Public Works and Government Services Canada
Travaux publics et Services gouvernementaux Canada

Canada

Respect ♦ Integrity ♦ Excellence ♦ Leadership

Serving GOVERNMENT, Serving CANADIANS.

TENDER SPECIFICATIONS

Project No. R.078549.001
DI Conduit Replacement & Expansion
CSC Drumheller Institution
Drumheller, AB

Solicitation No. EP922-190895

www.pwgsc-tpsgc.gc.ca

Division 26 - Electrical

Division 31 - Earthworks

Division 32 - Exterior Improvements

Division 33 - Utilities

Appendices

Drawing List Index

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

.1 Work of this Contract comprises renovation and replacement of electrical system infrastructure located at Correction Services Canada (CSC) Drumheller Institution.

.2 The Work of this contract includes supply and installation of new manhole vaults, new ductbanks, new junction boxes, and connection of new power and communication conduit to existing manholes. Work includes but is not limited to:

- .1 Locate & identify underground services in area of work.
- .2 Excavation and trenching. Trenching work includes typical conduit runs beneath finished grade to a depth of 914 mm and to a depth of 2,000 mm below fencing foundation. Within the secure compound, hydrovac excavating will be needed to avoid unregistered underground communication cables, gas lines and hydro utilities.
- .3 Installation of pre-cast and cast-in-place duct banks complete with 103mm rigid PVC conduits.
- .4 Interconnection of new conduits to existing manholes.
- .5 Installation of new conduits and junction boxes along crawlspaces and breeze-ways.
- .6 Installation of pull boxes and junction boxes along building walls, crawlspaces, and inside building (B15 only).
- .7 Installation of pre-cast manholes and underground pull boxes complete with crushed stone base.
- .8 Installation of grounding rod and bonding conductors for manholes.
- .9 Installation of wet well at each manhole.
- .10 Interconnection of new duct banks into buildings, core holes into buildings accordingly.
- .11 Repair and restoration of all surfaces at Work areas, including paving, concrete pads, roads, and sidewalks, gravel-covered areas and grass-covered sod areas.

.3 All underground installation must be backfilled and returned to original state. (i.e., Sod, concrete sidewalk, asphalt pavement).

.4 Any building or structure penetrations made during the execution of the work must be properly covered and sealed.

.5 Remove any waste material off site and dispose of properly.

.6 All work on site must be under supervision of CSC escorts and following the protocols for entry to the facility and activity within the various areas of the facility as established by the Institution.

.7 Work also includes commissioning and training on the use and care of all new systems installed.

.8 All materials and workmanship must be in accordance with the Engineer-sealed plans and specifications.

1.3 CONTRACT METHOD

.1 Construct Work under stipulated price contract.

.2 Relations and responsibilities between Contractor and subcontractors and subcontractors assigned by Departmental Representative are as defined in Conditions of Contract. Assigned Subcontractors must, in addition:

.1 Purchase and maintain liability insurance to protect Contractor from claims for not less than limits of liability which Contractor is required to provide.

1.4 WORK BY OTHERS

.1 Co-operate with other Contractors in carrying out their respective works and carry out instructions from Departmental Representative.

.2 Co-ordinate work with that of other Contractors. If any part of work under this Contract depends for its proper execution or result upon work of another Contractor, report promptly to Departmental Representative, in writing, any defects which may interfere with proper execution of Work.

.3 Work of Project executed during Work of this Contract, and which is specifically excluded from this Contract:

.1 Power system upgrades.

.2 Fire alarm upgrades.

.3 Communication system upgrades.

.4 Work of Project which will be executed after completion of Work of this Contract, and which is specifically excluded from this Contract:

.1 Supply and installation of cabling for power systems in the new conduit system.

.2 Supply and installation of fire alarm system cabling in the new conduit system.

.3 Supply and installation of communication cabling in the new conduit system.

1.5 FUTURE WORK

.1 Project is designed for future installation of cabling in all vaults and conduits. Provide pull rope in all conduits as specified.

.2 Ensure that Work avoids encroachment into areas required for future work.

1.6 WORK SEQUENCE

.1 Construct Work in stages to accommodate Owner's continued use of premises during construction.

.2 Maintain fire access/control.

1.7 CONTRACTOR USE OF PREMISES

.1 All Work must be carried under CSC supervision and oversight for security purposes.

.2 Limit use of premises for Work to allow:

.1 Owner occupancy.

.2 Work by other contractors.

.3 Co-ordinate use of premises under direction of Departmental Representative.

.4 Obtain and pay for use of additional storage or work areas needed for operations under this Contract.

.5 Remove or alter existing work to prevent injury or damage to portions of existing work which remain.

.6 Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as directed by Departmental Representative.

.7 At completion of operations condition of existing work: equal to or better than that which existed before new work started.

1.8 OWNER OCCUPANCY

.1 Owner will occupy premises during entire construction period for execution of normal operations.

.2 Co-operate with Owner in scheduling operations to minimize conflict and to facilitate Owner usage.

1.9 PARTIAL OWNER OCCUPANCY

NOT USED.

1.10 PRE-ORDERED PRODUCTS, PRE-BID WORK

NOT USED.

1.11 PRE-PURCHASED EQUIPMENT

NOT USED.

1.12 OWNER-FURNISHED ITEMS

NOT USED.

1.13 ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.14 EXISTING SERVICES

.1 Notify Departmental Representative and utility companies of intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours' notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to operations.

.3 Provide alternative routes for personnel and vehicular traffic.

.4 Establish location and extent of service lines in area of work before starting Work. Notify Departmental Representative of findings.

.5 Submit schedule to and obtain approval from Departmental Representative for any shut-down or closure of active service or facility including power and communications services. Adhere to approved schedule and provide notice to affected parties.

.6 Provide temporary services when directed by Departmental Representative.

.7 Provide adequate bridging over trenches which cross sidewalks or roads to permit normal traffic.

.8 Where unknown services are encountered, immediately advise Departmental Representative and confirm findings in writing.

.9 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in manner approved by authorities having jurisdiction.

.10 Record locations of maintained, re-routed and abandoned service lines.

.11 Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

1.15 DOCUMENTS REQUIRED

.1 Maintain at job site, one copy each document as follows:

- .1 Contract Drawings.
- .2 Specifications.
- .3 Addenda.
- .4 Reviewed Shop Drawings.

.5 List of Outstanding Shop Drawings.
.6 Change Orders.
.7 Other Modifications to Contract.
.8 Field Test Reports.
.9 Copy of Approved Work Schedule.
.10 Health and Safety Plan and Other Safety Related Documents.
.11 Other documents as specified.

Part 2 Products

NOT USED.

Part 3 Execution

NOT USED.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 ACCESS AND EGRESS

.1 Design, construct and maintain temporary "access to" and "egress from" work areas, including security fencing, temporary access, ramps or ladders, independent of finished surfaces and in accordance with relevant department representative, municipal, provincial and other regulations.

1.3 USE OF SITE AND FACILITIES

.1 Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with Departmental Representative to facilitate work as stated.

.2 Maintain existing services to building and provide for normal personnel and vehicle access to all existing facilities.

.3 Contractor is responsible for bringing their own washroom facilities, storages, barricades, fences, construction equipment, tools and garbage bins. Bidders shall coordinate with Departmental Representative for placement of facility/equipment locations and guide line for its usage/handling; during site walk through meeting before accepting bid.

.4 Contractor is responsible for its own equipment rentals, temp power supply and install; if it is required for construction of the site. Bidders shall coordinate with Departmental Representative for placement of temporary service location and power pick up source with Departmental Representative during site walk through meeting before accepting bid.

.5 At all times, construction material, tools, storage, bins shall be secured in place and locked.

.6 All work on the site must be carried out in a manner that is consistent with the policies of the Institution that are presented in the Commissionaire Post Orders presented in Appendix A. Although this document specifically describes the responsibilities of the Commissionaires in their oversight of security issues, the activities, conduct, and responsibilities of contractors working on site are clearly described.

1.4 ALTERATIONS TO EXISTING BUILDING

.1 Execute work with least possible interference or disturbance to building operations, occupants, public and normal use of premises. Arrange with Departmental Representative to facilitate execution of work.

1.5 EXISTING SERVICES

.1 Notify, Departmental Representative intended interruption of services and obtain required permission.

.2 Where Work involves breaking into or connecting to existing services, give Departmental Representative 48 hours of notice for necessary interruption of mechanical or electrical service throughout course of work. Keep duration of interruptions minimum. Carry out interruptions after normal working hours of occupants,

1.6 SPECIAL REQUIREMENTS

.1 Submit schedule in the form of a Bar (GANTT) Chart to be reviewed by Departmental Representative.

1.7 SECURITY

.1 Security clearances:

.1 Personnel employed on this project will be subject to security check. Obtain clearance, as instructed, for each individual who will require to enter premises.

.2 Obtain requisite clearance, as instructed, for each individual required to enter premises.

.3 Personnel will be checked in to the facility daily, at start of work shift, and provided with a pass that must be worn at all times. The pass must be returned at end of work shift and personnel checked out. The contractor is to allow for the time required for this process in the daily work routine.

.4 Contractor's personnel will require satisfactory initial security screening in order to work in premises and on site. This process is described in Section 1.4 of the Commissionaire Post Orders in Appendix A, which includes the related application form.

.2 Security escort:

.1 <u>Security Requirement</u>

.1 NO SECURITY REQUIREMENT EXISTS.

.2 **Contractor/Offeror will be escorted at all times during the performance of this contract.** Access to PROTECTED information or assets is not permitted.

.2 <u>INSTITUTIONAL ACCESS REQUIREMENTS</u>

.1 NIL security screening required as there is no access to sensitive information or assets. Contractor personnel will be escorted at all times by Correctional Service Canada Personnel or those authorized by CSC on its behalf. CSC has developed very stringent internal policies to ensure that the security of institutional operations is not compromised.

.2 Contractor personnel must adhere to institutional requirements for the conduct of searches by Correctional Service Canada, prior to admittance to the institution/site. Correctional Service Canada reserves the right to deny access to any institution/site or part thereof of any Contractor personnel, at any time.

.3 **Submit an escort request to Departmental Representative at least two (2) days before service is needed.** For requests submitted within time noted above, costs of security escort will be paid for by the Client. The Contractor’s late

requests for escorts may be refused/delayed, and the work requested not permitted until an escort can be arranged. Any delays in the project schedule due to Contractor's late escort request will be the responsibility of the Contractor to make up the time lost by adding any required work force needed during the scheduled normal work days. No "overtime" will be permitted by the escorting security force for the Contractor to make up this lost time.

.4 Any escort request may be cancelled free of charge if notification of cancellation is given at least 36 hours before scheduled time of escort. Cost incurred by late request will be Contractor's responsibility.

1.8 BUILDING SMOKING ENVIRONMENT

.1 Comply with smoking restrictions. Smoking is not allowed inside the premises. Smoking is only permitted outside in indicated areas.

1.9 WORKING CONDITIONS

.1 Subject to Institutional Security requirements, the Warden or designate shall permit the contractor as much freedom of action and movement as is reasonably possible and the contractor, in turn, shall be expected to cooperate with institutional personnel in ensuring that all security requirements are observed by construction workers.

1.10 OBSERVATION AND INSPECTION

.1 Construction activity and all related movement of personnel and vehicles shall be subject to observation and inspection by institutional staff to ensure that security requirements are met.

1.11 PARKING

.1 The Warden or designate shall assign the area to be used by the construction personnel.

.2 All unattended vehicles must have windows closed, with doors locked, and keys removed.

.3 Vehicles must not contain any type of weapons or ammunition.

1.12 SHIPPING AND ACCESS TO THE SITE

.1 Contractor shall verify with the Warden or designate the hours during which vehicles will be allowed to enter or leave the institution. Normal construction Work hours on site are 7:30 to 16:30.

.2 Contractor shall have all project material and equipment addressed in his/her name.

.3 The Warden or designate may prohibit or restrict access to any part of the institution.

.4 Private vehicles will not be allowed within the institution's security wall or fence without special permission.

.5 Trucks delivering materials, equipment, and tools to the job will be allowed when the contents are certified at gate entrance. All vehicles are subject to search.

1.13 TOOLS AND EQUIPMENT

.1 The contractor shall maintain a written inventory of all tools and equipment. A copy of the inventory of these tools and equipment shall be left with the Warden or designate.

.2 Contractor shall keep all tools and equipment under constant supervision and not leave them unattended.

.3 Contractor shall store tools and equipment in places approved by Warden or designate.

.4 Specific considerations, and identification and control of restricted tools is presented in Section 1.11 of the Commissionaire Post Orders in Appendix A, which includes a tool registration form.

Electronic equipment such as phones and computers are not permitted to enter the facility unless approved and registered. A sample form for Electronic Item Registry is presented in Appendix A.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 ADMINISTRATIVE

.1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.

.2 Prepare agenda for meetings.

.3 Distribute written notice of each meeting four days in advance of meeting date to Departmental Representative

.4 Provide physical space and make arrangements for meetings.

.5 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.

.6 Reproduce and distribute copies of minutes within three days after meetings and transmit to meeting participants

.7 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

.1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.

.2 Departmental Representative, Contractor, major Subcontractors, will be in attendance.

.3 Establish time and location of meeting and notify parties concerned minimum 5 days before meeting.

.4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.

1.4 PROGRESS MEETINGS

.1 During course of Work, schedule progress meetings monthly.

.2 Contractor, major Subcontractors involved in Work, Departmental Representative are to be in attendance.

.3 Notify parties minimum 5 days prior to meetings.

.4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance.

.5 Agenda to include the following:

.1 Review, approval of minutes of previous meeting.

.2 Review of Work progress since previous meeting.

.3 Field observations, problems, conflicts.

.4 Problems which impede construction schedule.

.5 Review of off-site fabrication delivery schedules.

.6 Corrective measures and procedures to regain projected schedule.

.7 Revision to construction schedule.

.8 Progress schedule, during succeeding work period.

.9 Review submittal schedules: expedite as required.

.10 Maintenance of quality standards.

.11 Review proposed changes for effects on construction schedule and on completion date.

.12 Other business.

Part 2 Products

NOT USED.

Part 3 Execution

NOT USED.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

.1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.

.2 Do not proceed with Work affected by submittal until review is complete.

.3 Present shop drawings, product data, samples and mock-ups in SI Metric units.

.4 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.

.5 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

.6 Verify field measurements and affected adjacent Work are co-ordinated.

.7 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.

.8 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.

.9 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.

.2 Submit shop drawings bearing stamp and signature of qualified professional engineer registered or licensed in Province of Alberta, Canada.

.3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.

.4 Allow 5 days for Departmental Representative's review of each submission.

.5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.

.6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.

.7 Accompany submissions with transmittal letter containing:

- .1 Date.
- .2 Project title and number.
- .3 Contractor's name and address.
- .4 Identification and quantity of each shop drawing, product data and sample.
- .5 Other pertinent data.

.8 Submissions include:

- .1 Date and revision dates.
- .2 Project title and number.
- .3 Name and address of:
  - .1 Subcontractor.
  - .2 Supplier.
  - .3 Manufacturer.
- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.

.9 After Departmental Representative's review, distribute copies.

.10 Submit electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.

.11 Submit electronic copies of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.

.12 Submit electronic copies of test reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.

.2 Testing must have been within 3 years of date of contract award for project.

.13 Submit electronic copies of certificates for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.

.2 Certificates must be dated after award of project contract complete with project name.

.14 Submit electronic copies of manufacturers' instructions for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.

.15 Submit electronic copies of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.

.1 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.

.16 Submit 6 copies of Operation and Maintenance Data for requirements requested in specification Sections and as requested by Departmental Representative

.17 Delete information not applicable to project.

.18 Supplement standard information to provide details applicable to project.

.19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, transparency copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

.20 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.

.1 This review shall not mean that PWGSC approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.

.2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains

solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 PROGRESS PHOTOGRAPHS

.1 Submit progress photographs of work as it its being completed, and prior to covering any manholes and ductbanks.

1.4 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Compensation Board status.

.2 Submit transcription of insurance immediately after award of Contract.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 PRECEDENCE

.1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 NOT USED

1.4 REFERENCES

.1 Canada Labour Code, Part 2, Canada Occupational Safety and Health Regulations.

.2 Health Canada/Workplace Hazardous Materials Information System (WHMIS).

.1 Material Safety Data Sheets (MSDS).

.3 Province of Alberta

.1 Occupational Health and Safety Act, R.S.A. - Updated 2013.

1.5 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:

.1 Results of site specific safety hazard assessment.

.2 Results of safety and health risk or hazard analysis for site tasks and operation

.3 Submit 3 copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative & Engineer, weekly.

.4 Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.

.5 Submit copies of incident and accident reports.

.6 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.7 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 7 days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 3 days after receipt of comments from Departmental Representative.

.8 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.

.9 Medical Surveillance: where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Departmental Representative.

.10 On-site Contingency and Emergency Response Plan: address standard operating procedures to be implemented during emergency situations.

1.6 FILING OF NOTICE

.1 File Notice of Project with Provincial authorities prior to beginning of Work.

1.7 SAFETY ASSESSMENT

.1 Perform site specific safety hazard assessment related to project.

.2 The Contractor shall comply with all requirements of the Governing Authority as to the manner in which all work is done. This means that all conduit, grounding and bonding are to be installed under the direct on-site supervision of a Field Service Representative (FSR) as per Safety Standards Act ELECTRICAL SAFETY REGULATION. The on-site installation crew must be led by a certified FSR who must be present at all times that work is being performed.

1.8 MEETINGS

.1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.

1.9 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:

.1 Live electrical components.
.2 Open Excavation.
.3 Confined Space Entry.
.4 Hoisting and Placing heavy components.
.5 Safety on working in highly secure zone.

1.10 GENERAL REQUIREMENTS

.1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

1.11 RESPONSIBILITY

.1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.

.2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

1.12 COMPLIANCE REQUIREMENTS

.1 Comply with Occupational Health and Safety Act, General Safety Regulation, Alberta Reg. 2009.

.2 Comply with Canada Labour Code, Canada Occupational Safety and Health Regulations.

1.13 UNFORSEEN HAZARDS

.1 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of the Province of Alberta and advise Departmental Representative verbally and in writing.

.2 When unforeseen or peculiar safety-related factor, hazard, or condition occur during performance of Work, advise Health and Safety co-ordinator and follow procedures in accordance with Acts and Regulations of Alberta having jurisdiction and advise Departmental Representative verbally and in writing.

1.14 HEALTH AND SAFETY CO-ORDINATOR

.1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:

.1 Have minimum 2 years' site-related working experience specific to activities associated with the work.

.2 Have working knowledge of occupational safety and health regulations.

.3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

.4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.

.5 Be on site during execution of Work and report directly to and be under direction of the site supervisor.

1.15 POSTING OF DOCUMENTS

.1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of the Province of Alberta, and in consultation with Departmental Representative.

1.16 CORRECTION OF NON-COMPLIANCE

.1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.

.2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.

.3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.17 WORK STOPPAGE

.1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

NOT USED.

1.3 INSPECTION

.1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.

.2 All testing to be carried out to meet specifications is Quality Control testing to be carried out and paid for by contractor for work related to this project.

.3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.

.4 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.

.5 Departmental Representative will order part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.4 INDEPENDENT INSPECTION AGENCIES

.1 Independent Inspection/Testing Agencies may be engaged by Departmental Representative for the purpose of random Quality Assurance testing of the work.

.2 Provide equipment required for executing inspection and testing by appointed agencies.

.3 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.

.4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.5 ACCESS TO WORK

.1 Allow inspection/testing agencies access to Work, off-site manufacturing and fabrication plants.

.2 Co-operate to provide reasonable facilities for such access.

1.6 PROCEDURES

.1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.

.2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in orderly sequence to not cause delays in Work.

.3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.7 REJECTED WORK

.1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.

.2 Make good other Contractor's work damaged by such removals or replacements promptly.

.3 If in opinion of Departmental Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Owner will deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which will be determined by Departmental Representative.

1.8 REPORTS

.1 Submit electronic copies of inspection and test reports to Departmental Representative.

1.9 TESTS

.1 The Contractor is to provide a Quality Control (QC) plan for the review and approval of the Departmental Representative prior to the commencement of work on site. The Contractor’s QC plan is to outline the measures to be taken on a day-to-day basis, including materials testing. All materials testing, including field sampling and measurements, is to be carried out by a certified materials testing laboratory or agency to be approved by the Departmental Representative.

.2 Concrete Testing to be carried out by the Contractor daily on each day concrete is placed on site, with reports provided to Departmental Representative. Testing is to include slump testing and air content testing, as well as compression testing. A minimum of 4 cylinders are to be taken for each type of concrete placed. If the placement involves more than 50 m^3, a set of cylinders are to be taken for each 50 m^3 or portion thereof. One concrete test cylinder is to be tested for compression at each of 7, 28, and 56 days. One cylinder is to be reserved for special considerations. The method of handling storage and testing shall comply with CSA A23.2.

.3 Compaction testing is to be carried out by the Contractor as needed to ensure the work meets the specifications. Provide not less than two field compaction tests for fill underlying each 50 linear meters of duct bank, and one field compaction test for fill overlying each 50 metres of duct bank.

.4 All testing for all materials to be carried out under the Contractor's QC plan is to be paid for by the Contractor.

Part 2 Products

NOT USED.

Part 3 Execution

NOT USED.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 CSC Technical Criteria – 2015 February Part 1

.2 ASTM A 53/A 53M-12, Standard specification for pipe, Steel, Black and Hot Dipped, Zinc-Coated Welded and Seamless.

.3 ASTM A 90/A 90M-13, Standard Test Method for Weight of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.

.4 ASTM A 121-13, Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.

.5 A653/A653M-15e1, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

.6 CAN/CSA-A23.1-14/A23.2-14- Concrete Materials and Methods of Concrete Construction/ Test Methods and Standard Practices for concrete.

1.3 INSTALLATION AND REMOVAL

.1 Modify and provide Temporary Perimeter Chain Link Fences, all associated detecting, surveillance devices and mounting accessories, for duration of new underground Duct Banks installation beneath existing perimeter chain linked Fences (i.e. on South/West corner of the fence). Refer to Drawing E100 and applicable details.

.2 Installation of temporary fencing shall comply with CSC Technical Criteria Part 1, SP-2 SITE – FENCE and SP-6 Temporary Construction Fences, applicable section. Refer to Appendix B.

.1 Buffer Zone area, i.e. a 4m buffer zone parallel to the interior side of the inner perimeter fence shall be free of all structures, construction material, vehicle, bin or storage.

.2 No Building Zone, i.e., no storage, garbage bins or material placed closer than 12m to the inner perimeter fence.

.3 Construction storage, garbage bins and construction material shall be located furthest from the gatehouse or access routes.

.3 Provide material and installation works for Temporary construction of Fences as per CSC Technical Criteria Part 1, applicable Section.

