 One key cabinet for a reserve duplicate set of all keys shall be located in a secure area at Security Administration.

5.9.4 Electronic key cabinets with tracking capability are used for all other staff keys to access their respective work areas. These doors are commercial grade equipped with commercial grade locks and cylinders. The key cabinet shall be located close to the main entrance of the institution and directly accessible to staff.

6. HARDWARE SCHEDULE

A proposed hardware schedule shall be submitted for review by CSC at the 66% working drawing stage.

A-7 ARCHITECTURE – FINISHES AND MODESTY SCREENS

1. SCOPE

This section provides performance criteria and guidelines for interior finishes for buildings at correctional institutions. Included in this section are modesty screens used in washrooms, cells and search areas.

2. RELATED SECTIONS

2.1 Technical Criteria Document

G–2 – Fire Authorities and Classification
A–2 – Building Construction
A–8 – Building Acoustics

2.2 Manuals and Standards

- Architectural Painting Specification Manual, Master Painter Institute, March 2006
- CAN/CGSB 85.100-93 Painting

3. PERFORMANCE CRITERIA

3.1 Interior finishes shall contribute to the need to provide safe institutions. Commensurate with the security level of the institution, interior finishes should minimize the opportunities available to the inmate to hide contraband and to transform building materials into weapons.

3.2 Interior finishes should be cost effective while being durable, easy to maintain and repair. Finishes should not exceed the level of quality used at public funded community facilities.

3.3 Although safety and cost effectiveness have priority, interior finishes shall contribute to a visually pleasing environment which may serve to influence the well-being and a harmonious interaction of inmates and staff.

4. DESIGN GUIDELINES

4.1 The choice of finish corresponds to the security requirements of a space usage, and the degree of staff supervision of that space. In general, areas of minimal staff supervision should not have finishes which allow concealment, while areas of frequent supervision allow for more latitude. Finishes used to cover overhead structural members and service lines may be avoided in supervised areas provided other relevant criteria are met.

4.2 Finishes for cells shall contribute to achieving a softer environment. Flooring for example shall be tiled as opposed to an epoxy sealed concrete even though the latter may be better from the standpoint of longevity, maintenance and security but harsher and harder than tile. The cove base at a concrete block wall however could be of epoxy for a clean non-removable finish. For coves on drywall, consider glued down wood trim and caulking.

4.3 Finishes for kitchens shall be selected based on longevity and ease of maintenance and sanitation. Although specific finishes are identified in the tables which follow, alternates such as seamless flooring which are commonly used in commercial kitchens and which are cost effective and have a proven performance shall also be considered.

4.4 Colour schemes should be such that they offer good visibility for effective security surveillance. Observation is greatly improved by providing light background colours; while this is less critical at close range, it is more important at a longer range, and becomes critical for the end walls of corridors. Colour schedules shall be approved by CSC.

4.5 Dark colours on screens and grilles enhance observation through these elements.

4.6 Spaces can be enhanced with the use of inmate wall graphics or paintings.

4.7 A suggested summary of interior finishes for various areas follows in Table A-7-2; and A-7-3. The designer may suggest alternate finishes for CSC approval. Designations FL, CL, and WL refer to finishes identified in Table A-7-1.

5 MODESTY SCREENS

5.1 Modesty screens aim to provide limited privacy to inmates during their use in areas such as toilets, showers, cells, and for strip search.

5.2 In areas other than cells, modesty screens may be standard steel toilet partitions with a clearance of 300 mm from the floor.

5.3 For cells, screens may be used to limit views of the use of toilet through the viewing port in the cell door. Space permitting, screens may be integrated with the furniture or be stand-alone. For this use, partitions may be fixed or curtain type as described below. Screens shall not obstruct views of the occupant beyond the toilet area.

5.4 Showers shall have canvas type curtains with clear vinyl tops and bottoms measured 1400 mm and 450 mm from the floor respectively. Military National Stock Number 7230 21 868 6585[1] – CURTAIN, SHOWER – gives details of such curtains.

5.5 Strip search areas shall be provided with tracks and enclosure curtains as stated for showers.

5.6 For existing institutions with grille front cells, modesty screens or curtains shall be installed at the inmate's request.

5.7 Both modesty screens and shower curtains must be made of fire resistant material. The Fire Safety Manual[2] – Section 8 – Paragraphs 54 and 55 reflect flammability requirements of the National Fire Code of Canada.