.4 Reconstruct and Restore the original integrality of existing perimeter fences after the installation of the Duct Banks beneath the fence is completed and verified for its proper functionality.

.5 Provide material and installation works for Restoring of the existing fences to its original integrity As per with CSC Technical Criteria Part 1, SP-2 SITE – FENCE, applicable section (Appendix B).

.6 Examine the security fencing system components in the area and coordinate the extent or work requirement with Departmental Representative.

.7 Provide rigorous attention to quality assurance, meeting the requirements outlined within this contract.

1.4 GUARD RAILS AND BARRICADES

.1 Provide secure, rigid guard rails and barricades around deep excavations.

.2 Provide as required by Departmental Representative.

1.5 DUST TIGHT SCREENS

.1 Provide dust tight screens or partitions to localize dust generating activities, and for protection of workers, finished areas of Work and public.

.2 Maintain and relocate protection until such work is complete.

1.6 ACCESS TO SITE

.1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.7 FIRE ROUTES

.1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.8 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

.1 Protect surrounding private and public property from damage during performance of Work.

.2 Be responsible for damage incurred.

1.9 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Waste Management And Disposal.

1.10 SIGNAGE

.1 Provide signage to control access to the construction area; all signage shall conform to the Federal Identity and Program, standard, coordinate signage designated location before placement.

Part 2 Products

2.1 MATERIAL

.1 If existing fence fabric damaged provide new chain-link fence fabric to CAN CGSB-138.1.

.1 Match existing fabric

.2 Wire size 4.8m Minimum – six gauge

.3 Size of mesh: 50.8mm

.4 Height of fabric to meet CSC Requirements

.5 Height 3,600 mm.

.6 Barbed edges top and bottom

.7 Average mass of zinc Coating to be not less than 610g/m2 of uncoated wire.

.8 Breaking strength to be 10,000N Minimum

.9 Galvanization: heavy-duty commercial; 25-35 year durability.

.2 Post, Braces and rails: to CAN/CGSB-138.8, galvanized steel pipe. Dimensions to meet CSC Requirements.

.1 Inspect Posts and rails, identify where post assembles meet concrete base in a manner that is not durable. i.e. identify post base conditions that are rusted or that will allow water to leak into pipe and footing assemblies.

.2 make good post base conditions by welding joints to eliminate gaps where water can penetrate into assembly finish welds with zinc rich coatings.

.3 Top and bottom and side tension wire to CAN/CGSB-138.2, single strand, galvanized steel wire.

.4 Replacement tie wire fasteners 9 gauge galvanized steel wire.

.5 Tension bar to ASTM A 653/A 653M, 5 x 20mm minimum galvanized steel.

.1 Tension bars to be at least 5mm thick and 20mm wide.

.6 Fittings and hardware to CAN/CGSB-138.2 galvanized steel.

.1 Tension bar bands 5 x 20mm minimum galvanized steel.

.2 Post caps to provide waterproof fit, to fasten securely over posts and to carry top rail.

.3 Overhang tops to provide waterproof fit, to hold top rails and a projection to hold barbed wire overhang to CSC standard details.

.4 Modify projection with clips or recesses to hold strands of concertina barbed tape wire spaced apart.

.5 Maintain existing projections projecting from fence at 45 degrees above horizontal holding concertina barbed wire.

.6 Turnbuckles; all fixtures; accessories to be drop forged steel, designed to fit and fasten without bending or distortion.

.7 Organic zinc rich coating to CAN/CGSB=1.181.

.8 Concertina Barbed wire to CAN/CGSB-1.181, 20 x 2.5mm diameter. Concertina wire to feature:

.1 Spring steel galvanized core wire.

.2 To form a concertina coil with a nominal exterior coil of 710mm.

.3 Concertina coil to have a minimum diameter of 635mm.

.4 Concertina coils shall be spaced in loops spaced no more than 230mm on centre.

.5 Define concertina coils clipping adjacent of three (3) points on the circumference.

.6 Concertina wire fabricated with 20mm barb dimension measured tip to tip of concertina blade barbs.

.7 Concertina wire barb clusters spaced 45mm on centre.

2.2 FINISHES

.1 Galvanizing:

.1 For chain link fabric to CAN/CGSB-138.1 grade.

.2 For Pipe refer to CSC Standards.

.3 For barbed refer to CSC Standards.

.4 For other fittings to CAN/CSA-G164.

.5 Performance requirement; All Products.

.6 Galvanization to heavy-duty commercial grade; 25-35 year durability.

Part 3 Execution

3.1 MODIFIED OR TEMPORARY PERIMETER FENCE

.1 Provide two stage Temporary perimeter security fences (i.e., one for outer fence, one for inner fence) for new conduits bank installation and routing. Submit a plan to Departmental Representative for review and approval prior to commencement of any work.

.2 Coordinate and get written approval for double chain link Temporary fence modification/alteration from Departmental Representative.

.3 Trenching, installation of ductbanks and back filling construction to take place in two stages: first stage for outer fence area duct banks routing, second stage for inner fence ductbanks routing.

.4 Temporary fencing modification duration shall be kept to minimum to Department Representative approval and site condition.

.5 All Temporary excavation of this type shall be backfilled as soon as possible after installation of duct banks has been completed, and verified for their proper functionality.

.6 Restore the original integrity of fence installation after the installation of new duct banks are in place and verified for their proper functionality.

.7 The temporary fences shall be erected in straight lines from corner to corner for direct viewing by camera, the corner of the perimeter shall be truncated at 45 degree to allow suitable placement of camera poles and cameras to afford optimal viewing between inner perimeter fence.

.8 The temporary fences equipped with a fence detection system, 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 separation for the Perimeter Intrusion Detection System (PIDS).

.9 Special attention shall be paid to sloped sites to ensure that gaps do not develop between the ground surface and the lower fence rail. Ground slope across the fence line shall be minimized to prevent erosion under the perimeter fences.

.10 Water shall be prevented from pooling between the perimeter fences, as this could affect the operation of the motion detection system. For special underground drainage requirement relating to perimeter fences

.11 Barbed tape concertina (BTC) wire shall be installed in such a manner that it prevents the passage of a person across the barbed coils.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 Departmental Representative's identification of existing survey control points and property limits.

1.3 QUALIFICATIONS OF SURVEYOR

.1 Qualified registered land surveyor, licensed to practise in Place of Work, acceptable to Departmental Representative.

1.4 SURVEY REFERENCE POINTS

.1 Existing base horizontal and vertical control points are designated on drawings.

.2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.

.3 Make no changes or relocations without prior written notice to Departmental Representative.

.4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.

.5 Require surveyor to replace control points in accordance with original survey control.

1.5 SURVEY REQUIREMENTS

.1 Establish two permanent bench marks on site, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

.2 Establish lines and levels, locate and lay out, by instrumentation.

.3 Stake for grading, fill and topsoil placement.

.4 Stake slopes.

.5 Establish lines and levels for mechanical and electrical work.

.6 All topographic surveying for construction layout and as built to be carried out by the contractor. Contractor to provide as-built autocad drawing.

1.6 EXISTING SERVICES

.1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

.2 Utility Locating and Hydrovac excavating will be needed to determine locations of unregistered underground communication cables, gas lines and hydro utilities on site.

Any disruption or cutting of existing utility lines done by contractor are to be fixed and paid for by the contractor.

.3 Remove abandoned service lines within 2 m of structures. Cap or otherwise seal lines at cut-off points as directed by Departmental Representative.

1.7 LOCATION OF EQUIPMENT AND FIXTURES

.1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.

.2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.

.3 Inform Departmental Representative of impending installation and obtain approval for actual location.

.4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.8 RECORDS

.1 Maintain a complete, accurate log of control and survey work as it progresses.

.2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles and elevations of Work.

.3 Record locations of maintained, re-routed and abandoned service lines.

.4 Record all underground utilities exposed on site. Records are to include location, size, and type of all utility.

1.9 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit name and address of Surveyor to Departmental Representative.

.2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.

.3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

1.10 SUBSURFACE CONDITIONS

.1 Promptly notify Departmental Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.

.2 After prompt investigation, should Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

NOT USED

Part 3 Execution

NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 PROJECT CLEANLINESS

.1 Maintain Work in neat & orderly condition, free from accumulation of waste products and debris.

.2 Remove waste materials from site at regularly scheduled times per Departmental Representative instruction and guide lines. Coordinate the requirement before commencement of construction work.

.3 Store volatile waste in covered metal containers, and remove from premises at end of each working day.

.4 Use only cleaning methods and materials recommended by manufacturer of surface to be cleaned.

1.3 FINAL CLEANING

.1 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.

.2 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.

.3 Prior to final review, remove surplus products, tools, construction machinery and equipment.

.4 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.

END OF SECTION

Part 1 General

1.1 WASTE MANAGEMENT GOALS

.1 Prior to start of Work conduct meeting with Departmental Representative to review and discuss PSPC's waste management goal and Contractor's proposed Waste Reduction Workplan for Construction, Renovation and/or Demolition (CRD) waste to be project generated.

.2 PSPC's waste management goal: to divert a minimum 75 percent of total Project Waste from landfill sites. Prior to project completion provide Departmental Representative documentation certifying that waste management, recycling, reuse of recyclable and reusable materials have been extensively practiced. The overall waste diversion goal for this project is 75

.3 Target percentage goals are achievable for waste diversion. Contractor to review and confirm Departmental Representative's Waste Audit acceptable values.

.4 Minimize amount of non-hazardous solid waste generated by project and accomplish maximum source reduction, reuse and recycling of solid waste produced by CRD activities.

.5 Protect environment and prevent environmental pollution damage.

1.2 RELATED REQUIREMENTS

NOT USED.

1.3 REFERENCE STANDARDS

.1 Public Works and Government Services Canada (PSPC)

.1 2002 National Construction, Renovation and Demolition Non-Hazardous Solid Waste Management Protocol.

.2 CRD Waste Management Market Research Report (available from PSPC's Environmental Services).

.3 Sustainable Development Strategy 2007-2009: Target 2.1 Environmentally Sustainable Use of Natural Resources.

.1 Real Property projects over $1 million and in communities where industrial recycling is supported, implementation of CRD waste management practices will be completed, with waste materials being reused or recycled.

.2 Contractually ensure resources used in construction or maintenance are consumed and recovered in a sustainable manner.

1.4 DEFINITIONS

.1 Approved/Authorized recycling facility: waste recycler approved by applicable provincial authority or other users of material for recycling approved by the Departmental Representative.

.2 Class III: non-hazardous waste - construction renovation and demolition waste.

.3 Construction, Renovation and/or Demolition (CRD) Waste: Class III solid, non-hazardous waste materials generated during construction, demolition, and/or renovation activities.

.4 Inert Fill: inert waste - exclusively asphalt and concrete.

.5 Waste Source Separation Program (WSSP): implementation and co-ordination of ongoing activities to ensure designated waste materials will be sorted into pre-defined categories and sent for recycling and reuse, maximizing diversion and potential to reduce disposal costs.

.6 Recyclable: ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse.

.7 Recycle: process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.

.8 Recycling: process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

.9 Reuse: repeated use of product in same form but not necessarily for same purpose. Reuse includes:

.1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.

.2 Returning reusable items including pallets or unused products to vendors.

.10 Salvage: removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

.11 Separate Condition: refers to waste sorted into individual types.

.12 Source Separation: act of keeping different types of waste materials separate beginning from the point they became waste.

.13 Waste Audit (WA): detailed inventory of estimated quantities of waste materials that will be generated during construction, demolition, deconstruction and/or renovation. Involves quantifying by volume/weight amounts of materials and wastes that will be reused, recycled or landfilled. Refer to Schedule A.

.14 Waste Diversion Report: detailed report of final results, quantifying cumulative weights and percentages of waste materials reused, recycled and landfilled over course of project. Measures success against Waste Reduction Workplan (WRW) goals and identifies lessons learned.

.15 Waste Management Co-ordinator (WMC): contractor representative responsible for supervising waste management activities as well as co-ordinating required submittal and reporting requirements.

.16 Waste Reduction Workplan (WRW): written report which addresses opportunities for reduction, reuse, or recycling of materials generated by project. Specifies diversion goals, implementation and reporting procedures, anticipated results and responsibilities. Waste Reduction Workplan (Schedule B) information acquired from Waste Audit.

1.5 DOCUMENTS

.1 Post and maintain in visible and accessible area at job site, one copy of following documents:

- .1 Waste Audit (Schedule A).
- .2 Waste Reduction Workplan (Schedule B).
- .3 Waste Source Separation Program.
- .4 Schedules A completed for project.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures

.2 Prepare and submit following prior to project start-up:

- .1 1 electronic copy of completed Waste Audit (WA): Schedule A.
- .2 1 electronic copy of completed Waste Reduction Workplan (WRW): Schedule B.

.3 Prepare and submit on monthly basis, throughout project or at intervals agreed to by Departmental Representative the following:

- .1 Receipts, scale tickets, waybills, and/or waste disposal receipts that show quantities and types of materials reused, recycled, or disposed of.
- .2 Written monthly summary report detailing cumulative amounts of waste materials reused, recycled and landfilled, and brief status of ongoing waste management activities.

.4 Submit prior to final payment the following:

- .1 Waste Diversion Report, indicating final quantities by material types salvaged for reuse, recycling or disposal in landfill and recycling centres, re-use depots, landfills and other waste processors that received waste materials
- .2 Provide receipts, scale tickets, waybills, waste disposal receipts that confirm quantities and types of materials reused, recycled or disposed of and destination.

1.7 WASTE AUDIT (WA)

.1 Departmental Representative will prepare WA prior to project start-up. WA will be provided with bid documentation (see Schedule A).

.2 WA provides detailed inventory, estimated quantities and types of waste materials that will be generated as well as their potential to be reused and/or recycled and project's waste diversion goals and objectives.

.3 After award of contract, contractor to review WA and confirm that anticipated quantities of waste generated are accurate and goals achievable.

.4 If after review, contractor determines that indicated quantities or opportunities in WA are not accurate or achievable, contractor to provide written details of discrepancies and revised quantities for areas of concern. Contractor to meet with Departmental Representative to review and justify revisions.

.5 Post on-site WA where contractor and sub-contractors are able to review content.

1.8 WASTE REDUCTION WORKPLAN (WRW)

.1 Prepare and submit WRW (Schedule B) at least 10 days prior to project start-up.

.2 WRW identifies strategies to optimize diversion through reduction, reuse, and recycling of materials and comply with applicable regulations, based on information acquired from WA.

.3 WRW should include but not limited to:

- .1 Applicable regulations.
- .2 Specific goals for waste reduction, identify existing barriers and develop strategies to overcome them.
- .3 Destination of materials identified.
- .4 Deconstruction/disassembly techniques and schedules.
- .5 Methods to collect, separate, and reduce generated wastes.
- .6 Location of waste bins on-site.
- .7 Security of on-site stock piles and waste bins.
- .8 Protection of personnel, sub-contractors.
- .9 Clear labelling of storage areas.
- .10 Training plan for contractor and sub-contractors.
- .11 Methods to track and report results reliably (Schedule D).
- .12 Details on materials handling and removal procedures.
- .13 Recycler and reclaimer requirements.
- .14 Quantities of materials to be salvaged for reuse or recycled and materials sent to landfill.
- .15 Requirements for monitoring on-site wastes management activities.

.4 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.

.5 Post WRW or summary where workers at site are able to review content.

.6 Monitor and report on waste reduction by documenting total volume (in tonnes) and cost of actual waste removed from project (Schedule D).

1.9 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

NOT USED.

1.10 WASTE SOURCE SEPARATION PROGRAM (WSSP)

.1 As part of Waste Reduction Workplan, prepare WSSP prior to project start-up.

.2 WSSP will detail methodology and planned on-site activities for separation of reusable and recyclable materials from waste intended for landfill.

.3 Provide list and drawings of locations that will be made available for sorting, collection, handling and storage of anticipated quantities of reusable and recyclable materials.

.4 Provide sufficient on-site facilities and containers for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.

.5 Locate containers to facilitate deposit of materials without hindering daily operations.

.6 Provide training for workers in handling and separation of materials for reuse and/or recycling.

.7 Locate separated materials in areas that minimizes material damage.

.8 Clearly and securely label containers to identify types/conditions of materials accepted and assist workers in separating materials accordingly.

.9 Monitor on-site waste management activities by conducting periodic site inspections to verify: state of signage, contamination levels, bin locations and condition, personnel participation, use of waste tracking forms and collection of waybills, receipts and invoices.

.10 On-site sale of salvaged materials is not permitted unless authorized in writing by Departmental Representative and provided that site safety regulations and security requirements are adhered to.

1.11 USE OF SITE AND FACILITIES

.1 Execute Work with minimal interference and disturbance to normal use of premises.

.2 Maintain security measures established by facility provide temporary security measures approved by Departmental Representative.

1.12 WASTE PROCESSING SITES

.1 Contractor is responsible to research and locate waste diversion resources and service providers. Salvaged materials are to be transported off-site to approved and/or authorized recycling facilities or to users of material for recycling.

1.13 QUALITY ASSURANCE

.1 After award of Contract, a mandatory site examination will be held for this Project for Contractor responsible for construction, renovation demolition/deconstruction waste management.

.1 Date, time and location will be arranged by Departmental Representative

.2 Waste Management Meeting: Waste Management Co-ordinator is to provide an update on the status of waste diversion and management activities at each meeting. Written monthly Waste Diversion Report summary to be provided by Waste Management Coordinator.

1.14 STORAGE, HANDLING AND PROTECTION

.1 Store, materials to be reused, recycled and salvaged in locations as directed by Departmental Representative.

.2 Unless specified otherwise, materials for removal become Contractor's property.

.3 Protect, stockpile, store and catalogue salvaged items.

.4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.

.5 Protect structural components not removed and salvaged materials from movement or damage.

.6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Departmental Representative.

.7 Protect surface drainage, mechanical and electrical from damage and blockage.

.8 Provide on-site facilities and containers for collection and storage of reusable and recyclable materials.

.9 Separate and store materials produced during project in designated areas.

.10 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated processing facilities.

.1 On-site source separation is recommended.

.2 Remove co-mingled materials to off-site processing facility for separation.

.3 Obtain waybills, receipts and/or scale tickets for separated materials removed from site.

.4 Materials reused on-site are considered to be diverted from landfill and as such are to be included in all reporting.

1.15 DISPOSAL OF WASTES

.1 Do not bury rubbish or waste materials.

.2 Do not dispose of waste into waterways.

.3 Keep records of construction waste including:

.1 Number and size of bins.

.2 Waste type of each bin.

.3 Total tonnage generated.

.4 Tonnage reused or recycled.

.5 Reused or recycled waste destination.

.4 Remove materials on-site as Work progresses.

.5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in the waste audit.

1.16 SCHEDULING

.1 Co-ordinate Work with other activities at site to ensure timely and orderly progress of Work.

Part 2 Products

NOT USED.

Part 3 Execution

3.1 APPLICATION

.1 Do Work in compliance with WRW and WSSP.

.2 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

3.3 DIVERSION OF MATERIALS

.1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.

.1 Mark containers or stockpile areas.

.2 Provide instruction on disposal practices.

.2 On-site sale of recyclable material is not permitted.

3.4 WASTE DIVERSION REPORT

.1 At completion of Project, prepare written Waste Diversion Report indicating quantities of materials reused, recycled or disposed of as well as the following:

.1 Identify final diversion results and measure success against goals from Waste Reduction Workplan.

.2 Compare final quantities/percentages diverted with initial projections in Waste Audit and Waste Reduction Workplan and explain variances.

.1 Supporting documentation.

.2 Waybills and tracking forms.

.3 Description of issues, resolutions and lessons learned.

3.5 WASTE AUDIT (WA)

.1 Schedule A - Waste Audit (WA)

(1) Material Category	(2) Material Quantity Unit	(3) Estimated Waste %	(4) Total Quantity of Waste (unit)	(5) Generation Point	(6) % Recycled	(7) % Reused
Wood and Plastics Material Description						
Off-cuts						
Warped Pallet Forms						
Plastic Packaging						
Cardboard Packaging						
Other						
Glass						
Wood						
Metal						
Other						

3.6 WASTE REDUCTION WORKPLAN (WRW)

.1 Schedule B

(1) Material Category	(2) Person(s) Respon-sible	(3) Total Quantity of Waste (unit)	(4) Reused Amount (units) Projected	Actual	(5) Recycled Amount (unit) Projected	Actual	(6) Material(s) Destina-tion
Wood and Plastics Material Description							
Chutes							
Warped Pallet Forms							
Plastic Packaging							
Card-board							

Packaging							
Other							
Glass							
Wood							
Metal							
Other							

3.7 COST/REVENUE ANALYSIS WORKPLAN (CRAW)

NOT USED.

3.8 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Schedule G - Government Chief Responsibility for the Environment:

Province	Address	General Inquires	Fax
Alberta	Alberta Environmental Protection Petroleum Plaza, South Tower 9915 - 108 thStreet Edmonton AB T5K 2G8	403-427-2739	
	Alberta Special Waste Management Corporation Pacific Plaza, Suite 610 10909 Jasper Avenue NW Edmonton AB T5J 3L9	403-422-5029	403-428-9627

3.9 SCHEDULES

.1 Following Schedules are included in this Specification:

.1 Waste Audit - Schedule A.

.2 Waste Reduction Workplan Form - Schedule B.

END OF SECTION

Part 1 General

1.1 NOT USED

1.2 NOT USED

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Acceptance of Work Procedures:

.1 Departmental Representative Inspection:

.1 Departmental Representative and Contractor to inspect Work and identify defects and deficiencies.

.2 Contractor to correct Work as directed.

.2 Completion Tasks: submit written certificates in English that tasks have been performed as follows:

.1 Work: completed and inspected for compliance with Contract Documents.

.2 Defects: corrected and deficiencies completed.

.3 Work: complete and ready for final inspection.

.3 Final Inspection:

.1 When completion tasks are done, request final inspection of Work by Departmental Representative

.2 When Work incomplete according to Departmental Representative, complete outstanding items and request re-inspection.

.4 Declaration of Substantial Performance: when Departmental Representative considers deficiencies and defects corrected and requirements of Contract substantially performed, make application for Certificate of Substantial Performance.

.5 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance to be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.

.6 Payment of Holdback: after issuance of Certificate of Substantial Performance of Work, submit application for payment of holdback amount in accordance with contractual agreement.

1.4 FINAL CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

Part 2 Products

2.1 NOT USED

Part 3 Execution

3.1 NOT USED

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 PRECEDENCE

.1 For Federal Government projects, Division 1 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 ADMINISTRATIVE REQUIREMENTS

NOT USED.

1.4 SUBMISSION

.1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.

.2 Copy will be returned after final inspection, with Departmental Representative's comments.

.3 Revise content of documents as required prior to final submittal.

.4 Two weeks prior to Substantial Performance of the Work, submit to the Departmental Representative three final copies of operating and maintenance manuals in English

.5 Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.

.6 If requested, furnish evidence as to type, source and quality of products provided.

.7 Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

.8 Pay costs of transportation.

1.5 FORMAT

.1 Organize data in the form of an instructional manual.

.2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.

.3 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.

.4 Arrange content by systems under Section numbers and sequence of Table of Contents.

.5 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.

.6 Text: Manufacturer's printed data, or typewritten data.

.7 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.6 CONTENTS - EACH VOLUME

.1 Table of Contents: provide title of project;

.1 date of submission; names,

.2 addresses, and telephone numbers of Departmental Representative and Contractor with name of responsible parties;

.3 schedule of products and systems, indexed to content of volume.

.2 For each product or system:

.1 list names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.

.3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.

.4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

.5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

1.7 AS-BUILTS AND SAMPLES

.1 In addition to requirements in General Conditions, maintain at the site for the Departmental Representative and Owner one record copy of:

.1 Contract Drawings.

.2 Specifications.

.3 Addenda.

.4 Change Orders and other modifications to the Contract.

.5 Reviewed shop drawings, product data, and samples.

.6 Field test records.

.7 Inspection certificates.

.8 Manufacturer's certificates.

.9 Product warranty or bond documentation.

.2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.

.3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.

.4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.

.5 Keep record documents and samples available for inspection by Departmental Representative.

1.8 RECORDING ACTUAL SITE CONDITIONS

.1 All topographic surveying for construction layout and as built to be carried out by the contractor. Contractor to provide as built autocad drawing

.2 Record information on set of black line opaque drawings provided by Departmental Representative.

.3 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.

.4 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.

.5 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:

.1 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.

.2 Field changes of dimension and detail.

.3 Changes made by change orders.

.4 Details not on original Contract Drawings.

.5 References to related shop drawings and modifications.

.6 Specifications: legibly mark each item to record actual construction, including:

.1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.7 Other Documents: maintain manufacturer's certifications, inspection certifications, required by individual specifications sections.

1.9 EQUIPMENT AND SYSTEMS

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.3 Include manufacturer's printed operation and maintenance instructions.

.4 Include sequence of operation by controls manufacturer.

.5 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.6 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.7 Additional requirements: As specified in individual specification sections.

1.10 WARRANTIES AND BONDS

.1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.

.2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

.3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.

.4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.

.5 Verify that documents are in proper form, contain full information, and are notarized.

.6 Co-execute submittals when required.

.7 Retain warranties and bonds until time specified for submittal.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 CSA International

.1 CSA S350-M1980 (R2003), Code of Practice for Safety in Demolition of Structures.

.2 National Research Council Canada (NRC)

.1 National Building Code of Canada 2015 (NBC).

.2 National Fire Code of Canada 2015 (NFC).

Part 2 Products

NOT USED.

Part 3 Execution

3.1 EXAMINATION

.1 Inspect building with Departmental Representative and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage and items to remain.

.2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.

.3 Remove tiles from suspended ceiling where required to allow access to run wiring conduit and ductwork

.4 Protect any existing equipment and systems in vicinity of work from damage during execution of work

.5 Repair and refinish all building elements affected by the work to pre-construction conditions

3.2 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.3 Refer to demolition drawings and specifications for items to be salvaged for reuse.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

- .1 CSA-A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-O86S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood.
- .3 CSA O121-17), Douglas Fir Plywood.
- .4 CSA O151-17, Canadian Softwood Plywood.
- .5 CSA O153-13, Poplar Plywood.
- .6 CSA-O325-16, Construction Sheathing.
- .7 CSA O437 Series93 (R2011), Standards for OSB and Waferboard.
- .8 CSA S269.1-16, Falsework and Formwork.

.2 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S701-115, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

- .1 Separate waste materials in accordance with Section 01 47 21 - Construction/Demolition Waste Management and Disposal.
- .2 Place materials defined as hazardous or toxic in designated containers.

Part 2 Products

2.1 MATERIALS

.1 Conduit Duct Spacers:

- .1 Underground Devices High Impact Polystyrene Spacers.
- .2 Minimum 190 mm between center of conduits.

.2 Formwork materials:

.1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-O86 & CSA O437 Series.

.2 For concrete with special architectural features, use formwork materials to CSA-A23.1/A23.2.

.3 Rigid insulation board: to CAN/ULC-S701.

.3 Form ties:

.1 Use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm diameter in concrete surface.

.4 Form liner:

.1 Plywood: Canadian Softwood Plywood to CSA O151.

.2 Waferboard: to CAN/CSA-O325.0.

.5 Form release agent: low VOC.

.6 Form stripping agent: colourless mineral oil, low VOC, free of kerosene.

.7 Falsework materials: to CSA-S269.1.

.8 Sealant: Butyl Rubber Sealant.

Part 3 Execution

3.1 FABRICATION AND ERECTION

.1 Verify lines, levels and centres before proceeding with formwork/falsework and ensure dimensions agree with drawings.

.2 Obtain Departmental Representative's approval for use of earth forms framing openings not indicated on drawings.

.3 Place duct spacers at 2000 mm apart.

.4 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.

.5 Fabricate and erect falsework in accordance with CSA S269.1.

.6 Do not place shores and mud sills on frozen ground.

.7 Provide site drainage to prevent washout of soil supporting mud sills and shores.

.8 Fabricate and erect formwork in accordance with CAN/CSA-S269.3 to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CSA-A23.1/A23.2.

.9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.

.10 Build in anchors, sleeves, and other inserts required to accommodate Work specified in other sections.

.1 Ensure that anchors and inserts will not protrude beyond surfaces designated to receive applied finishes, including painting.

.11 Clean formwork in accordance with CSA-A23.1/A23.2, before placing concrete.

3.2 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum of 7 days after placing concrete.

.2 Remove formwork when concrete has reached 80 % of its design strength or minimum period noted above, whichever comes later, and replace immediately with adequate reshoring.

.3 Provide necessary reshoring of members where early removal of forms may be required or where members may be subjected to additional loads during construction as required.

.4 Space reshoring in each principal direction at not more than 3,000 mm apart.

.5 Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.

END OF SECTION

Part 1 General

1.1 NOT USED

1.2 NOT USED

1.3 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM A1064/A1064M – 17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 ASTM A775/A775M-17, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.

.2 CSA International

.1 CSA-A23.1-14 /A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.3 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC, Reinforcing Steel Manual of Standard Practice.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section

Part 2 Products

2.1 MATERIALS

.1 Substitute different size bars only if permitted in writing by Departmental Representative

.2 Reinforcing steel: billet steel, grade 400, deformed bars to CSA-G30.18, unless indicated otherwise.

.3 Cold-drawn annealed steel wire ties: to ASTM A82/A82M.

.4 Epoxy Coating of non-prestressed reinforcement: to ASTM A775/A775M.

.5 Chairs, bolsters, bar supports, spacers: to CSA-A23.1/A23.2.

.6 Plain round bars: to CSA-G40.20/G40.21.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Canada

.2 Ship bundles of bar reinforcement, clearly identified in accordance with bar bending details and lists.

.1 Ship epoxy coated bars in accordance with ASTM A775A/A775M

Part 3 Execution

3.1 PREPARATION

.1 Galvanizing to include chromate treatment.

.1 Duration of treatment to be 1 hour per 25 mm of bar diameter.

.2 Conduct bending tests to verify galvanized bar fragility in accordance with ASTM A143/A143M.

3.2 FIELD BENDING

.1 Do not field bend or field weld reinforcement except where indicated or authorized by Departmental Representative

.2 When field bending is authorized, bend without heat, applying slow and steady pressure.

.3 Replace bars, which develop cracks or splits.

3.3 PLACING REINFORCEMENT

.1 Place reinforcing steel as indicated on placing drawings in accordance with CSA-A23.1/A23.2

.2 Use plain round bars as slip dowels in concrete.

.1 Paint portion of dowel intended to move within hardened concrete with one coat of asphalt paint.

.2 When paint is dry, apply thick even film of mineral lubricating grease.

.3 Prior to placing concrete, obtain Departmental Representative's approval of reinforcing material and placement.

.4 Ensure cover to reinforcement is maintained during concrete pour.

.5 Protect epoxy coated portions of bars with covering during transportation and handling.

3.4 FIELD TOUCH-UP

.1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcing steel with compatible finish to provide continuous coating.

3.5 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

Section 01 45 00 Quality Control

1.2 REFERENCE STANDARDS

.1 ASTM International

.1 ASTM A1064 / A1064M - 17 Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-19.24-M90, Multicomponent, Chemical-Curing Sealing Compound.

.3 CSA International

.1 CSA-A23.1-14/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-installation Meetings: convene pre-installation meeting one week prior to beginning concrete works.

.1 Verify project requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures

.2 Provide testing results for review by Departmental Representative and do not proceed without written approval when deviations from mix design or parameters are found.

1.5 QUALITY ASSURANCE

.1 Provide to Departmental Representative, 4 weeks minimum prior to starting concrete work, valid and recognized certificate from plant delivering concrete.

.1 Quality Control Plan: provide written report to Departmental Representative verifying compliance that concrete in place meets performance requirements.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Delivery and Acceptance Requirements:

.1 Concrete hauling time: deliver to site of Work and discharged within 120 minutes maximum after batching.

.1 Do not modify maximum time limit without receipt of prior written agreement from Departmental Representative and concrete producer as described in CSA A23.1/A23.2.

.2 Deviations to be submitted for review by the Departmental Representative.

.2 Concrete delivery: ensure continuous concrete delivery from plant meets CSA A23.1/A23.2.

Part 2 Products

2.1 DESIGN CRITERIA

.1 Performance: to CSA A23.1/A23.2, and as described in MIXES of PART 2 - PRODUCTS.

2.2 PERFORMANCE CRITERIA

.1 Quality Control Plan: ensure concrete supplier meets performance criteria of concrete as established by Departmental Representative and provide verification of compliance as described in PART 1 - QUALITY ASSURANCE.

2.3 MATERIALS

.1 Cement: to CSA A3001, Type HS

.2 Water: to CSA A23.1/A23.2

.3 Reinforcing bars: to CAN/CSA-G30.18, Grade 400

.4 Welded steel wire fabric: to ASTM A1064 / A1064M.

.5 Other concrete materials: to CSA A23.1/A23.2.

2.4 MIXES

.1 Alternative 1 - Performance Method for specifying concrete: to meet Departmental Representative performance criteria to CSA A23.1/A23.2.

.1 Ensure concrete supplier meets performance criteria as established below and provide verification of compliance as described in PART 3 - VERIFICATION.

.2 Provide concrete mix to meet following plastic state requirements:

.1 Uniformity: Provide testing at beginning and end of each batch

.2 Workability: free of surface blemishes

.3 Finishability: Slump 100 mm +/- 25 mm

.4 Set time: 24 hours maximum.

.5 Air content: 5 to 8%.

.3 Provide concrete mix to meet following hard state requirements:

.1 Durability and class of exposure: S-2 for underground duck banks, C-1 for above ground concrete pavement

.2 Compressive strength within 56 days: 32 MPa minimum.

.3 Aggregate size 19 mm maximum.

.4 Volume stability: acceptable volume change range 6% due to shrinkage, creep and freeze thaw cycle.

.4 Concrete supplier's certification.

.5 Provide quality management plan to ensure verification of concrete quality to specified performance.

Part 3 Execution

3.1 PREPARATION

.1 Provide Departmental Representative 48 hours' notice before each concrete pour.

.2 Place concrete reinforcing in accordance with drawings.

.3 During concreting operations:

.1 Ensure concrete delivery and handling facilitates placing with minimum of rehandling, and without damage to existing structure or Work.

.4 Protect previous Work from staining.

.5 Clean and remove stains prior to application of concrete finishes.

3.2 INSTALLATION/APPLICATION

.1 Do cast-in-place concrete work in accordance with CSA A23.1/A23.2.

.2 Cast in Place Duct Bank:

.1 Duct bank shall be encase in concrete with at least 75mm of concrete at the top and bottom and 50mm on each side

.3 Sleeves and inserts:

.1 Cast in sleeves, ties, slots, anchors, reinforcement, frames, conduit, bolts, waterstops, joint fillers and other inserts required to be built-in.

.2 Sleeves and openings greater than 100 mm x 100 mm not indicated, must be reviewed by Departmental Representative.

3.3 FINISHES

.1 Pavements, walks, curbs and exposed site concrete:

.1 Screed to plane surfaces and use wood aluminum magnesium floats.

.2 Provide round edges and joint spacings using standard tools.

.3 Trowel smooth to provide lightly brushed non-slip finish.

.2 All concealed concrete screed to plane surfaces.

3.4 CONTROL JOINTS

NOT USED.

3.5 EXPANSION AND ISOLATION JOINTS

NOT USED.

3.6 CURING

NOT USED.

3.7 SEALING APPLICATION

NOT USED.

3.8 SITE TOLERANCES

NOT USED.

3.9 FIELD QUALITY CONTROL

.1 Concrete testing: to CSA A23.1/A23.2 by testing laboratory designated by Departmental Representative and paid for by contractor following requirements in Section 01 45 00 Quality Control

3.10 CLEANING

.1 Clean in accordance with Section 01 74 11 – Cleaning.

.2 Use trigger operated spray nozzles for water hoses.

.3 Designate cleaning area for tools to limit water use and runoff.

.4 Cleaning of concrete equipment to be done in accordance with Section 01 35 43 Environmental Procedures.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 MEASUREMENT PROCEDURES

.1 Measure precast elements in units supplied, delivered, stored and erected.

.2 Precast elements measured as individual units, will include cost, supply, delivery, storage and erection of bearing assemblies, anchor bolts and patching of erection devices, transverse connections and field grouting of grout keys between precast members.

1.3 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

- .1 ASTM A1064/A1064M – 17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.
- .2 ASTM A775/A775M-17, Standard Specification for Epoxy-Coated Reinforcing Steel Bars.
- .3 ASTM C260/260M-10a(2016), Standard Specification for Air-Entraining Admixtures for Concrete.
- .4 ASTM D412-16, Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension.
- .5 ASTM D2240-15, Standard Test Method for Rubber Property - Durometer Hardness.

.2 Canadian Construction Documents Committee (CCDC)

- .1 CCDC 2-2008, Stipulated Price Contract.

.3 Canadian General Standards Board (CGSB)

- .1 CAN/CGSB-1.40-97, Anticorrosive Structural Steel Alkyd Primer.
- .2 CAN/CGSB-1.181-99, Ready Mixed Organic Zinc-Rich Coating.

.4 Canadian Standards Association (CSA International)

- .1 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
- .2 CSA-A23.4-16, Precast Concrete - Materials and Construction.
- .3 CAN/CSA-A3000-13, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
  - .1 CSA-A3001-13, Cementitious Materials for Use in Concrete.
- .4 CAN/CSA-G30.18-M92 (R2014), Carbon Steel Bars for Concrete Reinforcement.
- .5 CAN/CSA-G40.20/G40.21-2013, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.6 CAN/CSA-G164-M92 (R2003), Hot Dip Galvanizing of Irregularly Shaped Articles.

.7 CSA-W47.1-09 (R2014), Certification of Companies for Fusion Welding for Steel.

.8 CAN/CSA W48 (R2014), Filler Metals and Allied Materials for Metal Arc Welding

.9 CSA-W59-13, Welded Steel Construction (Metal Arc Welding).

.10 CSA-W186-M1990 (R2016), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.5 Underwriters' Laboratories of Canada (ULC)

.1 CAN/ULC-S701-11, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.

1.4 DESIGN REQUIREMENTS

.1 Design precast elements to CSA-A23.3 and fabrication to CSA-A23.4, including ability to carry handling stresses.

1.5 PERFORMANCE REQUIREMENTS

.1 Tolerance of precast elements dimension to CSA A23.4.

1.6 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings in accordance with CSA-A23.4 and include following items:

.1 Details of prestressed and non-prestressed members, reinforcement and their connections.

.2 Camber.

.3 Finishing schedules.

.4 Methods of handling and erection.

.5 Openings, sleeves, inserts and related reinforcement.

.3 Ensure each drawing submitted bears stamp and signature of qualified professional engineer registered or licensed in province of Alberta, Canada.

1.7 QUALITY ASSURANCE

NOT USED.

1.8 QUALIFICATIONS

.1 Fabricate and erect precast concrete elements by manufacturing plant certified in appropriate categories according to CSA-A23.4.

.2 Precast concrete manufacturer to be certified in accordance with CSA's certification procedures for precast concrete plants prior to submitting bid and to specifically verify as

part of tender that plant is currently certified in appropriate categories, Structural and Prestressed.

.3 Only precast elements fabricated in such certified plants to be acceptable to Departmental Representative and plant certification to be maintained for duration of fabrication, erection until warranty expires.

.4 Welding companies certified to CSA-W47.1.

1.9 DELIVERY, STORAGE AND HANDLING

.1 Deliver, handle and store precast/prestressed units according to manufacturer's instructions.

.2 Protect unit corners from contacting earth to prevent from staining.

1.10 WARRANTY

.1 Contractor warrants that precast element will not spall or show visible evidence of corrosion of embedded steel and cracking, except for normal hairline shrinkage cracks, in accordance with General Conditions GC - CCDC GC 12.3, but for 5 years.

Part 2 Products

2.1 SUSTAINABLE REQUIREMENTS

NOT USED.

2.2 MATERIALS

.1 The Precaster shall be responsible for the handling and storage of all materials. Materials used, are to be obtained from the same source for the duration of the project. Storage of materials will be in compliance with CSA A23.4-16 & CSA A23.1-14.

.1 Concrete shall have minimum compressive strength of 32 mPa within 56 days. The mix will also meet the requirements of CSA A23.1-14 S2 exposure class.

.1 The maximum nominal size of the coarse aggregate shall be 19 mm and meet the gradation requirements of CSA A23.1-14, Table 11, Group 1. Coarse aggregate shall be uniformly graded consisting of gravel, crushed stone or the combination of both. The coarse aggregates shall be strong, durable and shall not exceed the limits as specified in CSA A23.1, Table 12. The same aggregate source shall be used for the duration of the project.

.2 The fine aggregates shall meet the gradation requirements of CSA A23.1-14 Table 10 FA (1). Fine aggregates shall be consisting of stone, sand and other inert materials. The material shall be clean, hard, durable, strong and shall not exceed the specified limits in CSA A23.1-14, table 12. The same aggregate source shall be used for the duration of the project.

.3 Air Entraining admixtures shall conform to the requirements of ASTM C260. The Chemical admixtures shall conform to C494. Acceptable admixtures are super plasticizers, air entrainers, hydration stabilizers, rheology/viscosity modifiers and non-chloride based accelerants. Calcium chloride and or chloride based accelerants shall not be permitted.

.4 Cement & cementing materials will be in compliance with CSA – A 3000-13. The cement type used shall be: HS – High Sulphate resistance.

.5 Water used shall be potable and in conformance with CSA A23.1-14 along with being free of deleterious substances.

.2 Reinforcement shall be in compliance with CSA G30.18 for carbon steel bars for concrete reinforcement. Welded wire fabric shall be in compliance with ASTM 1064/1064M Standard specification for carbon-steel wire reinforcement, plain and deformed for concrete.

.1 All reinforcing material for the next day's production are to be brought inside the facility overnight to ensure it is at a minimum of 10^0 C.

.2 Reinforcement is to be kept clean of foreign deleterious materials such as but not limited to dried concrete paste, oil, grease, mud this will ensure a positive bond between the concrete and reinforcement. Any deleterious materials on the reinforcement will be removed prior to placement of concrete.

.3 Reinforcement is to be stored off the ground and not in contact with other dissimilar metals.

.4 Reinforcement to be placed as per the shop drawings and secured to prevent movement during casting. Slight adjustments in rebar placement is allowed in order to place hardware in the correct location. Reinforcement to be secured at each intersection as well all "tie wire" ends to be pushed in and away from the form or exposed face.

.5 Supports such as bar chairs to be placed in a fashion to prevent concrete damming during placement.

.6 Location and cover tolerances for reinforcement shall be as per CSA A23.4-16 Clause 14 & CSA A23.1-14 clause 6.6.8.

.7 Welding materials: to CSA W48.

.3 Embedded Materials shall conform to the requirements as shown on the shop drawings. Galvanizing materials to conform to ASTM 123/123M. Repairs of galvanized materials shall be in accordance with ASTM A780. Welded embeds to be in compliance with CSA W59.3 & CSA W186. Hardware to be manufactured by a facility certified to CSA W47.1.

.1 Embedded items shall be properly jigged, securely located prior to concrete placement and be in compliance with CSA A23.4-16 Clause 15 & CSA A23.1-14 Clause 6.7.

.2 Lifting and handling hardware will be in compliance with CSA A23.4-16 Clause 15.5. Lifting hardware to be accurately placed, jigged and secured to the proper projecting requirements; or if recessed, to the correct depth as well as ensuring the correct recess pocket is in place.

.3 Placement of Anchor bolts unless otherwise specified shall be in accordance with CSA A23.1-14 Clause 6.7.3.1.

2.3 MIXES

.1 Concrete.

.1 Proportion normal density concrete in accordance with CAN/CSA-A23.1

.2 Minimum compressive strength within 56 days: 32 MPa.

.3 Class of exposure: S2.

.4 Nominal size of coarse aggregate: 19 mm.

.5 Maximum water to cement ratio: 0.45

.6 Air content: 5 to 8%.

.7 Slump at time and point of discharge: 100 mm.

.8 Cement Type HS.

2.4 MANUFACTURED UNITS

.1 Manufacture units in accordance with CSA-A23.4.

.2 Mark each precast unit to correspond to identification mark on shop drawings for location with date cast on part of unit not be exposed.

.3 Provide hardware suitable for handling elements.

2.5 TOLERANCES

.1 The Precaster shall ensure that the elements are manufactured according to the shop drawings. The maximum variations from the shop drawing are listed below.

.1 Tolerances for placement of reinforcement shall be in accordance with CSA A23.4-16 Clause 14.4.1.

.2 Tolerances for concrete cover shall be in accordance with CSA A23.4-16 Clause 14.6, Table 1.

.3 Tolerances for hardware & embed placement shall be in accordance with CSA A23.4-16 Clause 15 & CSA A23.1-14 clause 6.7.

.4 General tolerances shall be in accordance with CSA A23.4-16 Clause 12.

2.6 CURING

.1 Concrete shall be protected against high wind, precipitation, temperature fluctuations and other adverse conditions during placement and the curing cycle. Once the finishing of the element is completed it shall be protected from rapid drying and ensuring moisture is retained. The elements will be covered with tarps or in the case of a detailed architectural finish, such as broomed steps, a finishing aid/evaporation will be applied to the surface, instead of covering the elements with tarps. Once the element has reached the designed release strength, the tarps can be removed from the form, stripped out and the required remedial work can be performed. The element can then be placed into storage.