TABLE A-7-1 – LIST OF SUGGESTED FINISHES

AREA	ELEMENT
Floor/Base	FL-1 - Carpeting (glue-down nylon, low pile textured loop)
	FL-2 - Resilient tile flooring (rubber base)
	FL-3 - Painting over Concrete, gloss enamel
	FL-4 - Resilient sheet flooring (vinyl) with rubber base
	FL-5 - Concrete floor finish (shake non-metallic hardener into finish and apply acrylic cure and seal)
	FL-6 - Porcelain/quarry tile with tile base
Ceilings	CL-1 - Acoustical Panels and Tiles (suspended lay-in system)
	CL-2 - Painting of suspended gypsum board
	CL-3 - Acoustical Panels and Tiles (concealed non-accessible system)
	CL-4 - Painting on Exposed Structure, primed ferrous metal surfaces: Semi-gloss enamel. Galvanized and zinc coated metal: semi-gloss enamel; Zinc coated metal decking; flat paint
	CL-5 - No finish
	CL-6 - Painting of underside of concrete, semi-gloss enamel

[1] http://7230.iso-group.com/NSNDetail/7230-21-868-6585/7230218686585.aspx

[2] 345 - FIRE SAFETY MANUAL, Issued under the authority of the Assistant Commissioner, 2005-12-01

AREA	ELEMENT
	CL-7 - Acoustical Panels and Tiles (glued to suspended gypsum board)
Walls	WL-1 - Gypsum or wood panel mounted on stud-type partitions
	WL-2 - Gypsum or wood panel mounted on concrete block/concrete (fire-rated and exterior walls)
	WL-3 - Painting on concrete block/concrete, semi-gloss enamel
	WL-4 - Gypsum over wood panel or expanded steel mesh on stud-type partitions
	WL-5 - Ceramic Tile (dado to 1800 mm)
	WL-6 - High build glazed coating, high gloss on concrete block/concrete
	WL-7 - Painting on concrete block/concrete gloss enamel
	WL-8 - Semi-gloss enamel with cellular wood fibre cementitious composition boards applied on upper half of wall (out of reach where possible)
Doors/Frames	DL-1 - Painting, semi-gloss enamel
Other Elements (miscellaneous metalwork, grills, etc.)	O1- Painting, high gloss enamel

TABLE A–7–2 – SUGGESTED SUMMARY OF INTERIOR FINISHES

DEPARTMENT	Floor FL	Ceiling CL	Walls WL
Group A Administration			
A1 Management Centre	FL-1/FL-2	CL-1	WL-1/WL-2
A2 Finance	FL-1/FL-2	CL-1	WL-1/WL-2
A3 Staff Services and Training	FL-1/FL-2	CL-1	WL-1/WL-2
A4 Administration & Central Registry	FL-1/FL-2	CL-1	WL-1/WL-2
A5 Case and Sentence Management	FL-1/FL-2	CL-1	WL-1/WL-2
A6 Parole Board Hearing	FL-1/FL-2	CL-1	WL-1/WL-2
Group B Security			
B1 External Security	FL-2	CL-2	WL-3
B2 Emergency Response & Armoury	FL-2	CL-2	WL-3
B3 Security Administration	FL-1/FL-2	CL-1	WL-1/WL-2
B4 Admissions & Discharge	FL-1/FL-2	CL-2	WL-3
Group C Socialization			
C1 Social Programs & Leisure Activities	FL-2	CL-3	WL-3
C2 Arts & Crafts	FL-3	CL-4	WL-3
C3 Private Family Visiting	FL-2	CL-3	WL-3
C4 Visits & Correspondence	FL-2	CL-3	WL-3
C5 Recreation	FL-2	CL-4	WL-3
Group D Spirituality			
D1 Chaplaincy	FL-2	CL-3	WL-3
D2 Aboriginal Services	FL-2	CL-3	WL-3