2.7 FINISHES

.1 Concrete surfaces to be finished is accordance with the shop drawings along with applicable sections of CSA A23.4-16.

.2 Once placing & consolidation is completed the surface will be screeded to the desired depth. The surface will then be finished using a trowel to ensure the top surface is free from open texturing, uneven surfaces (Projections or depressions) and shows no signs of laitance.

.3 The formed surface finish for a commercial grade finish shall ensure all fins and projections are removed (Grinding or stoning) along with large surface bug holes over 12mm filled with an appropriate repair mortar.

.4 The formed finish for an architectural grade shall have a smooth uniform finish and if painted any bond inhibiting materials removed such as grease. Bug holes over 6mm to be filled with an appropriate repair mortar.

.5 Repairs of structural nature, crack greater then .2mm, spalls or honeycombing greater then 50mm in size will be reviewed by the plant engineer prior to commencement. An engineered stamp repair will be used.

.6 Repairs of a non-structural nature, minor, chips spalls or honeycombing will be conducted using standard engineered stamped repair procedures.

2.8 STORAGE

.1 Products will be stored in a manner to minimize twisting, racking, bowing or warping and to avoid damage of the element. All blocking or dunnage used shall be of a type that prevents unsightly staining and or damage to the element. Elements are to be clearly marked in an approved location with the date, weight, mark #.

2.9 SOURCE QUALITY CONTROL

.1 Inspect prestressed concrete tendons in accordance with CSA-G279.

.2 Provide records from in-house quality control programme based upon plant certification requirements to Departmental Representative for inspection and review.

.3 Precast plants should keep complete records of supply source of concrete material, steel reinforcement, prestressing steel and provide to Departmental Representative for review upon request.

Part 3 Execution

3.1 ERECTION

.1 Do precast concrete work in accordance with CSA-A23.4 and CAN/CSA-S6.

.2 Do welding in accordance with CSA-W59, for welding to steel structures and CSA-W186, for welding of reinforcement.

.3 Erect precast elements within allowable tolerances as indicated.

.4 Non-cumulative erection tolerances in accordance with CSA-A23-4.

.5 Set elevations and alignment between units to within allowable tolerances before connecting units.

.6 Grout underside of unit bearing plates with shrinkage compensating grout.

.7 Fasten precast units in place as indicated on reviewed shop drawings.

.8 Secure with bolts using lockwashers.

.9 Uniformly tighten bolted connections with torque indicated.

.10 Do not weld or secure bearing plates at sliding joints.

.11 Clean field welds with wire brush and touch-up with zinc rich primer for galvanized components.

3.2 VERIFICATION

NOT USED.

3.3 CLEANING

NOT USED.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCES

.1 Definitions:

.1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

.2 CSA Group

.1 CSA C22.1-15, Canadian Electrical Code, Part 1 (24th Edition), Safety Standard for Electrical Installations.

.2 CSA C22.3, No7-(R2015), Underground Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

Part 2 Products

2.1 DESIGN REQUIREMENTS

.1 Operating voltages: to CAN3-C235.

.2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

.1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

.3 Language operating requirements: provide identification name plates and labels in English.

2.2 MATERIALS AND EQUIPMENT

.1 Material and equipment to be CSA certified. Where CSA certified material or equipment are not available, obtain special approval from authority having jurisdiction before delivery to site.

.2 Factory-assemble control panels and component assemblies.

2.3 WIRING IDENTIFICATION

.1 Identify wiring with permanent indelible identifying markings, coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.

.2 Maintain phase sequence and colour coding throughout.

.3 Colour coding: to CSA C22.1.

.4 Use colour coded wires in communication cables, matched throughout system.

.5 All underground conduits to be color coded based on voltages they carry and special color identified for telecommunication and security at point of entrance in all manholes and junction boxes

2.4 CONDUIT AND CABLE IDENTIFICATION

.1 Colour code conduits, boxes and metallic sheathed cables.

.2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals.

.3 Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

.2 Do overhead and underground systems in accordance with CAN/CSA-C22.3, except where specified otherwise.

3.3 CONDUIT AND CABLE INSTALLATION

.1 Install conduit and sleeves prior to pouring of concrete.

.2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.

.3 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.4 MOUNTING HEIGHTS

.1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

.2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.

.3 Mount Junction Boxes as per drawings.

3.5 CO-ORDINATION OF PROTECTIVE DEVICES

.1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.6 SYSTEM STARTUP

.1 Instruct Departmental Representative in operation, care and maintenance of systems, system equipment and components.

.2 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

.3 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 CSA International

.1 CSA-C22.2 No. 18.4-(R2015) Hardware for the Support of Conduit, Tubing, and Cable.

.2 CSA-C22.2 No. 18.3-12(R2017) Conduit, Tubing, and Cable Fittings. (Tri-national standard, with ANCE NMX-J-017 and UL 514B)

.3 CAN/CSA-C22.2 No.65-13, Wire Connectors (Tri-National Standard with UL 486A-486B and NMX-J-543-ANCE).

.2 National Electrical Manufacturers Association (NEMA)

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for wire and box connectors and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for wire and box connectors for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors in dry location off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect wire and box connectors from nicks, scratches, and blemishes

.3 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

Part 2 Products

2.1 MATERIALS

.1 Pressure type wire connectors to: CAN/CSA-C22.2 No.65.

.2 Fixture type splicing connectors to: CAN/CSA-C22.2 No.65.

.3 Bushing stud connectors: to NEMA to consist of:

- .1 Connector body and stud clamp for stranded copper conductors.
- .2 Clamp for stranded copper conductors.
- .3 Stud clamp bolts.
- .4 Bolts for copper conductors.
- .5 Sized for conductors as indicated.

.4 Clamps or connectors as required to: CAN/CSA-C22.2 No.18.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for wire and box connectors installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Remove insulation carefully from ends of conductors and:

- .1 Apply coat of zinc joint compound on aluminum conductors prior to installation of connectors.
- .2 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CAN/CSA-C22.2 No.65.
- .3 Install fixture type connectors and tighten to CAN/CSA-C22.2 No.65. Replace insulating cap.
- .4 Install bushing stud connectors in accordance with NEMA.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

- .1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 CSA Group

.1 CSA C22.1-15, Canadian Electrical Code, Part 1 (24th Edition), Safety Standard for Electrical Installations.

.2 CSA C22.2 No.41-13(R2015), Grounding and Bonding Equipment (Tri-National Standard, with NMX-J-590-ANCE and UL 467).

.3 CSA C22.2 No.65-13(R2015), Wire connectors (Tri-National Standard, with UL 486A-486B NMX-J-543-ANCE).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for connectors and terminations and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for connectors and terminations for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground in dry location indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect connectors and terminations from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Waste Reduction Workplan related to Work of this Section.

Part 2 Products

2.1 CONNECTORS AND TERMINATIONS

.1 Copper long barrel compression connectors to CSA C22.2 No.65 as required sized for conductors.

.2 Contact aid for aluminum cables where applicable.

.3 Four-way joint boxes submarine type in accordance with Section 26 05 44 - Raceway and Boxes for Electrical Systems.

.4 Four-way junction boxes with respective pothead for 4 conductor cables allowance for stress - cone beyond for X - linked polyethylene cable aluminum with copper sheath.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for connectors and terminations installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Install stress cones, terminations, and splices in accordance with manufacturer's instructions.

.2 Bond and ground as required to CSA C22.2 No.41.

3.3 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 American National Standards Institute /Institute of Electrical and Electronics Engineers (ANSI/IEEE)

.1 ANSI/IEEE 837-2014, IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for grounding equipment and include product characteristics, performance criteria, physical size, finish and limitations.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for grounding equipment for incorporation into manual.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials indoors off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect grounding equipment from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

.4 Develop Waste Reduction Workplan.

Part 2 Products

2.1 EQUIPMENT

.1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.

.2 Copper conductor: minimum 6 m long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as required.

.3 Rod electrodes: copper clad steel 19 mm diameter by minimum 3 m long.

.4 Grounding conductors: bare stranded copper, tinned, soft annealed, size #6 AWG.

.5 Insulated grounding conductors: green, copper conductors, size #6 AWG.

.6 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.

.7 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:

.1 Grounding and bonding bushings.

.2 Protective type clamps.

.3 Bolted type conductor connectors.

.4 Thermit welded type conductor connectors.

.5 Bonding jumpers, straps.

.6 Pressure wire connectors.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for grounding equipment installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION GENERAL

.1 Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.

.2 Install connectors in accordance with manufacturer's instructions.

.3 Install grounding rod and plate as indicated on drawings.

.4 Protect exposed grounding conductors from mechanical injury.

.5 Make buried connections, and connections to conductive water main, electrodes, using copper welding by thermit process.

.6 Use mechanical connectors for grounding connections to equipment provided with lugs.

.7 Soldered joints not permitted.

.8 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.

.9 Install flexible ground straps for bus duct enclosure joints, where such bonding is not inherently provided with equipment.

.10 Connect building structural steel and metal siding to ground by welding copper to steel.

.11 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.

.12 Ground secondary service pedestals.

3.3 MAINTENANCE HOLES

.1 Install conveniently located grounding stud, electrode, size stranded copper conductor in each maintenance hole.

.2 Install ground rod in each maintenance hole so that top projects through bottom of maintenance hole. Provide with lug to which grounding connection can be made. Confirm ground resistance meets or exceeds Canadian Electrical Code minimum requirements.

3.4 ELECTRODES

.1 Make ground connections to continuously conductive underground water pipe on street side of water meter.

.2 Install rod electrodes and make grounding connections as indicated.

.3 Bond separate, multiple electrodes together.

.4 Use size #6 AWG copper conductors for connections to electrodes.

.5 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

3.5 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.

.2 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Departmental Representative and local authority having jurisdiction over installation.

.3 Perform tests before energizing electrical system. Resistance to the ground of a single-made electrode to be 10 Ohms or less

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

.3 Waste Management: separate waste materials.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Canadian Standards Association (CSA International)

.1 CSA C22.1-15, Canadian Electrical Code, Part 1, 24th Edition. safety standard for electrical installations

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures

.2 Product Data:

.1 Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Provide shop drawings: in accordance with Section 01 33 00 - Submittal Procedures

.1 Provide drawings stamped and signed to Departmental Representative for review and approval.

1.3 DELIVERY, STORAGE AND HANDLING

.1 Waste Management and Disposal:

.1 Separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 JUNCTION, CABINETS AND PULL BOXES

.1 NEMA Type 3R

.2 Covers Surface Mounted: screw-on flat covers.

.3 Construction: welded sheet steel hinged door, handle, latch lock 2 keys and catch.

Part 3 Execution

3.1 JUNCTION, PULL BOXES AND CABINETS INSTALLATION

.1 Install pull boxes in inconspicuous but accessible locations.

.2 Mount cabinets with top not higher than 2 m above finished floor except where indicated otherwise.

.3 Install terminal block in Type T cabinets.

.4 Only main junction and pull boxes are indicated. Install additional pull boxes as required by CSA C22.1.

3.2 IDENTIFICATION

.1 Equipment Identification: to Section 26 05 00 - Common Work Results for Electrical.

.2 Identification Labels: size 2 indicating system name, voltage and phase or as indicated.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 Canadian Standards Association (CSA International)

.1 CAN/CSA C22.2 No. 18.3-12 (R2017) Conduit, Tubing, and Cable Fittings (tri-national standard, with ANCE NMX-J-017 and UL 514B).

.2 CSA C22.2 No. 45.1-07 (R2017) Electrical Rigid Metal Conduit – Steel (Tri-National standard, with UL 6 and NMX-J-534-ANCE-2007).

.3 CSA C22.2 No. 83-M1985 (R2017), Electrical Metallic Tubing.

.4 CSA C22.2 No. 211.2-06 (R2016), Rigid PVC (Unplasticized) Conduit.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product data: submit manufacturer's printed product literature, specifications and datasheets.

.1 Submit conduit manufacturing data.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Place materials defined as hazardous or toxic waste in designated containers.

.3 Ensure emptied containers are sealed and stored safely for disposal away from children.

Part 2 Products

2.1 CONDUITS

.1 Underground conduit in concrete duct banks: Rigid PVC conduit: to CSA C22.2 No. 211.2.

.2 Conduit above grade: Rigid Galvanized Conduit: to CSA C22.2 No. 45.

2.2 CONDUIT FASTENINGS

.1 One hole steel straps to secure surface conduits NPS 2 and smaller.

.2 Beam clamps to secure conduits to exposed steel work.

.3 Rooftop Supports

.1 Submit shop drawings prior to fabrication for approval by Departmental Representative in accordance with section 01 33 00 – Submittal Procedures.

.2 Duct supports to be hot-dipped galvanized to ASTM A123. Minimum zinc coating to be 2.6MIL.

.3 Supports to be spaced at minimum 2,000 mm.

.4 Crawlspace Hangers:

.1 Submit shop drawings prior to fabrication for approval by Departmental Representative in accordance with section 01 33 00 – Submittal Procedures.

.2 Hangers to be hot-dipped galvanized to ASTM A123.

.3 Hangers to be spaced at a minimum 2,000 mm.

.5 Channel type supports for two or more conduits.

.6 Threaded rods, 6 mm diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

.1 Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.

.2 Ensure factory "ells" where 90 degrees bends for NPS 1 and larger conduits.

.3 Watertight connectors and couplings for EMT.

.1 Set-screws are not acceptable.

2.4 FISH CORD

.1 Polypropylene.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

.1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.

.2 Conceal conduits except in mechanical and electrical service rooms.

.3 Surface mount conduits except on roof top and in crawlspace.

.4 Install fish cord in empty conduits.

3.3 SURFACE CONDUITS

.1 Run parallel or perpendicular to building lines.

.2 Locate conduits behind infrared or gas fired heaters with 1.5 m clearance.

.3 Run conduits in flanged portion of structural steel.

.4 Group conduits wherever possible on suspended or surface channels as indicated.

.5 Do not pass conduits through structural members except as indicated.

.6 Do not locate conduits less than 75 mm parallel to steam or hot water lines with minimum of 25 mm at crossovers.

3.4 CONCEALED CONDUITS

.1 No work is required to be concealed in this project.

3.5 CONDUITS IN PRECAST CONCRETE DUCT BANKS

.1 Locate to suit reinforcing steel.

.2 Protect conduits from damage where they stub out of concrete.

.3 Install sleeves where conduits pass through slab or wall.

.4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed.

.5 Conduits in slabs: minimum slab thickness 4 times conduit diameter.

.6 Encase conduits completely in concrete with minimum 25 mm concrete cover.

.7 Organize conduits in slab to minimize cross-overs.

3.6 CONDUITS UNDERGROUND

.1 Slope conduits to provide drainage to manholes

.2 Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

3.7 CONDUITS ON BREEZEWAY AND IN CRAWLSPACE

.1 Install conduits on rooftop supports or hangers as indicated on drawings.

3.8 CLEANING

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

Section 01 45 00 Quality Control.

1.2 REFERENCES

.1 ASTM International

.1 ASTM D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft^3) (600kN-m/m^3).

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Co-ordination: arrange with Departmental Representative for location of buried services that may be impacted by the execution of work.

.1 Pay costs of locating, identifying, exposing and protection of existing services during the execution of the work.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

Part 2 Products

2.1 MATERIALS

.1 All aggregate materials used must be site examined prior to using.

.2 Granular Fill Type 1: Granular Base.

.1 Crushed stone or gravel shall consist of hard, durable, angular particles, and shall be free of clay lumps, cementation, organic material, frozen material and other deleterious materials. Aggregates shall exhibit the following physical properties:

.1 % Fracture, by weight (2 faces) – 60 min.

.2 Los Angeles Abrasion, loss, % - 45 max.

.3 Liquid Limit, % - 25 max.

.4 Plasticity Index, % - 6 max.

.5 California Bearing Ratio, when compacted to 100% of ASTM D698 – 80 min.

.2 Gradation shall be within the following limits when tested to ASTM C-117 with sieve sizes to CAN/CGSBD 8-GP-2M rather than ASTM E11, and shall have a smooth curve without sharp breaks when plotted on a semi-log grading chart.

.1 Table 1: Granular Base Course Gradation Limits

Sieve Size (mm)	Percent Passing Sieve Size
25	100
20	95-100
10	55-80
5	35-65
2.5	28-52
0.630	13-35
0.315	9-26
0.160	6-18
0.080	4-10

.3 Granular Fill Type 2: Granular Sub-Base.

.1 Crushed stone or gravel shall consist of hard, durable, angular particles, and shall be free of clay lumps, cementation, organic material, frozen material, and other deleterious materials. Aggregates shall exhibit the following physical properties:

.1 % Fracture, by weight (2 faces) – 20 min.

.2 Los Angeles Abrasion, loss, % - 45 max.

.3 Liquid Limit, % - 25 max.

.4 Plasticity Index, % - 6 max.

.5 California Bearing Ratio, when compacted to 100% of ASTM D698 – 40 min.

.2 Gradation shall be within the following limits when tested to ASTM C-117 with sieve sizes to CAN/CGSBD 8-GP-2M rather than ASTM E11, and shall have a smooth curve without sharp breaks when plotted on a semi-log grading chart.

.3 Table 2: Granular Sub-Base Course Gradation Limits

Sieve Size (mm)	Percent Passing Sieve Size
80	100
40	60-90
20	40-70
10	25-60
5	15-45
2.5	10-35
0.630	5-23
0.160	3-12
0.080	2-10

.4 Sand Backfill

.1 Sand is to be clean and free-running, conforming to grading below (sieve sizes to CDN/CGS BD 8-GP-2M).

.2 Table 3: Sand Backfill Gradation Limits

Sieve Size (mm)	Percent Passing Sieve Size
10	100
5	90-100
0.630	25-60
0.08	0-3

.5 Lean-mix concrete fill for bedding and protection of existing utility pipes.

.1 Aggregates – 20 mm nominal.

.2 Slump – 50 to 75 mm.

.3 Compressive strength – 5 mPa (min).

.4 Air content – 5 to 8%.

.5 Cement content – 150 kg/m^3 (min).

.6 Fly ash – 10% of cement content (max).

.6 Native Common Backfill.

Part 3 Execution

3.1 EXAMINATION

.1 The work of this section involves the excavation and backfilling of trenches to accommodate the installation of new electrical conduits, duct banks, and manholes.

.2 Evaluation and Assessment:

.1 Before commencing work verify locations of buried services on and adjacent to site. Verify where open trench excavation may be used and where hydrovaac services will be required.

3.2 PREPARATION

.1 Temporary erosion and sedimentation control:

.1 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.2 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

.2 Protection of in-place conditions:

.1 Protect excavations from freezing.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Departmental Representative's approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage.

.5 Protect buried services that are required to remain undisturbed.

.3 Removal:

.1 Remove trees, stumps, logs, brush, shrubs, bushes, vines, undergrowth, rotten wood, dead plant material, exposed boulders and debris within work areas.

.2 Remove stumps and tree roots below footings, slabs, and paving, and to 600 mm below finished grade elsewhere.

.3 Remove obsolete buried services within 2 m of work: cap cut-offs.

3.3 EXCAVATION

.1 Shore and brace excavations, protect slopes and banks and perform work in accordance with Provincial regulations.

.2 Strip topsoil over areas to be covered by new construction, over areas where grade changes are required, and so that excavated material may be stockpiled without covering topsoil.

.1 Stockpile topsoil on site for later use.

.3 Excavate as required to carry out work.

.1 Do not disturb soil or rock below bearing surfaces.

.2 Notify Departmental Representative when excavations are complete.

.3 If bearings are unsatisfactory, additional excavation will be authorized in writing and paid for as additional work.

.4 Excavation taken below depths shown without Departmental Representative's written authorization to be filled with concrete of same strength as for footings at Contractor's expense.

3.4 FIELD QUALITY CONTROL

.1 Testing of materials and compaction of backfill and fill will be carried out by testing laboratory retained by contractor and in accordance with Section 01 45 00 Quality Control.

.2 Not later than 1 week minimum before backfilling or filling, submit samples of backfill to designated testing agency.

.3 Do not begin backfilling or filling operations until material has been approved for use by Departmental Representative.

.4 Not later than 48 hours before backfilling or filling with approved material, notify Departmental Representative. Contractor to arrange compaction tests to be carried out by suitable testing agency.

3.5 BACKFILLING

.1 Use compacted granular fill as indicated in the plans in locations where gravel or concrete-finished surfaces will be used.

.2 Use native, common backfill as indicated in the plans in locations that will be sodded.

.3 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.

.4 Lateral support: maintain even levels of backfill around structures as work progresses, to equalize earth pressures.

.5 Compaction of subgrade: compact existing subgrade under walks, paving, and slabs on grade, to same compaction as fill.

.1 Fill excavated areas with selected subgrade material, gravel or sand compacted as specified for fill.

.6 Placing:

.1 Place backfill, fill and base course material in 150 mm lifts: add water as required to achieve specified density.

.7 Compaction: compact each layer of material to following Corrected Maximum Dry Density for material in accordance with Section 31 05 10:

.1 To underside of base courses: 95%.

.2 Base courses: 100%.

.3 Elsewhere: 92%.

.8 Under slabs and paving:

.1 Use Type 1 and Type 2 Material.

.9 In trenches with precast duct bank in sod locations:

.1 Common Back Fill.

.10 Under seeded and sodded areas: use site excavated material to bottom of topsoil except in trenches and within 600 mm of foundations.

.11 Course rock material, not capable of fine grading, is not acceptable, imported material must be placed on this type of material.

.12 Against foundations (except as applicable to trenches and under slabs and paving): excavated material or imported material with no stones larger than 200 mm diameter within 600 mm of structures.

3.6 GRADING

.1 Grade so that water will drain away from buildings, walls, manholes, fences and paved areas, to catch basins and other drainage or disposal areas.

.1 Grade to be gradual between finished spot elevations shown on drawings.

3.7 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Dispose of cleared and grubbed material off site daily.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C127-15, Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate.

.2 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3)).

.3 ASTM D1557-02e1, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kN-m/m^3)).

.4 ASTM D4253-16, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.

1.3 DEFINITIONS

.1 Corrected maximum dry density is defined as:

.1 D = (F1 x D1) + (0.9 x D2 x F2)

.2 Where: D = corrected maximum dry density kg/m^3.

.1 F1 = fraction (decimal) of total field sample passing 4.75 mm sieve.

.2 F2 = fraction (decimal) of total field sample retained on 4.75 mm sieve (equal to 1.00 - F1).

.3 D1 = maximum dry density, kg/m^{3}of material passing mm sieve.

.4 D2 = bulk density, kg/m^3, of material retained on mm sieve, equal to 1000G where G is bulk specific gravity (dry basis) of material when tested to ASTM C127.

.3 For free draining aggregates, determine D1 (maximum dry density) to ASTM D4253 when directed by Departmental Representative.

Part 2 Products

NOT USED.

Part 3 Execution

NOT USED.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM C117-17, Standard Test Method for Material Finer than 75-µm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136/C136M-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D698-12e2, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 ;) (600 kN-m/m^3 ;).