DEPARTMENT	Floor FL	Ceiling CL	Walls WL
Group E Housing			
E1 Small Group Accommodation	FL-2	CL-2	WL-1
E2 Minimum Security Unit	FL-2	CL-2	WL-1
E3 Responsibility Unit	FL-2	CL-2	WL-1
E3 Direct Observation Unit	FL-2	CL-4	WL-3
E5 Maximum Security Unit	FL-2	CL-4	WL-3
E6 Segregation Unit	FL-2	CL-4	WL-3
Group F Health Services			
F1 Health Care Centre	FL-2	CL-2	WL-1/WL-2
F2 Mental Health Care	FL-2	CL-2	WL-1/WL-2
Group G Technical Services			
G1 Maintenance	FL-5	CL-5	WL-4
G2 Food Services	FL-6	CL-2	WL-5/WL-6
G3 Institutional Services	FL-4	CL-6	WL-7
G4 Material Management	FL-5	CL-5	WL-4
Group H Occupational Development			
F1 Occupational Development/CORCAN	FL-5	CL-5	WL-4
Group J Education & Personal Development			
G1 Education	FL-2	CL-3	WL-3
G2 Correctional Programs	FL-2	CL-3	WL-3
G3 Library	FL-2	CL-3	WL-3
Circulation	FL-2	CL-2	WL-3

TABLE A-7-3 – SUMMARY OF INTERIOR FINISHES IN SPECIFIC SPACES

SPACE	Floor FL	Ceiling CL	Walls WL
Vault, secure storage, terminal equipment rooms, telecommunications equipment, inmate rooms, segregation cells, armoury	FL-2	CL-6	WL-3
Washrooms (staff, inmate and public), bathing laundry	FL-3	CL-6	WL-6
Entrance / Vestibules	FL-6	CL-2/CL-6	WL-2/WL-3
Storage spaces type 3, loading dock, compressor rooms, receiving/issuing, training rooms	FL-5	CL-5	WL-4
Offices, dining rooms, tailoring room	FL-2	CL-3	WL-3
Maintenance closets	FL-3	CL-5	WL-3
Music room	FL-1/FL-2	CL-7	WL-8

A-8 ARCHITECTURE – BUILDING ACOUSTICS

1. SCOPE

This section outlines acoustic considerations unique to correctional facilities.

2. RELATED SECTIONS

2.1 ***Technical Criteria Document***

A–7 – Finishes and Modesty Screens

2.2 Mechanical design requirements referring to noise and vibration control are outlined in the Mechanical sections of this Technical Criteria Document. These sections are:

M–1 – General Mechanical Requirements
M–2 – Plumbing Requirements
M–3 – Fire Protection Requirements
M–4 – Heating, Ventilating & Air Conditioning Requirements

2.3 ***Other references***

- National Building Code of Canada 2010, National Research Council, 2010, ISBN 0-660-19976-4, Division B – Section 9.11 Sound Control http://www.nrc-cnrc.gc.ca/eng/ibp/irc/codes/2010-national-building-code.html
- CSA Z107.10–06 – Guide for the use of Acoustical Standards in Canada
- CSA Z107.58–02, Noise Emission Declaration for Machinery
- ASTM E90–09 Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
- ASTM E336–10 Standard Test Method for Measurement of Airborne Sound Attenuation between Rooms in Buildings
- ASTM E413–10 Classification for Rating Sound Insulation
- The Acoustics Design Guide for Corrections, Advisory Council on Corrections and Acoustics, 1993

3. DEFINITIONS

The following criteria are used to define the acoustic requirements of a given space and are useful here in interpreting the ratings in table A-8-1 which follows:

3.1 The **Noise Criterion (NC) number** – indicates the recommended maximum permissible background noise level in dBA in the important 1200 – 2400 Hz frequency band.

3.2 The **Sound Transmission Class (STC) number** – determines the sound transmission loss through a construction assembly considering the frequency range audible to the human ear. This indicates the required noise insulation for a closed space.

3.3 The **Reverberation Time (RT) rate** – is a measure of the reverberation time at which the reverberant sound dies away. This is defined as the time required for the reverberant sound to diminish by 60 dB. The RT depends on the absorptive area and the volume of the space.

4. PERFORMANCE CRITERIA

4.1 Acoustical treatment shall be considered in the design of spaces as an integral element.

4.2 Building sub systems shall consider the acoustic implications on the surrounding areas.

4.3 All acoustic assemblies shall be compatible with the security requirements of the institution. Special attention should therefore be paid to finishes such as sound reflectors, suspended ceilings, etc., within inmate areas which are only periodically

supervised. To control concealment, acoustical panelling shall be set high from the floor and / or allow for ease of detection if tampered with.

5. DESIGN GUIDELINES

5.1 Ceilings and walls in group areas such as a library, classrooms, chapel, common dining rooms and visits rooms may be provided with acoustical panels applied to solid structure or other monolithic finish.