.4 ASTM D1557-12e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 ;) (2,700 kN-m/m^3 ;).

.5 ASTM D4318-17, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series.

.2 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000-13, Cementitious Materials Compendium

.1 CSA-A3001-13, Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.4 U.S. Environmental Protection Agency (EPA)/Office of Water

.1 EPA 832R92005, Storm Water Management for Construction Activities: Developing Pollution Prevention Plans and Best Management Practices.

1.2 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

1.3 QUALITY ASSURANCE

.1 Submit design and supporting data at least 2 weeks prior to beginning Work.

.2 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of AB, Canada.

.3 Keep design and supporting data on site.

.4 Health and Safety Requirements:

.1 Do construction occupational health and safety in accordance with Alberta Workplace Health and Safety regulations.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Divert excess materials from landfill to local stockpile for reuse as directed by Consultant.

1.5 EXISTING CONDITIONS

.1 Buried services:

.1 The work of this section involves the excavation and backfilling of trenches to accommodate the installation of new electrical conduits, duct banks, and manholes.

.2 Before commencing work, verify location of buried services on and adjacent to work sites.

.3 Arrange with Departmental Representative for relocation of buried services that interfere with execution of work.

.4 Remove obsolete buried services within 2 m of work: cap cut-offs.

.5 Size, depth and location of existing services and structures to be determined by contractor (Call Before You Dig).

.6 Prior to beginning excavation Work, notify Departmental Representative to establish location and state of use of buried utilities and structures. Authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work. Verify where hydrovac excavation will be required.

.7 Confirm locations of buried services by careful test excavations.

.8 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered. Use hydrovac excavation to locate around buried gas lines and hydro utilities.

.9 Where service line lines or structures exist in area of excavation, obtain direction of Departmental Representative.

.10 Record location of maintained, re-routed and abandoned underground lines.

.11 Confirm locations of any recent excavations adjacent to area of excavation.

.2 Existing buildings and surface features:

.1 Conduct, with Departmental Representative, condition survey of existing buildings, trees and other plants, lawns, fencing, service poles, wires, pavement, survey bench marks and monuments which may be affected by Work.

.2 Protect existing buildings and surface features from damage while Work is in progress. In event of damage, immediately make repair as directed by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 In accordance with Section 31 00 00 Earthworks.

Part 3 Execution

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

3.2 PREPARATION/PROTECTION

.1 Protect existing features and existing utilities as required.

.2 Keep excavations clean, free of standing water, and loose soil.

.3 Where soil is subject to significant volume change due to change in moisture content, cover and protect to Engineer approval.

.4 Protect natural and man-made features required to remain undisturbed. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage. Protect buried services that are required to remain undisturbed.

3.3 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative.

.1 Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.4 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Avoid excavation below groundwater table if quick condition or heave is likely to occur.

.1 Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.3 Protect open excavations against flooding and damage due to surface run-off.

3.5 EXCAVATION

.1 Advise Departmental Representative at least 7 days in advance of excavation operations for initial cross sections to be taken.

.2 Duct banks Trenching shall be conventional excavation methods except where there is any risk of damaging adjacent services or structures.

.3 Where there is any risk of damaging adjacent service or structures, the excavation methods shall be hydro excavation.

.4 Excavate to lines, grades, elevations and dimensions as directed by Departmental Representative.

.5 Excavation must not interfere with bearing capacity of adjacent foundations.

.6 Do not disturb soil within branch spread of trees or shrubs that are to remain.

.1 If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.7 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by Departmental Representative.

.8 Restrict vehicle operations directly adjacent to open trenches.

.9 Dispose of surplus and unsuitable excavated material in approved location on site.

.10 Do not obstruct flow of surface drainage or natural watercourses.

.11 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.12 Obtain Engineer approval of completed excavation.

.13 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by Departmental Representative.

.14 Hand trim, make firm and remove loose material and debris from excavations.

.1 Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil.

.15 Call Local utilities for location of existing of surrounding utilities and approval to begin excavation.

3.6 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services.

.2 Place bedding and surround material in unfrozen condition.

.3 Place 150 mm of sand fill under precast base.

.4 Provide lean-mix concrete to protect exposed existing utilities as indicated in drawings.

3.7 BACKFILLING UNDER ROADWAYS, AND SIDEWALKS

.1 Do not backfill with common fill.

.2 Do not use backfill material which is frozen or contains ice, snow or debris.

.3 Use granular fill compacted as indicated on the drawings. Place 150 mm layers and compact to density indicated.

.4 Replace material to match existing roadway or sidewalk structure.

.1 In accordance with Section 03 30 00 Cast In Place Concrete and Section 32 12 16 Asphalt Paving.

3.8 BACKFILLING

.1 Do not proceed with backfilling operations until completion of following:

.1 Departmental Representative has inspected and approved installations.

.2 Departmental Representative has inspected and approved of construction below finish grade.

.3 Inspection, testing, approval, and recording location of underground utilities where applicable.

.4 Removal of concrete formwork.

.5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Backfilling around installations:

.1 Place bedding and surround material as specified in drawings.

.2 Place layers simultaneously on both sides of installed Work to equalize loading. Difference not to exceed 600 mm.

.4 Place fill in areas as indicated in 150mm lifts and compact to density indicated.

.5 Consolidate and level fill with internal vibrators.

.6 Backfilling around Security Fences:

.1 The No Man Zone area, i.e. the ground area between the outer perimeter fence and the inner perimeter fence (7.5m) shall have the top soil removed and covered with filter fabric and crushed stone for a depth of at least 200mm to minimize plant growth.

In order to minimize false alarm activated by motion detection system between outer and inner perimeter fences (7.5m), the ground surface shall be graded to prevent pooling of water and run-off shall be collected.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

.1 Agriculture and Agri-Food Canada

.1 The Canadian System of Soil Classification, Third Edition, 1998.

1.3 DEFINITIONS

NOT USED.

1.4 WASTE MANAGEMENT AND DISPOSAL

.1 Separate waste materials for recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Divert unused soil amendments from landfill to official hazardous material collections site approved by Departmental Representative.

.3 Do not dispose of unused soil amendments into sewer systems, into lakes, streams, onto ground or in locations where it will pose health or environmental hazard.

Part 2 Products

2.1 TOPSOIL

.1 Topsoil for sod areas: mixture of particulates, micro-organisms and organic matter which provides suitable medium for supporting intended plant growth.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

.1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

.2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.

.3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION OF EXISTING GRADE

.1 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.

.2 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials.

.1 Remove soil contaminated with calcium chloride, toxic materials and petroleum products.

.2 Remove debris which protrudes more than 75 mm above surface.

.3 Dispose of removed material off site.

.3 Cultivate entire area which is to receive topsoil to minimum depth of 100 mm.

.1 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.3 PLACING AND SPREADING OF TOPSOIL/PLANTING SOIL

.1 Place topsoil after Departmental Representative has accepted subgrade.

.2 Spread topsoil in uniform layers not exceeding 150 mm.

.3 For sodded areas keep topsoil 15 mm below finished grade.

.4 Spread topsoil to following minimum depths after settlement.

.1 135 mm for sodded areas.

.5 Manually spread topsoil/planting soil around trees, shrubs and obstacles.

3.4 FINISH GRADING

.1 Grade to eliminate rough spots and low areas and ensure positive drainage.

.1 Prepare loose friable bed by means of cultivation and subsequent raking.

.2 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative.

.1 Leave surfaces smooth, uniform and firm against deep footprinting.

3.5 ACCEPTANCE

.1 Departmental Representative will inspect and test topsoil in place and determine acceptance of material, depth of topsoil and finish grading.

3.6 SURPLUS MATERIAL

.1 Dispose of materials except topsoil not required where directed by Departmental Representative.

3.7 CLEANING

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

NOT USED.

1.2 REFERENCE STANDARDS

NOT USED.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Scheduling:

.1 Schedule sod laying to coincide with preparation of soil surface.

.2 Schedule sod installation when frost is not present in ground.

.3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 31 19 - Project Meetings.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for sod, geotextile and fertilizer and include product characteristics, performance criteria, physical size, finish and limitations.

1.5 QUALITY ASSURANCE

.1 Qualifications:

.1 Landscape Planting Supervisor: Landscape Industry Certified Technician with Softscape Installation designation.

1.6 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials in accordance with supplier's recommendations.

.2 Replace defective or damaged materials with new.

.4 Develop Construction Waste Management Plan related to Work of this Section.

Part 2 Products

2.1 MATERIALS

.1 Commercial Grade Turf Grass Nursery:

.1 Mow sod at height directed by Departmental Representative within 36 hours prior to lifting, and remove clippings.

.2 Not more than 5 broadleaf weeds and up to 20% native grasses per 40 square metres.

.2 Water:

.1 Supplied by Departmental Representative at designated source.

2.2 SOURCE QUALITY CONTROL

.1 Obtain written approval from Departmental Representative of sod at source.

.2 When proposed source of sod is approved, use no other source without written authorization from Departmental Representative.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for sod installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 PREPARATION

.1 Do not perform work under adverse field conditions such as frozen soil, excessively wet soil or soil covered with snow, ice, or standing water.

.2 Remove and dispose of weeds; debris; stones 50 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off site.

3.3 SOD PLACEMENT

.1 Ensure sod placement is done under supervision of certified Landscape Planting Supervisor.

.2 Lay sod within 24 hours of being lifted if air temperature exceeds 20 degrees C.

.3 Lay sod sections in rows, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.

.4 Roll sod as directed by Departmental Representative. Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 – Cleaning.

.1 Leave Work area clean at end of each day.

.2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 – Cleaning.

.1 Clean and reinstate areas affected by Work.

.3 Waste Management: separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

3.5 PROTECTION BARRIERS

.1 Protect newly sodded areas from deterioration with as directed by Departmental Representative.

.2 Remove protection 2 weeks after installation as directed by Departmental Representative.

3.6 MAINTENANCE DURING ESTABLISHMENT PERIOD

.1 Perform following operations from time of installation until acceptance.

.1 Water sodded areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 75 to 100 mm.

.2 Cut grass to 50 mm when or prior to it reaching height of 75 mm.

.3 Maintain sodded areas weed-free 95%.

.4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

.5 Temporary barriers or signage to be maintained where required to protect newly established sod.

3.7 ACCEPTANCE

.1 Sodded Commercial Grade Turf Grass Nursery Sod areas will be accepted by Departmental Representative provided that:

.1 Sodded areas are properly established.

.2 Extent of surface soil visible when grass has been cut to height of 60 mm is acceptable.

.3 Sod is free of bare or dead spots and extent of weeds apparent in grass is acceptable.

.4 Sodded areas have been cut minimum 2 times prior to acceptance.

.5 Fertilizing in accordance with fertilizer program has been carried out at least once.

.2 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

.3 When environmental conditions allow, all sodded areas showing shrinkage cracks shall be top-dressed and seeded with a seed mix matching the original.

.4 Areas sodded in fall will be accepted in following spring one month after start of growing season provided acceptance conditions are fulfilled.

3.8 MAINTENANCE DURING WARRANTY PERIOD

.1 Perform following operations from time of acceptance until end of warranty period:

.1 Water sodded Sod areas at weekly intervals to obtain optimum soil moisture conditions to depth of 100 mm.

.2 Repair and re-sod dead or bare spots to satisfaction of Departmental Representative.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials International (ASTM)

.1 ASTM A1064/A1064M – 17, Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

.2 ASTM C139-17, Standard Specification for Concrete Masonry Units for Construction of Catch Basins and Manholes.

.3 ASTM C478-14, Standard Specification for Precast Reinforced Concrete Manhole Sections.

.4 ASTM D1056-14, Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.

.2 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000-13 (R2013), Cementitious Materials Compendium

.1 CSA-A3001-13, Cementitious Materials for Use in Concrete.

.2 CSA A23.1/A23.2-14, Concrete Materials and Methods of Concrete Construction/ Test Methods and Standard Practices for Concrete.

.3 CAN/CSA-G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.

.4 CAN/CSA C22.3 N.7-15, Underground Systems.

.3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)

.1 Material Safety Data Sheets (MSDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit shop drawings for precast manholes and precast duct banks for review to Departmental Representative.

.1 Contractor to receive Departmental Representative approval prior to ordering precast material.

1.3 QUALITY ASSURANCE

.1 Pre-Installation Meetings: convene pre-installation meeting one week prior to beginning to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's installation instructions and warranty requirements.

1.4 DELIVERY, STORAGE AND HANDLING

.1 Packing, shipping, handling and unloading:

.1 Deliver, store and handle materials in accordance with manufacturer's written instructions.

.2 Waste Management and Disposal:

.1 Separate waste materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

Part 2 Products

2.1 PVC DUCTS

.1 Rigid PVC ducts, type EB1, encased in reinforced concrete.

2.2 PVC DUCT FITTINGS

.1 Rigid PVC opaque solvent welded type couplings, bell end fittings, plugs, caps, adaptors as required to make complete installation.

.2 Expansion joints.

.3 Rigid PVC 5 degree angle couplings.

2.3 PIPE WALL PENETRATION SEALS

.1 Rigid PVC pipes into manholes.

.1 Seal forms a water tight mechanical seal between the pipe and the hole through which it passes.

.2 Hydrostatically seals the penetration up to 40 psi.

.3 EPDM black rubber seal to ASTM D-1418.

2.4 PRECAST CONCRETE MANHOLES, PULL BOXES & DUCT BANKS

.1 Do work in accordance with Section 03 41 00 Precast Concrete.

.2 Precast concrete manholes and auxiliary sections fabricated in steel forms.

.3 Aggregates: to CSA A23.1/A23.2.

.4 Cement: CAN/CSA-A3001, Type HS.

.5 Steel welded wire fabric mesh reinforcing: to ASTM A82/A82M and CAN CSA G30.18

.6 Pulling inserts and bolts for racks integrally cast in concrete.

.7 Neoprene gasket seals between manhole sections: to ASTM D1056.

.8 Size: As per drawings.

.9 Precast Concrete Manholes: to ASTM C478/C478M.

.1 Manhole step and ladder rung spacing: 405

2.5 DRAINAGE

.1 Floor drain fittings: consisting of floor drain, back water valve, trap and pipe connection

.2 Storm sewer connection: cast iron service saddle consisting of oil-resistant gasket, stainless steel clamp and oil-resistant O ring.

2.6 MANHOLE NECKS

.1 Concrete brick and mortar.

2.7 MANHOLE FRAMES AND COVERS

.1 Cast iron manhole frames and covers.

.2 Bolted on covers to prevent unauthorized entry.

.3 Size: As indicated on drawings.

2.8 GROUNDING

.1 Ground rods: in accordance with Section 26 05 28 - Grounding - for cable rack grounding.

2.9 CABLE RACKS

.1 Hot dipped galvanized cable racks and supports.

2.10 MANHOLE WET WELL

.1 300 mm diameter PVC Pipe with removable cap.

2.11 CABLE PULLING EQUIPMENT

.1 Pulling iron: galvanized steel rods, size and shape as indicated.

.2 Pull rope: 6 mm stranded nylon tensile strength 5 kN, continuous throughout each duct run with 3 m spare rope at each end.

2.12 MARKERS

.1 Concrete type cable markers: 600 x 600 x 100 mm, with words: "Cable", "Joint", "Conduit" impressed in top surface, with arrows to indicate change in direction of duct runs.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION GENERAL

.1 Install underground precast duct banks and manholes.

.2 Open trench completely between manholes before ducts are laid and ensure that no obstructions will necessitate change in grade of ducts.

.3 Prior to laying ducts, construct "mud slab" not less than 75 mm thick.

.4 Install ducts at elevations and with slope as indicated and minimum slope of 1 to 400.

.5 Install base spacers at maximum intervals of 1.5 m levelled to grades indicated for bottom layer of ducts.

.6 When a duct system crosses an underground pipeline, the facility that is installed at the greater depth shall be in the lower position at the crossing unless agreed otherwise by Departmental Representative. A minimum depth of 300 mm at crossing will be used.

.7 Make transpositions, offsets and changes in direction using 5 degree bend sections, do not exceed a total of 20 degree with duct offset.

.8 Use bell ends at duct terminations in manholes or buildings.

.9 Use conduit to duct adapters when connecting to conduits.

.10 Terminate duct runs with duct coupling set flush with end of concrete envelope when dead ending duct bank for future extension.

.11 Cut, ream and taper end of ducts in field in accordance with manufacturer's recommendations, so that duct ends are fully equal to factory-made ends.

.12 Allow concrete to attain 50% of its specified strength before backfilling.

.13 Use anchors, ties and trench jacks as required to secure ducts and prevent moving during placing of concrete.

- .1 Tie ducts to spacers with twine or other non-metallic material.
- .2 Remove weights or wood braces before concrete has set and fill voids.

.14 Clean ducts before laying:

- .1 Cap ends of ducts during construction and after installation to prevent entrance of foreign materials.

.15 Install four 3 m lengths of 15M reinforcing rods, one in each corner of duct bank when connecting duct to manholes or buildings.

- .1 Wire rods to 15M dowels at manhole or building and support from duct spacers.
- .2 Protect existing cables and equipment when breaking into existing manholes.
- .3 Place concrete down sides of duct bank filling space under and around ducts.

.4 Rod concrete with flat bar between vertical rows filling voids.

.16 Install pull rope continuous throughout each duct run with 3 m spare rope at each end.

3.3 MANHOLES

.1 Install precast manholes.

.2 Alternately connect large duct runs by leaving square opening in wall, later pouring duct run and wall opening in one pour, and install 10M x 3m reinforcing rods in duct run at manhole connection.

.3 Build up concrete manhole neck to bring cover flush with finished grade in paved areas and 40 mm above grade in unpaved areas.

.4 Install manhole frames and covers for each manhole:

.1 Set frames in concrete grout onto manhole neck.

.5 Drain floor towards sump with 1 to 48 slope minimum and install drainage fittings as indicated.

.6 Install cable racks, anchor bolts and pulling irons as indicated.

.7 Grout frames of manholes:

.1 Cement grout to consist of two parts sand and one part cement and sufficient water to form a plastic slurry.

.8 Ensure filling of voids in joint being sealed.

.1 Plaster with cement grout, walls, ceiling and neck.

.9 Spray paint "X" on ceiling of manhole above floor drain or sump pit.

.10 Install wet well past depth of manhole. Connect 100 mm HDPE pipe from bottom of interior manhole to inside Wet Well as indicated on drawings.

3.4 MARKERS

.1 Mark location of duct runs under hard surfaced areas not terminating in manhole with railway spike driven flush in edge of pavement, directly over run.

.1 Place concrete duct marker at ends of such duct runs.

.2 Construct markers and install flush with grade.

.2 Mark ducts every 150 m along straight runs and changes in direction.

.3 Where markers are removed to permit installation of additional duct, reinstall existing markers.

.4 Lay concrete markers flat and centered over duct with top 25 mm above earth surface.

.5 Provide drawings showing locations of markers.

3.5 FIELD QUALITY CONTROL

.1 Site Tests/Inspections:

.1 Inspection of duct will be carried out by Departmental Representative prior to placing.

.2 Placement of concrete and duct cleanout to be done when Departmental Representative present.

3.6 CLEANING

.1 Proceed in accordance with Section 01 74 11 – Cleaning.

.2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

CSC Drumheller DI Conduit Replacement
& Expansion

Drumheller, Alberta

R. 078549.001

Appendix A

CSC Commissionaire Post Orders

CSC Drumheller DI Conduit Replacement
& Expansion

Drumheller, Alberta

R. 078549.001

Appendix A

CSC Commissionaire Post Orders

COMMISSIONAIRE POST ORDERS

CSC DRUMHELLER INSTITUTION

GUIDELINES AND RESPONSIBILITIES FOR COMMISSIONAIRE

The Agency (Corps of Commissionaires) employee shall be under the direct supervision of the Warden or his delegate, who in turn will report directly to the Warden or the Correctional Manager Operations. He/she shall be aware of the security requirements on the site and the nature and extent of all activities included in Standing Orders and Institutional instructions affecting his/her responsibilities. Permitting only those personnel identified on approved lists to enter the work site, and contact the Correctional Manager Operations for clarification when unauthorized persons wish to or try to enter. Ensure that proper control of tools, contraband, keys, and cell phones are maintained. Maintain effective radio and/or telephone communication with the designated Institutional Security Officer. When requested, prepares general and specific written reports regarding activities and concerns on the work site.

THE COMMISSIONAIRE SHALL:

1. Make Himself/Herself Aware, On The Nature And Extent Of All Site Activities And Security Requirements, And To Be Familiar With All Pertinent Written And Verbal Instruction Regarding His/Her Responsibility By:

a) Making himself/herself aware of the general area of the site, control posts in the immediate area, routes to be taken for vehicle and pedestrian movement to and from the construction site, anticipated inmate movement, and specific times of mass movement in the proximity of the construction site.

b) Remain alert at all times, while on duty.

c) Documents and written materials on the Commissionaires' person must be job related.

2. Ensure Only Authorized Personnel And Equipment Enter The Work Site And That The Site Is Secured By:

a) Permitting only those personnel identified on approved lists and is in possession of a construction site badge or visitor badge to enter the work site and detaining those who are not so identified until the matter is resolved by contacting Correctional Manager Operations for clarification.

b) Ensuring all authorized contract personnel remain in designated areas and do not deliberately come in contact with inmates, reporting violations of the above to Correctional Manager Operations or Duty Correctional Manager.

c) Ensure that vehicles arriving or leaving the site are not approached by inmates.

d) Work with assigned security officers (CX's) to escort contractors in areas with high Inmate movement. These personnel will be assigned by the Institution when notification is made for contractor entry into the Institution, if required.

e) Searching all items entering or leaving the work site except when escorted by, or being delivered by, a CSC Officer, in which case it is the CSC Officer who will perform the search. The purpose of the search is to ensure no contraband enters or leaves the site.

f) At the end of each working day, pay particular attention to power driven tools, saw blades, ropes, ladders, etc. to ensure they are intact and secured according to Institutional instructions.

g) Having all vehicles leave the work site immediately after unloading unless specific instructions are issued for vehicles to remain on site. If the vehicle remains on site it must be guarded or secured at all times, (i.e. ignition keys cannot be left in vehicles; doors must be locked when operator leaves the vehicle cab).

h) Refuse entry to all personnel in possession of narcotics, drugs, firearms, alcohol, or other contraband articles for which possession is a criminal offense, then immediately notify the Correctional Manager Operations or Duty Manager and submitting as required, written reports.

i) Ensuring contractor personnel are aware that their vehicles are to be searched by the Correctional officer working at the gate, each time the vehicle enters or leaves, and that all contract personnel are to sign the log sheet when entering and leaving the Institution.

j) Preventing the entry of restricted items into the Institution.

3. Ensure Proper Key Control Related To The Building Site Is Maintained At All Times By:

a) Keeping under observation and frequent inspection, the location and security of any key control box and/or safe on the construction site.

b) Having a complete and thorough understanding of Institutional key control procedures.

c) Ensure that at no time, an inmate is allowed to handle keys.

d) Refuse entry and report immediately, any unauthorized holders of keys.

4. Maintaining Effective Communication By:

a) Using proper voice procedure on the radio set as instructed by Institutional Official.

b) Using professional & courteous language.

c) Developing and maintaining written communication.

d) Reporting (part 5).

5. Reporting Of Unusual and Unacceptable Activities:

a) The Commissionaire will Report to Correctional Manager Operations or Duty Correctional Manager, on an urgent basis, any person (staff or inmate) by whose actions or by having in possession, dangerous contraband that would have an immediate effect upon security of the Institution and would constitute an indictable offense.

b) Report immediate concerns for the unsafe work practice to the contractor and/or Public Works Project Manager.

c) Submit as required, written reports covering daily activities, situations, or circumstances as may be requested.

d) Reporting immediately any breach or suspected breaches of tool control procedures as identified in Institutional orientation and training, to the Correctional Manager Operations.

e) Reporting incidents of contact between contract workers and inmates, and reporting incidents to the Correctional Manager Operations.

6. Ensure Contractor Secures Tools And Cleans Up The Work Site By:

a) Keeping under observation and frequently inspecting the work area used by the Contractor.

b) Ensuring that a list of all tools used by the Contractor is supplied to Officer at Main Gate.

c) Ensuring all construction material is locked in a designated secure area at the end of the workday.

d) Ensuring the Contractor only brings in tools that are needed for the project currently under construction.

e) Ensuring the Contractor removes all tools from work site and/or secures them in a designated secure area (lock box).

7. Advising Contractor Of The Time He Can Commence Work And The Time He Must Be Clear Of Work Site:

a) Ensure the Contractor does not delay or engage in work that cannot be Completed within prescribed times including extended work hours previously approved the Warden or his designate.

GENERAL AUTHORITY

Under The Direction of the Warden or His Delegate in Security:

1. The Commissionaire may refuse the admittance of any person entering the work site without proper approval and/or authority.

2. The Commissionaire will coordinate operations in conjunction with the Prime Contractor or with advance notice to the Prime Contractor, Public Works and Government Canada Lead Project Manager, or his delegate, who in turn receives instructions from the Warden, regarding the duties to be performed by the Commissionaires.

3. The senior Commissionaire in conjunction with the Warden or his designate will advise and instruct any Commissionaire of the requirement to improve his/her performance if deemed necessary.

1 General

1.1 PURPOSE

.1 To ensure that both the construction project and the Institutional operations may proceed without undue disruption or hindrance and that the security of the Institution is maintained at all times.

1.2 DEFINITIONS

.1 ***"Contraband"*** means:

.1 An intoxicant, including alcoholic beverages, drugs and narcotics.

.2 A weapon or a component thereof, ammunition for a weapon, and anything that is designed to kill, injure or disable a person or that is altered so as to be capable of killing, injuring or disabling a person, when possessed without prior authorization.

.3 An explosive or a bomb, or a component thereof.

.4 Currency over any applicable prescribed limit $50.00.

.5 Any item not described in paragraphs (1) to (4) that could jeopardize the security of a Penitentiary or the safety of persons, when that item is possessed without prior authorization.

.2 ***"Unauthorized Smoking and Related Items"*** means all smoking items including, but not limited to, cigarettes, cigars, tobacco, chewing tobacco, cigarette making machines, matches and lighters.

.3 ***"Commercial Vehicle"*** means any motor vehicle used for the shipment of material, equipment and tools required for the construction project.

.4 ***"CSC"*** means Correctional Service Canada.

.5 ***"Director"*** means Director, Warden or Superintendent of the Institution as applicable.

.6 ***"Construction Employees"*** means persons working for the general contractor, the sub-contractors, equipment operators, material suppliers, testing and inspection companies and regulatory agencies.

.7 ***"Departmental Representative"*** means the project manager from Public Works and Government Services Canada.

.8 ***"Perimeter"*** means the fenced or walled area of the Institution that restrains the movement of the inmates.

.9 ***"Construction Limits"*** means the area as shown on the contract drawings that the contractor will be allowed to work. This area may or may not be isolated from the security area of the Institution. These are the immediate areas in and around the construction.

1.3 PRELIMINARY PROCEEDINGS

.1 Prior to the commencement of work, the contractor will meet with the Director or his representative to:

.1 Discuss the nature and extent of all activities involved in the Project.

.2 Establish mutually acceptable security procedures in accordance with this instruction and the Institution's particular requirements.

.2 The contractor will:

.1 Ensure that all construction employees are aware of the security requirements.

.2 Ensure that a copy of the security requirements is always prominently on display at the job site.

.3 Co-operate with Institutional personnel in ensuring that security requirements are observed by all construction employees.

1.4 CONSTRUCTION EMPLOYEES

.1 Submit to the Departmental Representative and the Institution SIO Office (Tammy Kranzler) a list of the names with date of birth of all construction employees to be employed on the construction site and a security clearance form for each employee.

.2 Allow two (2) weeks for processing of CPIC security clearances. Employees will not be admitted to the Institution without a valid security clearance in place and recent picture identification such as a provincial driver's license. Security clearances obtained from other CSC Institutions are not valid at this Institution.

.3 The Director may require that facial photographs may be taken of construction employees and these photographs may be displayed at appropriate locations in the Institution or in an electronic database for identification purposes. The Director may require that Photo ID cards be provided for all construction

workers. ID cards will then be left at the designated entrance to be picked upon arrival at the Institution and shall be displayed prominently on the construction employees clothing at all time while employees are in the Institution. Verify this requirement with the Departmental Representative

.4 Entry to Institutional Property will be refused to any person there may be reason to believe may be a security risk.

.5 Any person employed on the construction site will be subject to immediate removal from Institutional Property if they:

.1 Appear to be under the influence of alcohol, drugs or narcotics.

.2 Behave in an unusual or disorderly manner.

.3 Are in possession of contraband.

1.5 VEHICLES

.1 All unattended vehicles on CSC property shall have windows closed; doors and trunks shall be locked and keys removed. The keys shall be securely in the possession of the owner or an employee of the company that owns the vehicle. The Institution requires lockable gas caps on all vehicles and motorized equipment used in the construction area.

.2 The director may limit at any time the number and type of vehicles allowed within the Institution.

.3 Drivers of delivery vehicles for material required by the project will not require security clearances but must remain with their vehicle the entire time that the vehicle is in the Institution. The Director may require that these vehicles be escorted by Institutional staff or Commissionaires while in the Institution.

.4 If the Director allows trailers to be left inside the secure perimeter of the Institution, these trailer doors will be locked at all times. All windows will be securely locked when left unoccupied. All trailer windows shall be covered with expanded metal mesh. All storage trailers inside and outside the perimeter must be locked when not in use.

1.6 PARKING

.1 The parking area(s) to be used by construction employees will be designated by the Director. Parking in other locations will be prohibited and vehicles may be subject to removal.

1.7 SHIPMENTS

.1 All shipments of project material, equipment and tools shall be addressed in the Contractor's name to avoid confusion with the Institution's own shipments. The contractor must have his own employees on site to receive any deliveries or shipments. CSC staff will **NOT** accept receipt of deliveries or shipments of any material equipment or tools.

1.8 TELEPHONES

.1 There will be no installation of telephones, Facsimile machines and computers with Internet connections permitted within the perimeter of the Institution unless prior approval of the Director is received.

.2 The Director will ensure that approved telephones, facsimile machine and computers with Internet connections are located where they are not accessible to inmates. All computers will have an approved password protection that will stop an Internet connection to unauthorized personnel.

.3 Wireless cellular and digital telephones, including but not limited to devices for telephone messaging, pagers, Blackberries, telephone used as 2-way radios, are not permitted within the perimeter of the Institution unless approved by the Director. If wireless cellular telephones are permitted, the user will not permit

their use by any inmate.

.4 The Director may approve but limit the use of two-way radios.

1.9 WORK HOURS

.1 Work hours within the Institution are: Monday to Friday 8:00 a.m. (08:00 hrs) to 4:00 p.m. (16:00 hrs).

.2 Work will not be permitted during weekends and statutory holidays without the permission of the Director. A minimum of seven days advance notice will be required to obtain the required permission. In case of emergencies or other special circumstances, this advance notice may be waved or period shortened by the Director.

1.10 OVERTIME WORK

.1 No overtime work will be allowed without permission of the Director. Give a minimum forty-eight (48) hours advance notice when overtime work on the construction project is necessary and is being requested for approval. If overtime work is required because of an emergency such the completion of a concrete pour or work to make the construction safe and secure, the contractor will advise the Director as soon as this condition is known and follow the directions given by the Director. Costs to the Crown for such events may be attributed to the contractor.

.2 When overtime work, weekend statutory holiday work is required and approved by the Director, extra staff members may be posted by the Director or his designate, to maintain the security surveillance. The Departmental Representative may post extra staff for inspection of construction activities. The actual cost of this extra staff may be subject to reclamation by the Crown.

1.11 TOOLS AND EQUIPMENT

.1 Maintain a complete list of all tools and equipment to be used during the construction project. Make this inventory available for inspection when required. Tool lists are to include the following as well as any screw & or drill bits and any disposable tool items such as disposable blades etc.

.1 **Restricted tools** (tools requiring special permission to carry on to site.

.1 Explosive tools (Hilti-gun, etc.)

.2 Bolt cutters

.3 Acids

.4 Bottle jacks (hydraulic)

.5 Knives (other than approved hobby knives and cutlery)

.6 Scissors, tailors;

.7 Adjustable wrenches, 10" long or more;

.8 Tin snips

.9 Linesmen pliers

.10 Metal cutting devices

.11 Hacksaw blades wrecking or cross bars

.12 Files

.13 Vice grip pliers with cutters in jaws

.14 Picks

.15 Portable, electrically driver power tools capable of cutting or drilling (skill saws, jigsaws and drill motors)

.16 Welding equipment (accessories locked up)

.17 Ropes, heavy cord

.18 Axes

.19 Ladders

.20 Gasoline

.21 Coal oil, turpentine

.22 Lacquers and sealers

.23 Pure ammonia

.24 Pneumatic guns and staplers

.25 Propane cylinders

.2 **Non-restricted tools:**

.1 Includes tools that are used daily and are not usually expected to be used to effect an escape.

.2 Throughout the construction project maintain the up-to-date/daily tool list and equipment specified above. Tool lists for PWGSC projects are to be submitted by the Commissionaires to the Departmental Representative at the end of each working day.

.3 Keep all tools and equipment under constant supervision, particularly power-driven and cartridge-driven tools, cartridges, files, saw blades, rod saws, wire, rope, ladders and any sort of jacking device.

.4 Store all tools and equipment in approved secure locations.

.5 Lock all toolboxes when not in use. Keys are to remain in the possession of the employees of the contractor. Scaffolding shall be secured and locked when not erected and when erected, will be secured in a manner agreed upon with the Institutional designate.

.6 All missing or lost tools or equipment shall be reported immediately to the Director.

.7 The Director will ensure that the security staff members carry out checks of the Contractor's tools and equipment against the list provided by the Contractor. These checks may be carried out at the following intervals:

.1 At the beginning and conclusion of every construction project.

.2 Weekly, when the construction project extends longer than a one-week period.

.3 The Contractor may be subject to random checks by security staff to ensure proper storage and security of tools throughout the project.

.4 Certain tools/equipment such as cartridges and hacksaw blades are highly controlled items. The contractor will be given at the beginning of the day, a quantity that will permit one day's work. Used blades/cartridges will be returned to the Director's representative at the end of each day.

.8 If propane or natural gas is used for heating the construction, the Institution will require that an employee of the contractor supervise the construction site during non-working hours.

1.12 KEYS

1. **Security Hardware Keys**

.1 The Contractor shall arrange with the security hardware supplier/installer to have the keys for the security hardware to be delivered directly to

Institution, specifically the Security Maintenance Officer (SMO).

.2 The SMO will provide a receipt to the Contractor for security hardware keys.

.3 The contractor will provide a copy of the above-mentioned receipt to the Engineer.

2. **Other Keys**

.1 The contractor will use standard construction cylinders for locks for his use during the construction period.

.2 The contractor will issue instructions to his employees and sub-trades, as necessary, to ensure safe custody of the construction set of keys.

.3 Upon completion of each phase of the construction, the CSC representative will, in conjunction with the lock manufacturer:

.1 Prepare an operational keying schedule.

.2 Accept the operational keys and cylinders directly from the lock manufacturer.

.3 Arrange for removal and return of the construction cores and install the operational core in all locks.

.4 Upon putting operational security keys into use, the CSC construction escort shall obtain these keys as they are required from the SMO and open doors as required by the Contractor. The Contractor shall issue instructions to his employees advising them that all security keys shall always remain with the CSC construction escort.

1.13 SECURITY HARDWARE

.1 Turn over all removed security hardware to the Director of the Institution for disposal or for safekeeping until required for re-installation.

1.14 PRESCRIPTION DRUGS

.1 Employees of the contractor who are required to take prescription drugs during the workday shall obtain approval of the Director to bring a one-day supply only into the Institution.

1.15 SMOKING RESTRICTIONS

.1 Contractors and construction employees are not permitted to smoke inside correctional facilities or outdoors within the perimeter of a correctional facility and must not possess unauthorized smoking items within the perimeter of a correctional facility.

.2 Contractors and construction employees who are in violation of this policy will be requested to immediately cease smoking or dispose of any unauthorized smoking items and, if they persist, will be directed to leave the Institution.

.3 Smoking is only permitted outside the perimeter of a correctional facility in an area to be designated by the Director.

1.16 CONTRABAND

.1 Weapons, ammunition, explosives, alcoholic beverages, drugs and narcotics are prohibited on Institutional property.

.2 The discovery of contraband on the construction site and the identification of the person(s) responsible for the contraband shall be reported immediately to the Director.

.3 Contractors should be vigilant with both their staff and the staff of their sub-contractors and suppliers that the discovery of contraband may result in

cancellation of the security clearance of the affected employee. Serious infractions may result in the removal of the company from the Institution for the duration of the construction.

.4 Presence of arms and ammunition in vehicles of contractors, sub-contractors, suppliers or employees, will result in the immediate cancellation of security clearances for the driver of the vehicle.

1.17 SEARCHES

.1 All vehicles and persons entering Institutional property may be subject to search.

.2 When the Director suspects, on reasonable grounds, that an employee of the Contractor is in possession of contraband or unauthorized items, he may order that person to be searched.

.3 All employees entering the Institution may be subject to screening of personal effects for traces of contraband drug residue.

1.18 ACCESS TO AND FROM INSTITUTIONAL PROPERTY

.1 Construction personnel and commercial vehicles will not be admitted to the Institution after normal working hours, unless approved by the Director.

1.19 MOVEMENT OF VEHICLES

.1 Escorted commercial vehicles will be allowed to enter or leave the Institution through the vehicle access gate during the following hours:

- 8:00 a.m. to 4:00 p.m. (or within approved hours of work).

.2 The contractor shall advise the Director twenty-four (24) hours in advance on the arrival of heavy equipment coming on site, such as concrete trucks, cranes, etc.

.3 Vehicles being loaded with soil or other debris, or any vehicle considered impossible to search, must be under continuous supervision by CSC staff or Commissionaires working under the authority of the Director.

.4 Commercial vehicles will only be allowed access to Institutional property when their contents are certified by the Contractor or his representative as being strictly necessary to the execution of the construction project.

.5 Vehicles shall be refused access to Institutional property if, in the opinion of the Director, they contain any article which may jeopardize the security of the Institution.

.6 Private vehicles of construction employees will not be allowed within the security wall or fence of medium or maximum-security Institutions without the permission of the Director.

.7 With prior approval of the Director, a vehicle may be used in the morning and evening to transport a group of employees to the work site. This vehicle will not remain within the Institution the remainder of the day.

.8 With the approval of the Director, certain equipment may be permitted to remain on the construction site overnight or over the weekend. This equipment must be securely locked, with the battery removed. The Director may require that the equipment be secured with a chain and padlock to another solid object.

1.20 MOVEMENT OF CONSTRUCTION EMPLOYEES ON INSTITUTIONAL PROPERTY

.1 Subject to the requirements of good security, the Director will permit the Contractor and his employees as much freedom of action and movement as is possible.

.2 However, notwithstanding the paragraph above, the Director may:

.1 Prohibit or restrict access to any part of the Institution.

.2 Require that in certain areas of the Institution, either during the entire

construction project or at certain intervals, construction employees only be allowed access when accompanied by a member of the CSC security staff.

.3 During the lunch and coffee/health breaks, all employees will remain within the construction site. Employees are not permitted to eat in the officer's lounge and dining room.

1.21 SURVEILLANCE AND INSPECTION

.1 Construction activities and all related movement of personnel and vehicles will be subject to surveillance and inspection by CSC security staff members to ensure that established security requirements are met.

.2 CSC staff members will ensure that an understanding of the need to carry out surveillance and inspections, as specified above, is established among construction employees and maintained throughout the construction project.

1.22 STOPPAGE OF WORK

.1 The director may request at any time that the contractor, his employees, sub-contractors and their employees not enter or leave the work site immediately due to a security situation occurring within the Institution. The contractor's site supervisor shall note the name of the staff member making the request and the time of the request and obey the order as quickly as possible.

.2 The contractor shall advise the Engineer within 24 hours of this delay to the progress of the work.

1.23 CONTACT WITH INMATES

.1 Unless specifically authorized, it is forbidden to come into contact with inmates, to talk with them, to receive objects from them or to give them objects. Any employee doing any of the above will be removed from the site and his security clearance revoked.

.2 It is forbidden to take pictures of inmates, of CSC staff members or of any part of the Institution other than those required as part of this contract.

1.24 COMPLETION OF CONSTRUCTION PROJECT

.1 Upon completion of the construction project or, when applicable, the takeover of a facility, the Contractor shall remove all remaining construction material, tools and equipment that are not specified to remain in the Institution as part of the construction contract.

I _____ ***on***, _____, ***have***

(Print Name) ***(Date)***

read the above outlined duties and responsibilities, and am fully aware that I am not authorized to conduct any communication with any Media Representative, regarding CSC Operations, or information about staff or inmates.

_____ _____

(Witness) ***(Date)***

Correctional Service Canada | Service correctionnel Canada

PROTECTED B / PROTÉGÉ B — ONCE COMPLETED / UNE FOIS REMPLI

INSTITUTIONAL ACCESS CPIC CLEARANCE REQUEST

ACCÈS À UN ÉTABLISSEMENT DEMANDE DE VÉRIFICATION DU DOSSIER AU CIPC

PUT AWAY ON FILE – CLASSER AU DOSSIER
ADMINISTRATIVE OR OPERATIONAL FILE
DOSSIER ADMINISTRATIF OU OPÉRATIONNEL
▶ **Original =** 3170-12

▶ **PLEASE PRINT INFORMATION CLEARLY - VEUILLEZ ÉCRIRE EN LETTRES MOULÉES**

Institution – Établissement	**Request received / Demande reçue le** Date (YYAA-MM-DJ)	**PUT AWAY ON FILE / CLASSER AU DOSSIER** ▶ **3170-12**

A. PERSONAL INFORMATION – RENSEIGNEMENTS PERSONNELS

Surname / Nom de famille	Full name (no nicknames or initials) / Nom au complet (pas de surnoms ou d'initiales)	Maiden name (if applicable) / Nom de jeune fille (s'il y a lieu)

Date of birth / Date de naissance (YYAA-MM-DJ)	Place of birth – Lieu de naissance: City/Town – Ville ou municipalité	Province/State – Province ou état	Country – Pays

B. PHYSICAL DESCRIPTION – DESCRIPTION PHYSIQUE

☐ Male / Homme ☐ Female / Femme

Height – Grandeur	Weight – Poids	Eye color – Couleur des yeux	Hair color / Couleur des cheveux

C. ADDRESS – ADRESSE

Street – Rue	City/Town – Ville ou municipalité	Province	Postal Code - Code postal	Telephone number – Numéro de téléphone: Home – Domicile	Work – Bureau

Representing (name of company/organization) – Représente (nom de la compagnie ou de l'organisation)

D. GENERAL INFORMATION – RENSEIGNEMENTS GÉNÉRAUX

1.	Have you ever been convicted of a criminal offence for which you have not been granted a pardon, or an offence for which you have been granted a pardon and such a pardon has been revoked? Avez-vous déjà été reconnu coupable d'une infraction criminelle pour laquelle on ne vous a pas octroyé un pardon ou d'une infraction pour laquelle on vous a octroyé un pardon qui a été révoqué?	☐ Yes / Oui	☐ No / Non
2.	Do you personally know of any person incarcerated in a correctional facility?: Connaissez-vous personnellement une personne qui est incarcérée dans un établissement correctionnel? If so, provide names - Si oui, fournir son nom :	☐ Yes / Oui	☐ No / Non
3.	Do you have any reason to believe coming into contact with this person could pose a risk to your or their personal safety? Avez-vous des raisons de croire que le fait d'entrer en contact avec cette personne pourrait présenter un risque pour votre sécurité personnelle ou la sienne ?	☐ Yes / Oui	☐ No / Non
4.	Are you related/associated to an inmate or on an inmate's visiting list? Êtes-vous apparenté ou associé à un détenu ou inscrit sur la liste des visiteurs d'un détenu?	☐ Yes / Oui	☐ No / Non

If you have answered YES to any of the above, please explain below. – Si vous avez répondu OUI à une des questions ci-dessus, veuillez fournir une explication ci-après.

▶

E. SIGNATURE (When sections A to E are filled out completely, please return the completed form to the institution for approval.)

(Une fois que les sections A à E ont été remplies, veuillez retourner le formulaire dûment rempli à l'établissement aux fins d'approbation.)

In making this application, I hereby give the Correctional Service of Canada my consent to use the information provided on this form to conduct such inquiries with police authorities as may be necessary to ascertain my suitability. Finally, I acknowledge that the Correctional Service of Canada has no responsibility for any harm that may come to me in the course of my activities, except where such harm is a direct result of negligence on the part of an employee(s) of the Service.
NOTE: Access may be denied for submitting false information. Passes may be issued for those receiving clearance and approval.

En soumettant la présente demande, j'autorise le Service correctionnel du Canada à se servir des renseignements fournis dans le formulaire afin de mener, auprès des services de police, toute enquête jugée nécessaire pour vérifier mon admissibilité. Par ailleurs, je conviens que le Service correctionnel du Canada ne peut être tenu responsable d'un préjudice subi dans le cadre de mes activités sauf si ce préjudice est directement attribuable à la négligence d'un ou de plusieurs employés du Service.
NOTA : Tout demandeur qui fournit de faux renseignements peut se voir refuser l'accès à l'établissement. Un laissez-passez peut être émis aux demandeurs dont la demande d'accès est approuvée.