5.2 For inmate areas, suspended lay-in tile acoustical ceilings are acceptable for high ceiling application or for areas under the presence of staff.

5.3 Noise reducing acoustic treatment is not required in recreational or shop occupational areas. The location of these relatively noisy areas within the correctional complex must be considered so that conflicts do not develop between noisy and quiet spaces.

5.4 The acoustical requirements of administration offices within a correctional institution will correspond to those of similar facilities located in any public office building[1].

5.5 Interview rooms and enclosed offices shall have no other treatment than standard office partitions with appropriate insulation and solid core office doors but assuring viewing capability from the corridor. Ceilings shall be either lay-in acoustical tile or drywall.

5.6 Boardrooms and classrooms shall have their partitions extend to the underside of the floor or roof above to achieve a higher sound transmission barrier.

5.7 Cells and bedrooms shall have their partitions extend to the underside of the floor or roof above.

5.8 The table below provides general guidelines with ratings assumed to be achievable using conventional construction materials and methods. Testing for results accomplished is not intended.

Table A–8–1 – General Building Acoustics (Basic Design Guide)

SPACE	NC(dB)	STC(dB)	RT(SEC)
Chapel, Library, Classrooms, and boardrooms	30	40-45	0.3-0.5
Administration Offices and interview rooms	35-40	35-40	0.3-0.5
Dining Rooms,	35-40	40-45	1.0-1.2
Parole Hearing Room + Deliberation Room	35-40	45	0.3-0.5
Inmate Cells + Bedrooms	40	35-40	0.3-0.5
Living unit common areas	35-40	35-40	1.0-1.2
Visit & Correspondence at Medium & Maximum Levels	*Provide acoustical treatment to the room to enhance monitoring of conversations with listening devices*		
Mechanical noise-generating devices	*Provide isolation and absorption in order to meet the above*		

[1] CSA–Z412–00 (R2005) – Guideline on Office Ergonomics, Section 6.3 The acoustical environment
Public Works and Government Services Canada, An Architect's Guide for Sustainable Design of Office Buildings, Section 2.9 Improving Acoustic Quality, http://www.tpsgc-pwgsc.gc.ca/biens-property/archtct/page-2-eng.html#a2
Public Works and Government Services Canada, Fit-up Standards: Technical Reference Manual http://www.tpsgc-pwgsc.gc.ca/biens-property/documents/pubs-am9-eng.pdf

A-9 ARCHITECTURE – INTERIOR SIGNAGE

1. SCOPE

This section outlines requirements for interior signage in correctional institutions other than contained in the Treasury Board of Canada (TB) procedural manual Signage: System Overview and Implementation. The TB manual provides standard requirements for government buildings, including correctional facilities.

2. GENERAL REQUIREMENTS

2.1 Signs required by an institution fall into four (4) categories:

- Outdoor Path Finding/Directional Signs required in public areas,
- Building Identification Signs,
- Room/Door Identification Signs which include the building number,
- Interior signs necessary for operational reasons.

The room and door numbering system which is required shall form part of the building construction package in order to allow the early identification of door locations at the commissioning stage.

2.2 The need for signage is limited in many areas which are not open to the public or in which access is restricted and movement is controlled; in such cases, a door numbering system is adequate. Where staff offices and work stations are located, name plates may be required; corporate identity signs shall be used to meet requirements in such cases.

3 DESIGN REQUIREMENTS

3.1 All buildings and rooms shall be supplied with alphanumeric identification in accordance with established regionally approved system.

3.2 The building shall have all signage in place before it is occupied. For this the contract documents shall have the rooms numbered as per the numbers in use at that institution.

3.3 The conventions to be followed are: the building has a number which is the next number that follows existing buildings. Rooms within the building are by floor 001, 002… for the basement; 101, 102… for the ground floor, 201, 202… for the 2nd floor, and etc. Rooms accessible from another room but not from the corridor have a letter ending ie 101A is accessible from 101 and 101B is accessible from 101A.

3.4 All signs shall be sized and labeled in accordance with the above TB manual and signs shall be surface mounted and follow the location used at that institution.

3.5 Signs shall be affixed so that they are not easily removable. For higher security institutions, security type fasteners shall be used.

4 PROCUREMENT OF SIGNAGE

Signage shall be procured from a federally approved supplier (standing offer with a signage company). Procurement shall comply with normal CSC established procedures or form part of the construction project.