Applicant's signature – Signature du demandeur ▶ | Date (YYAA-MM-DJ)

F. FOR OFFICE USE ONLY – RÉSERVÉ AU SCC

Reason for clearance – Motif justifiant la demande d'accès

Department making the request (please print) / Unité qui soumet la demande (en lettres moulées s.v.p.)	Signature of Division Head / Signature du chef de la division ▶	Date (YYAA-MM-DJ)

☐ No criminal record / Aucun casier ☐ A possible criminal record #: / Numéro du casier judiciaire ▶ Last entry: / Dernière entrée : ▶

☐ An outstanding warrant/charge held by: / Auteur du mandat non exécuté/accusation en instance : ▶

SIGNATURES

▶ ☐ Approved / Approuvée ☐ Not approved / Non approuvée

The individual has been advised. – Le demandeur a été informé de la décision. ▶ ☐ Yes / Oui ☐ No / Non By: / Par :

Security Intelligence Officer / Agent de renseignements de sécurité ▶	Date (YYAA-MM-DJ)	Institutional Head / Directeur de l'établissement ▶	Date (YYAA-MM-DJ)	Visit Review Board / Comité des visites ▶	Date (YYAA-MM-DJ)

Correctional Service Canada | Service correctionnel Canada

PROTECTED B / PROTÉGÉ B — ONCE COMPLETED / UNE FOIS REMPLI

NOTE: Reference document/document de référence =

PUT AWAY ON FILE – CLASSER AU DOSSIER
ADMINISTRATIVE OR OPERATIONAL FILE
DOSSIER ADMINISTRATIF OU OPÉRATIONNEL
▶ Original = 3280-8

ELECTRONIC ITEM REGISTRY AND AUTHORIZATION

REGISTRE ET AUTORISATION DES APPAREILS ÉLECTRONIQUES

Shawn D Lumsden - PWGSC Project Manager
Official Visitor Name / Nom du visiteur officiel

2016-10-03
Date (YYAA-MM-DJ)

Name of Institution / Nom de l'établissement : Drumheller Institution

TYPE OF ELECTONIC DEVICE/TYPE D'APPAREIL ÉLECTRONIQUE

Cell phone/téléphone cellulaire	Make/marque :	
	Cell phone #/n° de cellulaire :	( )
	Device serial #/ n° de série de l'appareil	
	Other/autre :	
BlackBerry/appareil BlackBerry	Make/marque :	Q10 model:RFL111LW
	Cell phone #/n° de cellulaire :	(587) 894-0395
	Device serial #/ n° de série de l'appareil	PIN:2C02FD04
	Other/autre :	with SD micro 2GB card
Tablet/tablette électronique	Make/marque :	
	Cell phone #/n° de cellulaire :	( )
	Device serial #/ n° de série de l'appareil	
	Other/autre :	
E-Reader/lecteur de livres numériques	Make/marque :	
	Cell phone #/n° de cellulaire :	( )
	Device serial #/ n° de série de l'appareil	
	Other/autre :	
Laptop/ordinateur portatif	Make/marque :	
	Cell phone #/n° de cellulaire :	( )
	Device serial #/ n° de série de l'appareil	
	Other/autre :	
Other Device/autre appareil	Make/marque :	
	Cell phone #/n° de cellulaire :	( )
	Device serial #/ n° de série de l'appareil	
	Other/autre :	

I understand that the use of electronic item(s) is related to official duties, i.e. Medical purposes/other use as authorized by the Institutional Head or delegate) and that inmates are **not** to have access to it.
Je comprends que l'utilisation de ces appareils électroniques est liée à mes fonctions officielles, c.-à-d. à des fins médicales/autres utilisations autorisées par le directeur de l'établissement ou son délégué) et que les détenus ne peuvent **pas** y avoir accès.

I _____ hereby agree to abide by the above and understand that immediate
Official Visitor's Signature

notification is required in the event that the device goes missing.

Je _____ , par la présente, m'engage à respecter ce qui est énoncé
Signature du visiteur officiel

précédemment et à signaler immédiatement la disparition de ces appareils, s'il y a lieu.

AUTHORIZATION – AUTORISATION

Institutional Head Name / Nom du Directeur de l'établissement	Signature	Date (YYAA-MM-DJ)

CSC/SCC 1467 (2012-06) (Word Version – Version Word)

Information may be accessible or protected as required under the provisions of the *Access to Information Act* and the *Privacy Act*.
Les renseignements peuvent être accessibles ou protégés selon ce que prescrivent la *Loi sur l'accès à l'information* et la *Loi sur la protection des renseignements personnels*.

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TOOL REGISTER

DATE:

CONTRACTOR/COMPANY NAME:

PROJECT NAME:

NUMBER OF PAGES:

CONTRACTORS NAME: PRINTED	COMMISSIONAIRES NAME:	LIST OF TOOLS:	TIME IN:	TIME OUT:	CONTRACTORS SIGNATURE AT TIME OUT

CSC Drumheller DI Conduit Replacement
& Expansion

Drumheller, Alberta

R. 078549.001

Appendix B
CSC Technical Criterial

CSC Drumheller DI Conduit Replacement
& Expansion

Drumheller, Alberta

R. 078549.001

Appendix B
CSC Technical Criterial

Correctional Service Canada | Service correctionnel Canada

SAFETY, RESPECT AND DIGNITY FOR ALL

LA SÉCURITÉ, LA DIGNITÉ ET LE RESPECT POUR TOUS

Technical Criteria for Correctional Institutions

ISSUED BY FACILITY PLANNING AND STANDARDS
APRIL 2015

Canada

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.

---

[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.

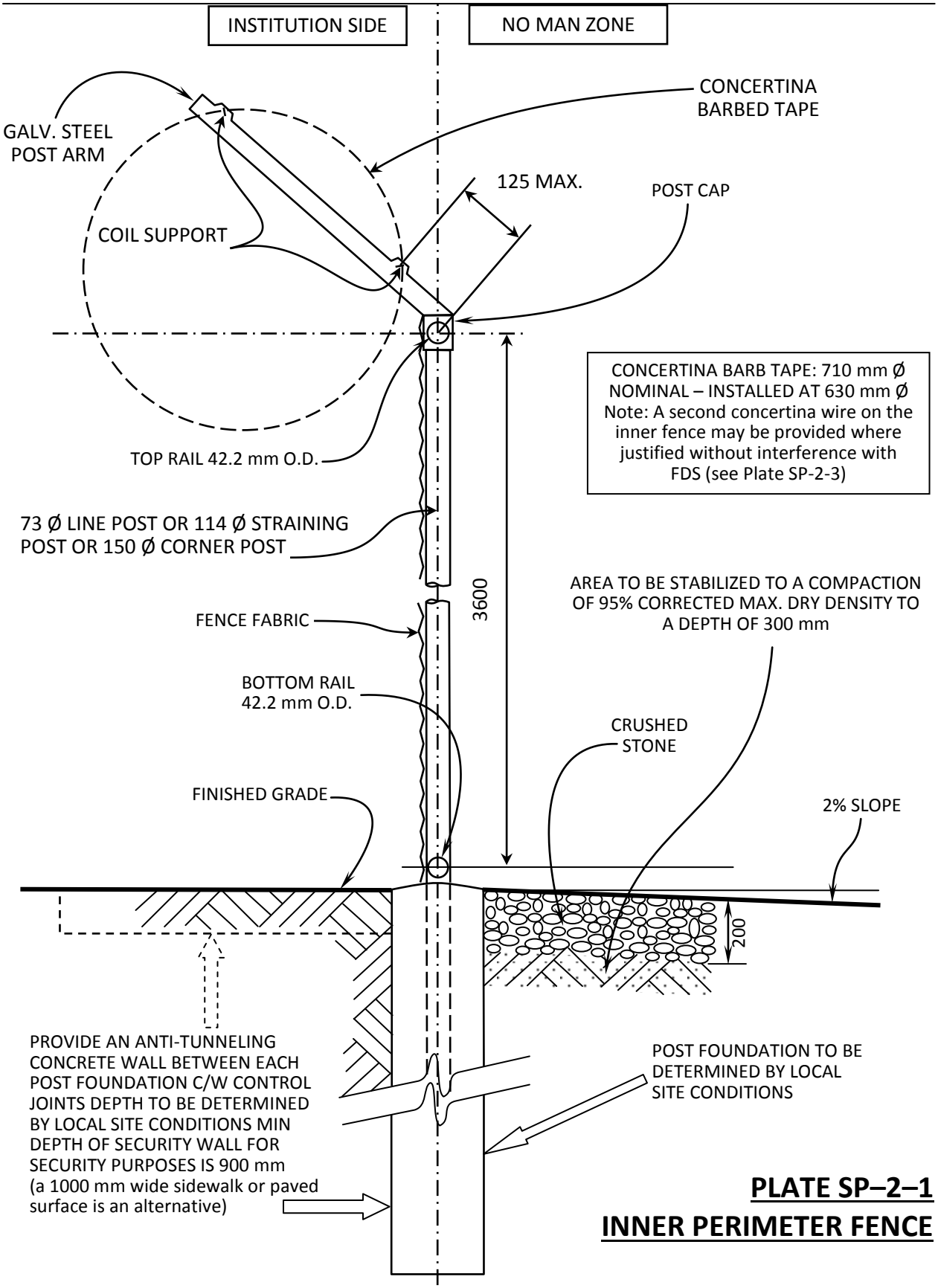


PLATE SP–2–1
INNER PERIMETER FENCE

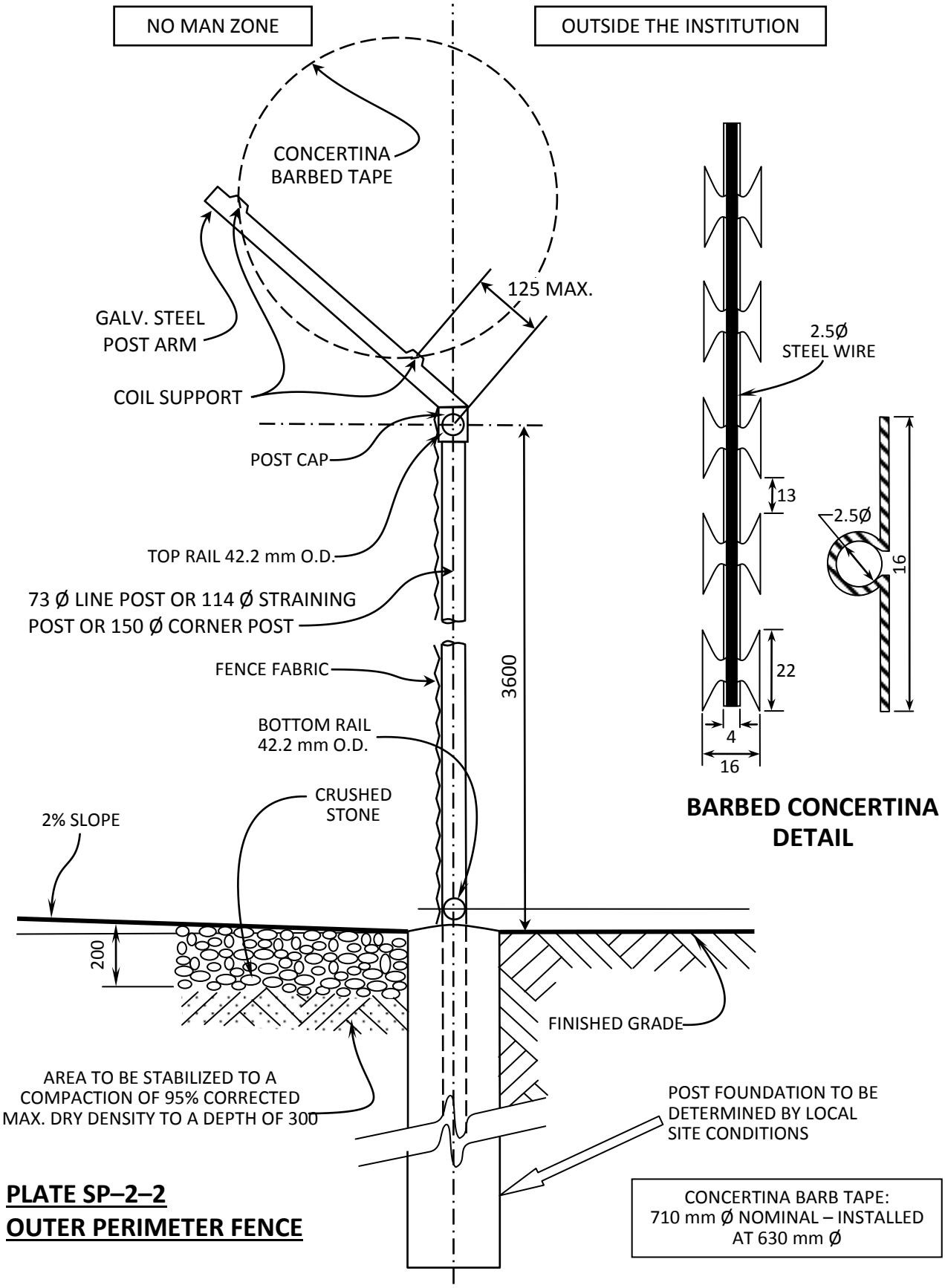


PLATE SP–2–2
OUTER PERIMETER FENCE

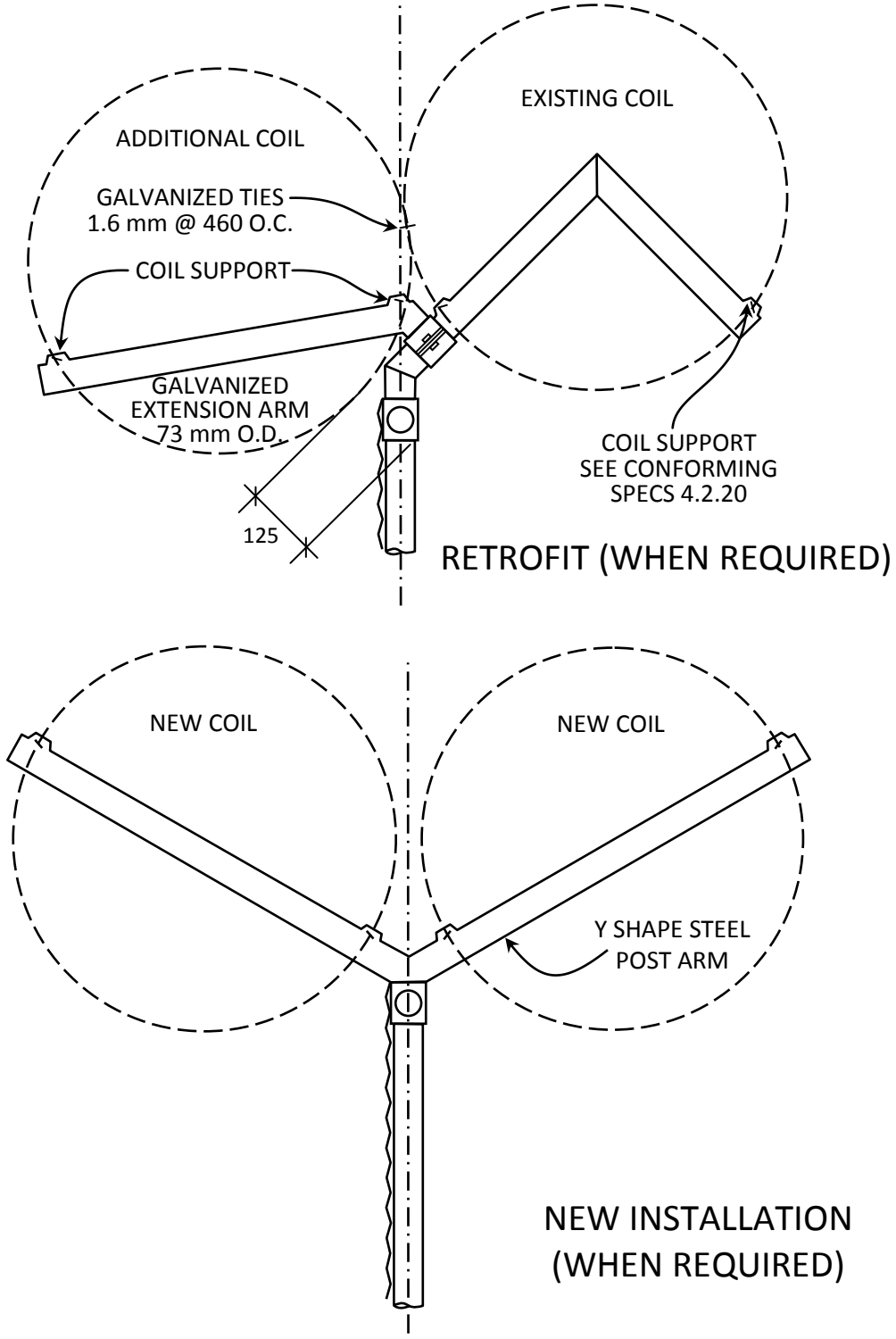


PLATE SP–2–3 – INNER FENCE WITH A SECOND CONCERTINA TAPE

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

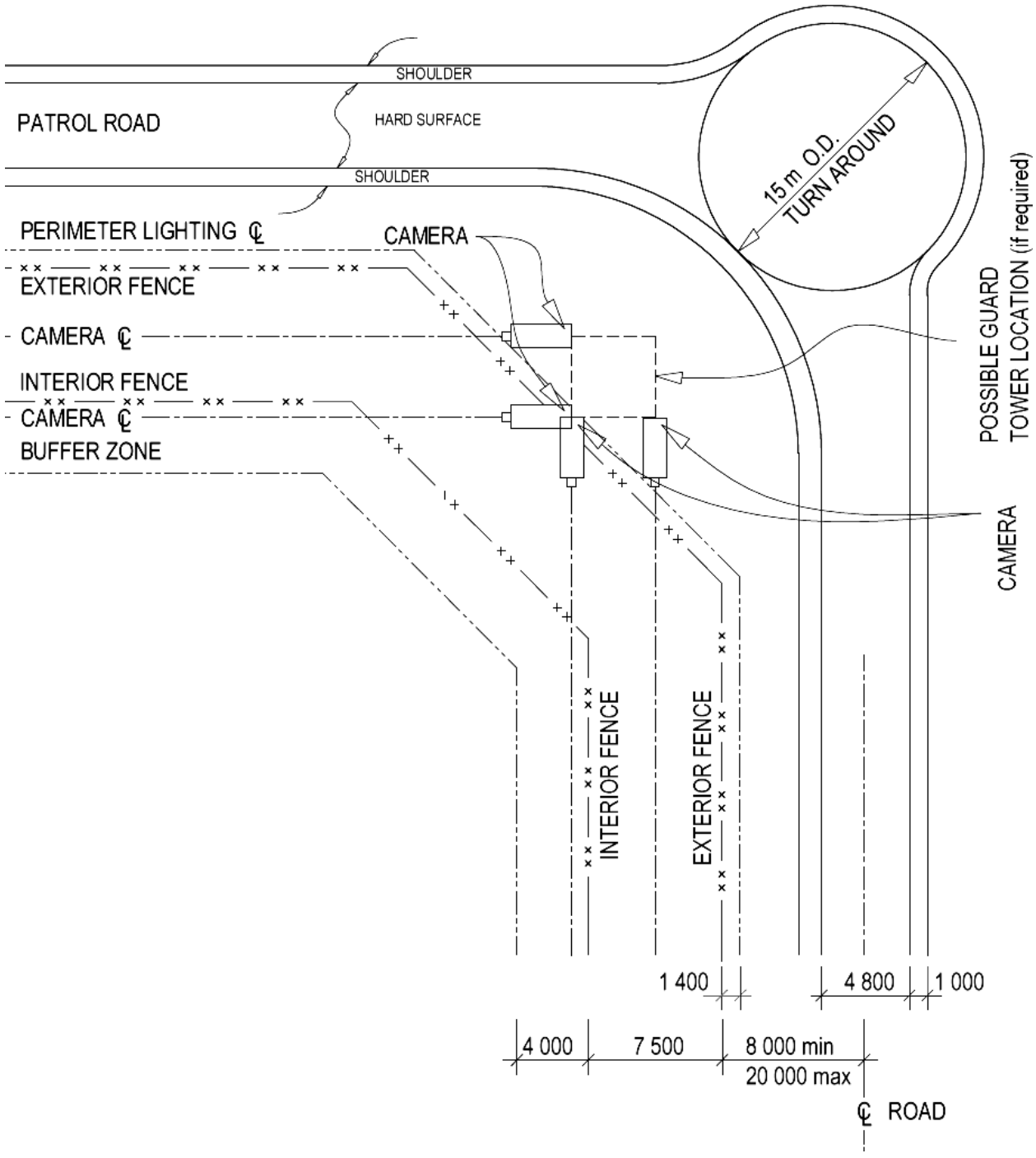


PLATE SP–2–4 – TYPICAL PERIMETER FENCE CORNER WITH TOWER

NOTE: CAMERA LINES ARE FOR INFORMATION PURPOSES ONLY

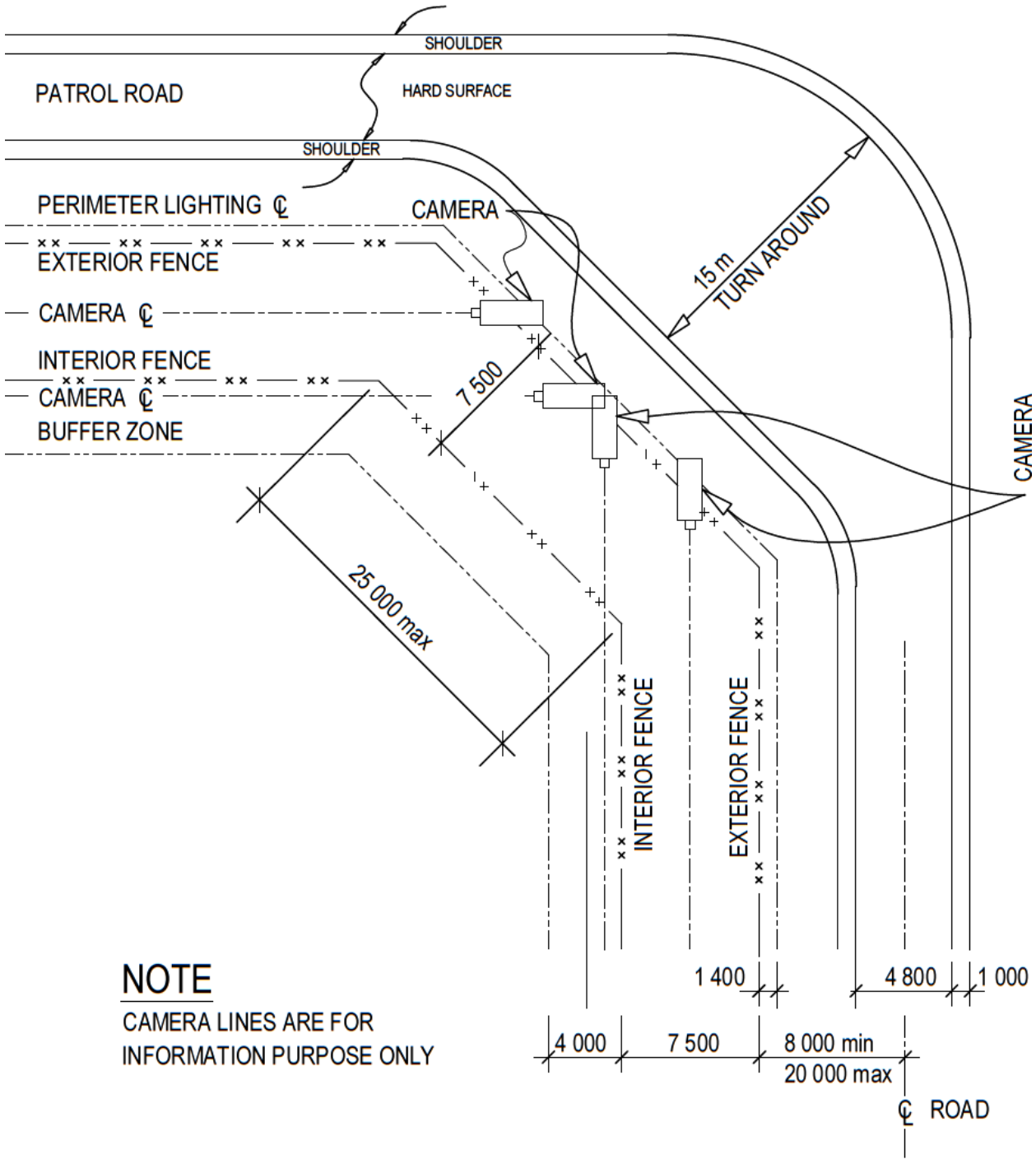


PLATE SP–2–5 – TYPICAL PERIMETER FENCE CORNER WITHOUT TOWER

CAMERAS ARE MOUNTED ON OUTRIGGERS OVER THE CONCERTINA

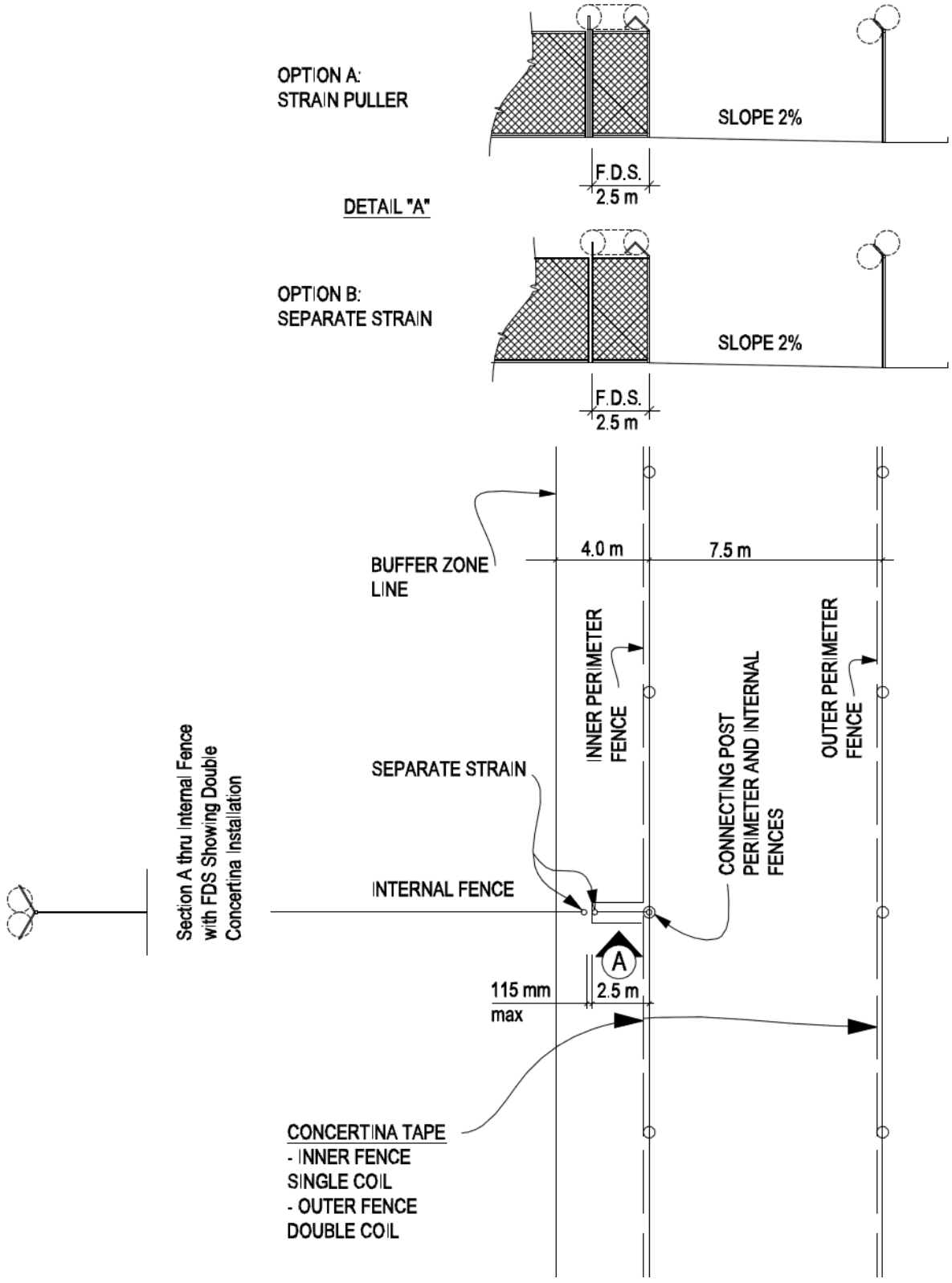


PLATE SP–2–6 – INTERNAL FENCES INTERSECTING THE INNER PERIMETER FENCE – DETAILS

SP-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.

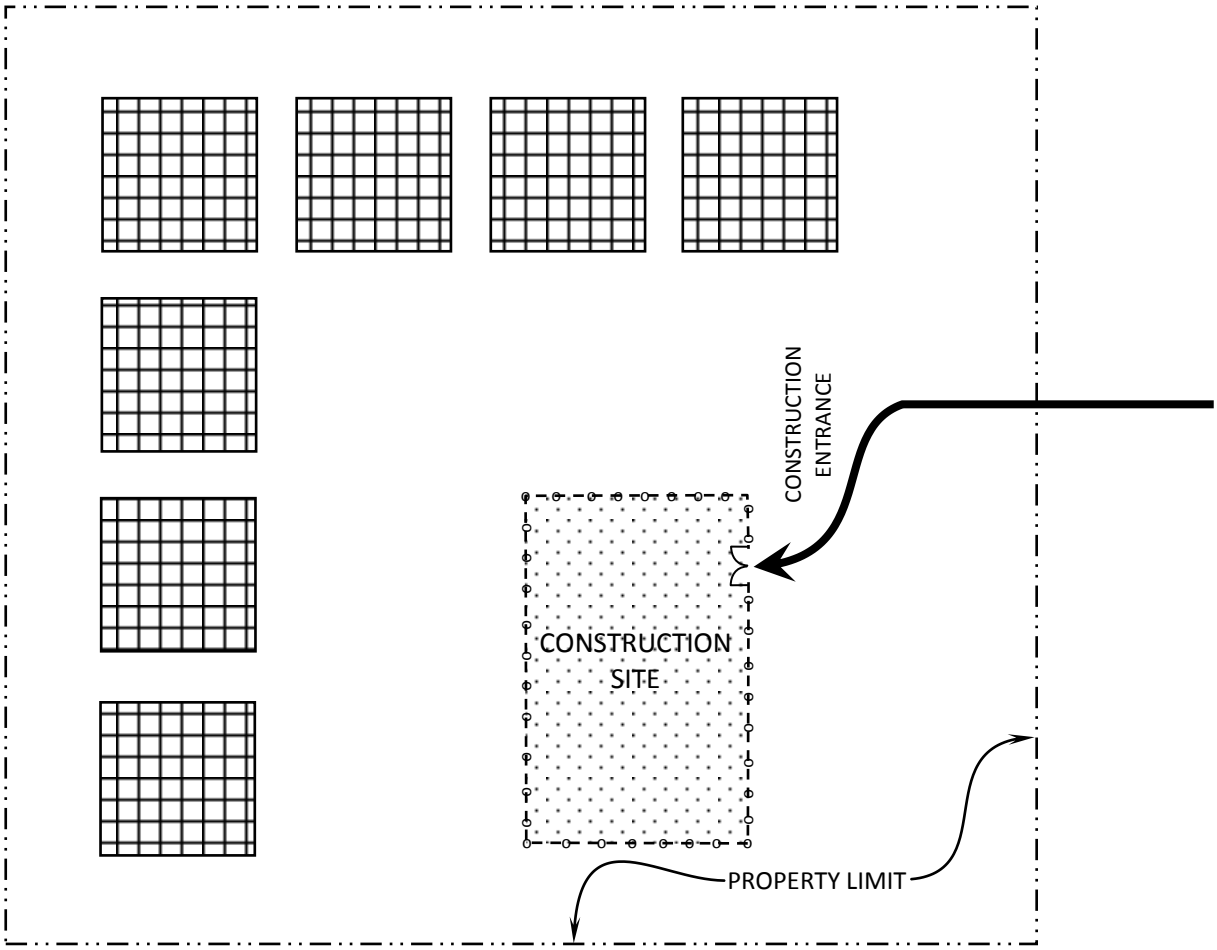


PLATE SP–6–1 – TYPE 1 FENCE

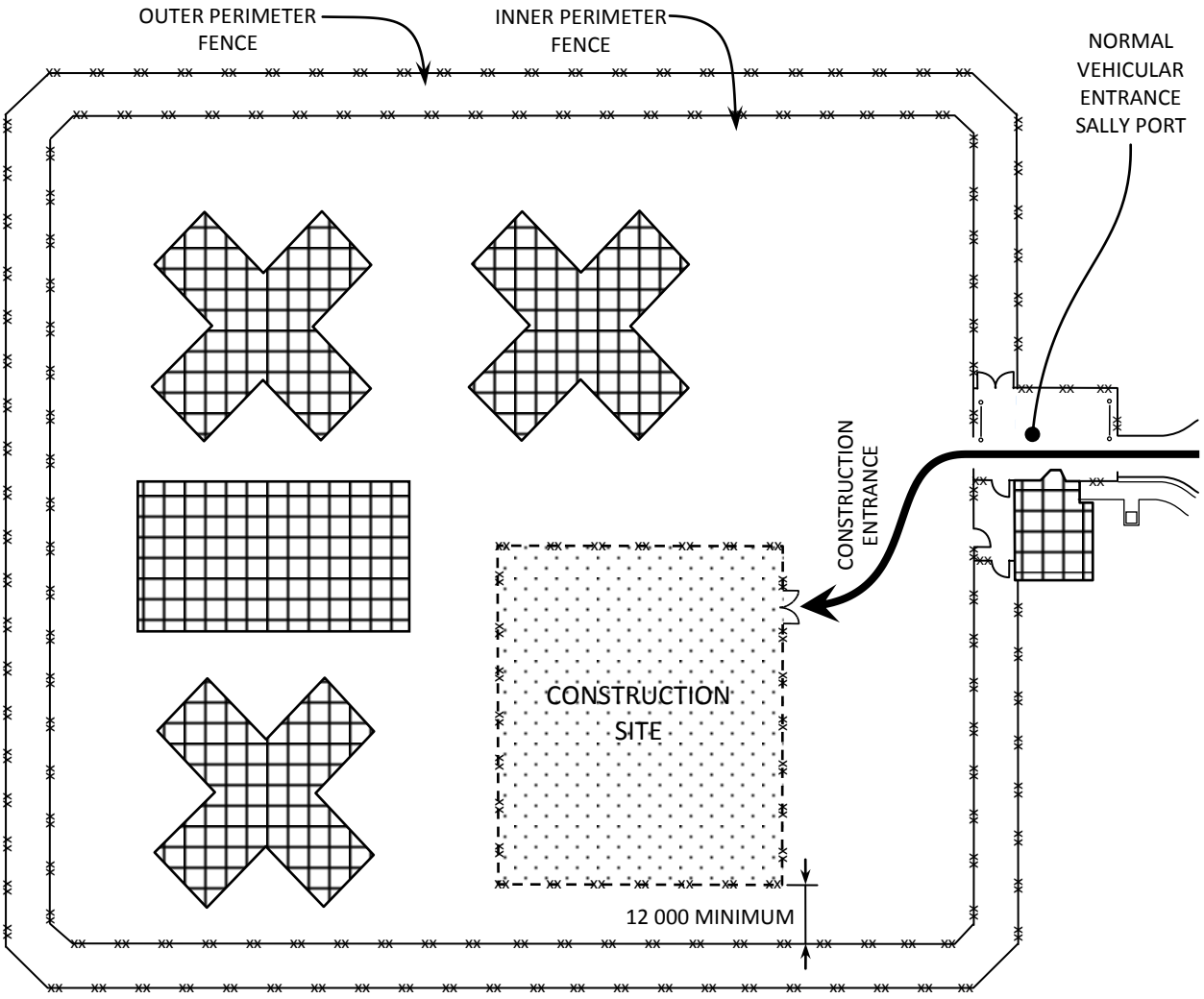
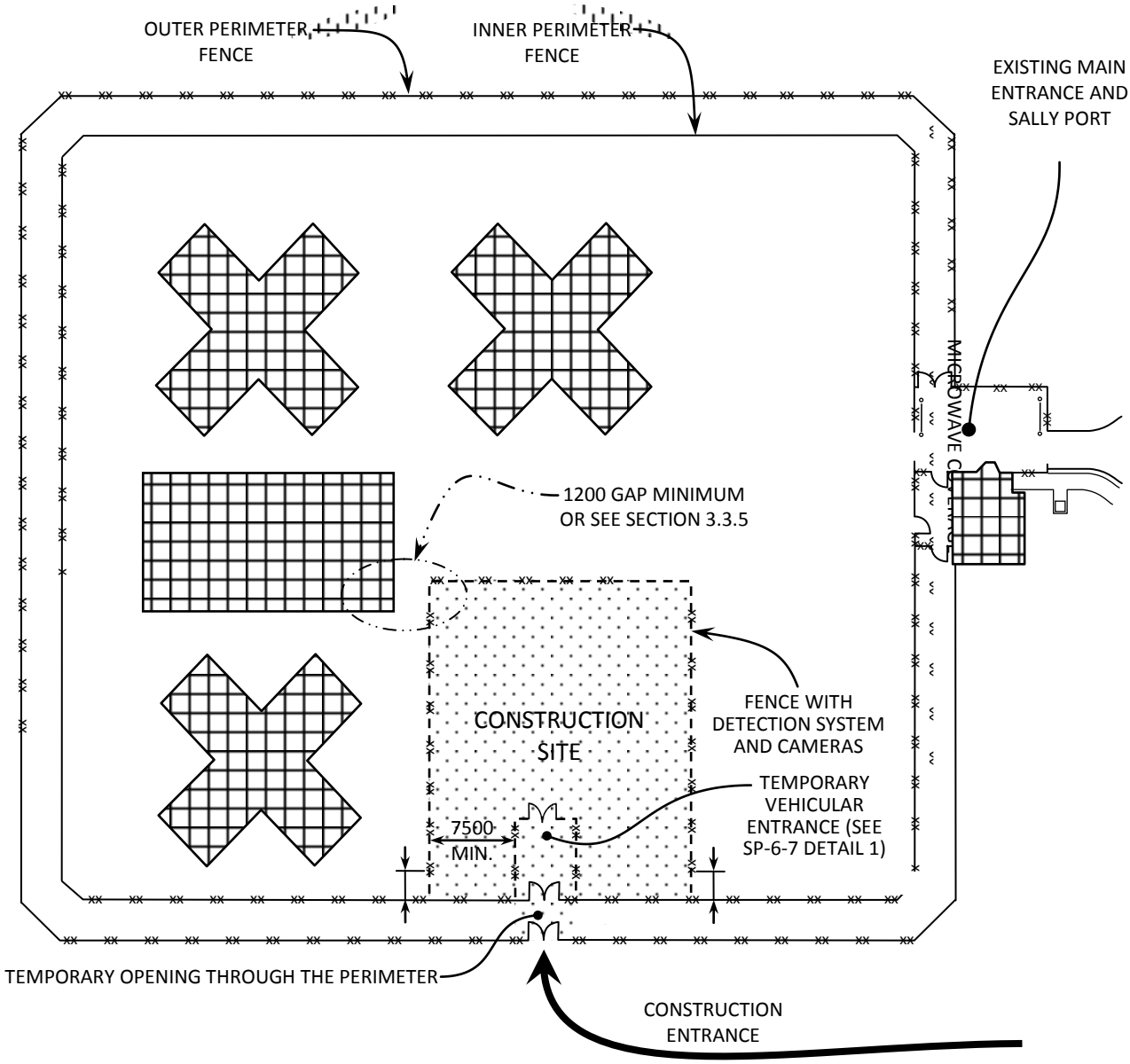
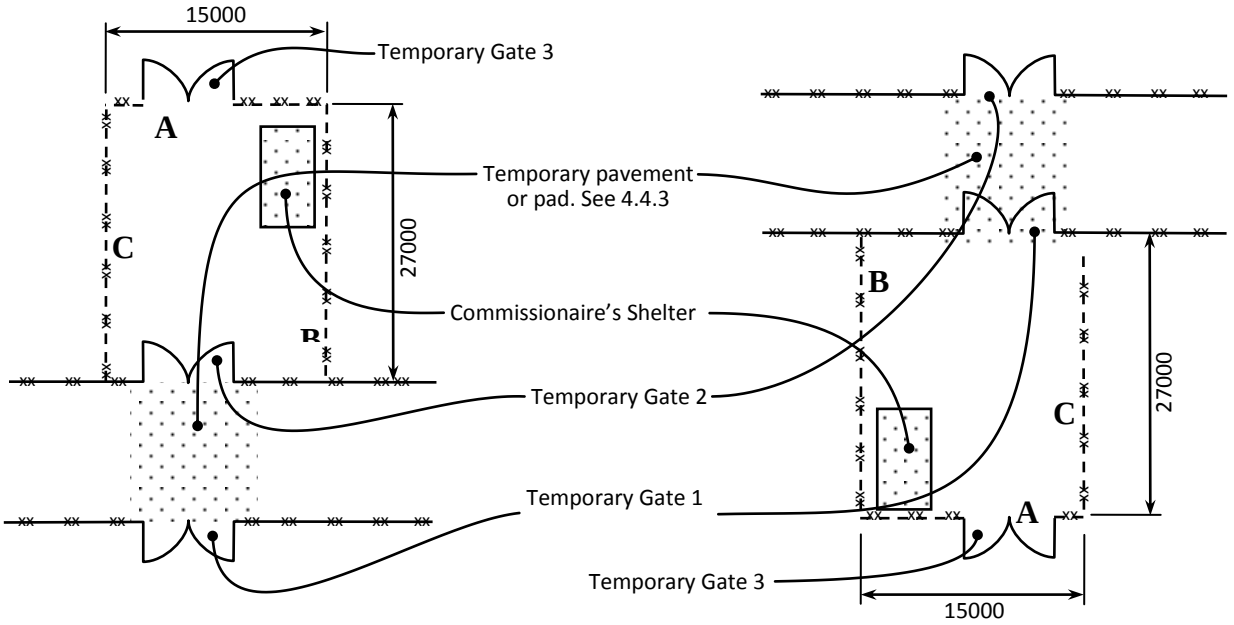


PLATE SP–6–2 – TYPE 2 AND 3 FENCE

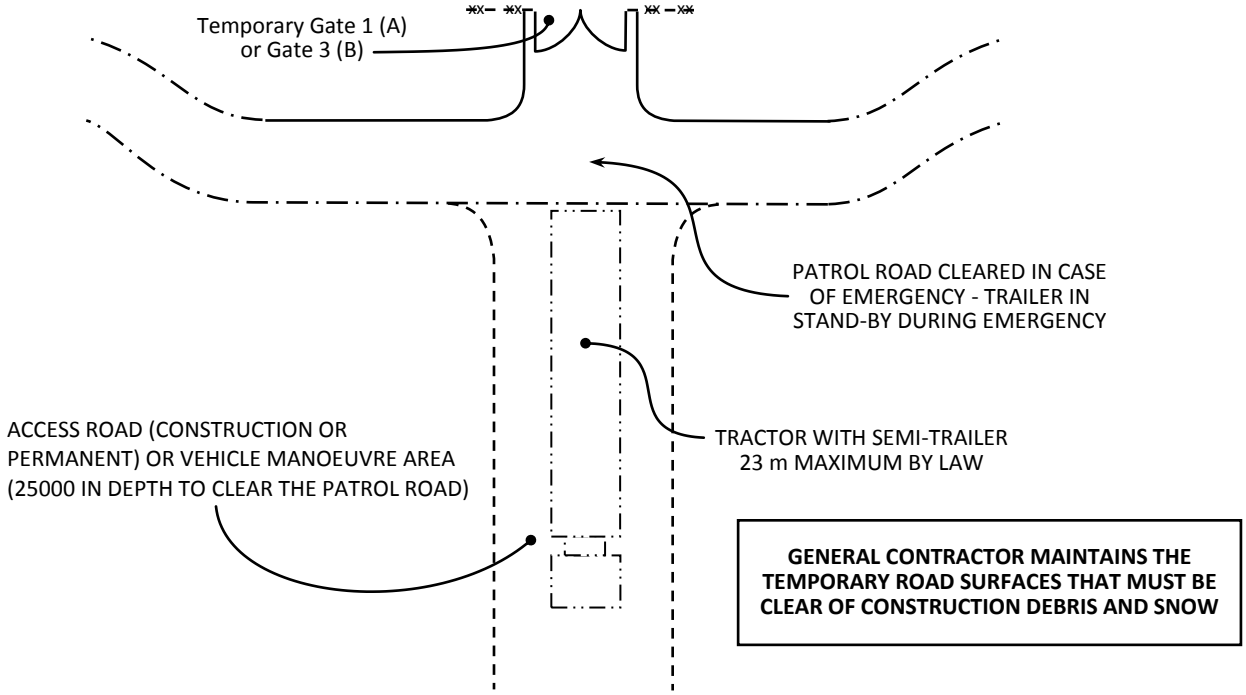
PLATE SP–6–3 – TYPE 4 FENCE





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