Public Works and Government Services Canada

Travaux publics et Services gouvernementaux Canada

RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:
Public Works and Government Services Canada
ATB Place North Tower
10025 Jasper Ave./10025 ave. Jaspe
5th floor/5e étage
Edmonton
Alberta
T5J 1S6
Bid Fax: (780) 497-3510

SOLICITATION AMENDMENT
MODIFICATION DE L'INVITATION

The referenced document is hereby revised; unless otherwise indicated, all other terms and conditions of the Solicitation remain the same.

Ce document est par la présente révisé; sauf indication contraire, les modalités de l'invitation demeurent les mêmes.

Comments - Commentaires

Vendor/Firm Name and Address
Raison sociale et adresse du fournisseur/de l'entrepreneur

Issuing Office - Bureau de distribution
Public Works and Government Services Canada
ATB Place North Tower
10025 Jasper Ave./10025 ave Jasper
5th floor/5e étage
Edmonton
Alberta
T5J 1S6

Title - Sujet Mise à niveau de la génératrice de	
Solicitation No. - N° de l'invitation EW038-150557/A	**Amendment No. - N° modif.** 002
Client Reference No. - N° de référence du client PWGSC EW038-150557	**Date** 2014-08-22
GETS Reference No. - N° de référence de SEAG PW-$PWU-201-10233	
File No. - N° de dossier PWU-4-37076 (201)	**CCC No./N° CCC - FMS No./N° VME**
Solicitation Closes - L'invitation prend fin **at - à 02:00 PM** **on - le 2014-09-11**	**Time Zone** **Fuseau horaire** Mountain Daylight Saving Time MDT
F.O.B. - F.A.B. **Plant-Usine:** ☐ **Destination:** ☐ **Other-Autre:** ☐	
Address Enquiries to: - Adresser toutes questions à: Ho (RPC), Hector	**Buyer Id - Id de l'acheteur** pwu201
Telephone No. - N° de téléphone (780) 497-3543 ( )	**FAX No. - N° de FAX** (780) 497-3510
Destination - of Goods, Services, and Construction: **Destination - des biens, services et construction:**	

Instructions: See Herein

Instructions: Voir aux présentes

Delivery Required - Livraison exigée	**Delivery Offered - Livraison proposée**
Vendor/Firm Name and Address **Raison sociale et adresse du fournisseur/de l'entrepreneur** **Telephone No. - N° de téléphone** **Facsimile No. - N° de télécopieur**	
Name and title of person authorized to sign on behalf of Vendor/Firm (type or print) **Nom et titre de la personne autorisée à signer au nom du fournisseur/ de l'entrepreneur (taper ou écrire en caractères d'imprimerie)** **Signature** **Date**	

Canada

Reportez-vous au document anglais

The following change(s) to the tender documents are effective immediately, and will form part of the contract documents:

1. GENERAL

1.1	The Bidding Documents are amended as noted in this Addendum, which consists of one (1) page and the following attachments: 1. Revised Table of Contents 2. Section 01 35 43 – Environmental Procedures 3. Section 02 41 13 – Selective Site Demolition 4. Section 03 21 00 – Reinforcing Steel 5. Section 03 30 00 – Cast In Place Concrete 6. Section 05 12 00 – Structural Steel Framing 7. Section 31 05 16 – Aggregate Materials 8. Section 31 23 33 01 – Excavation, Trenching and Backfilling
1.2	This Addendum is issued prior to bid closing to incorporate revisions noted herein. Include in the Bid price all such revisions which will become part of the Work. Perform all such Work in accordance with the Contract Documents.
1.3	All affected drawings, schedules and panel changes shall be reflected in final as-built and manual submissions.

2. CHANGES TO PREVIOUS ADDENDA

2.1	N/A

3. CLARIFICATIONS

3.1	N/A

4. SPECIFICATIONS

4.1.	Table of Contents: 1. See attached revised Table of Contents.
4.2.	Section 01 35 43 – Environmental Procedures: 1. See attached new section.
4.3.	Section 02 41 13 – Selective Site Demolition: 1. See attached new section.
4.4.	Section 03 21 00 – Reinforcing Steel: 1. See attached new section.
4.5.	Section 03 30 00 – Cast in Place Concrete: 1. See attached new section.
4.6.	Section 05 12 00 – Structural Steel Framing: 1. See attached new section.
4.7.	Section 05 50 00 – Metal Fabrications: 1. Delete section.
4.8.	Section 31 05 16 – Aggregate Materials: 1. See attached new section.
4.9.	Section 31 23 33 01 – Excavation, Trenching and Backfilling: 1. See attached new section.

5. DRAWINGS

5.1	N/A

End of Addendum Number 1.

Part 1 General

1.1 FIRES

.1 Fires and burning of rubbish on site not permitted.

1.2 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site unless approved by Departmental Representative.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.3 DRAINAGE

.1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.

.2 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

.3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

1.4 SITE CLEARING

.1 Minimize stripping of topsoil and vegetation.

1.5 POLLUTION CONTROL

.1 Maintain temporary erosion and pollution control features installed under this contract.

.2 Control emissions from equipment and plant to local authorities emission requirements.

.3 Prevent sandblasting and other extraneous materials from contaminating air beyond application area, by providing temporary enclosures.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 Department of Justice Canada (Jus).

.1 Canadian Environmental Assessment Act (CEAA), 1995, c. 37.

.2 Canadian Environmental Protection Act, 1999 (CEPA), c. 33.

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

.1 Material Safety Data Sheets (MSDS).

.3 Transport Canada (TC).

.1 Transportation of Dangerous Goods Act, 1992 (TDGA), c. 34.

1.2 DEFINITIONS

.1 Demolition: rapid destruction of building following removal of hazardous materials.

.2 Hazardous Materials: dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: asbestos PCB's, CFC's, HCFC's poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.

1.3 SUBMITTALS

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

.2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Section 02 81 01 - Hazardous Materials.

.3 Shop drawings.

.1 Submit for approval drawings, diagrams or details showing sequence of demolition work and supporting structures and underpinning, where required by authorities having jurisdiction.

.4 Hazardous Materials: provide description of Hazardous Materials and Notification of Filing with proper authorities prior to beginning of Work as required.

1.4 QUALITY ASSURANCE

.1 Regulatory Requirements: ensure Work is performed in compliance with CEPA, CEAA, TDGA, and applicable Provincial/Territorial regulations.

.2 Site Meetings.

.1 Convene pre-installation meeting one week prior to beginning work of this Section in accordance with Section 01 32 17 - Construction Progress Schedule - Bar (GANTT) Chart:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building sub-trades.

.4 Review manufacturer's installation instructions and warranty requirements.

.2 Arrange for site visit with Departmental Representative to examine existing site conditions adjacent to demolition work, prior to start of Work.

.3 Hold project meetings every week.

.4 Ensure key personnel, site supervisor, project manager, subcontractor and representatives attend.

.5 Departmental Representative will provide written notification of change to meeting schedule established upon contract award 24 hours prior to scheduled meeting.

1.5 DELIVERY, STORAGE AND HANDLING

.1 Perform Work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Storage and Protection.

.1 Protect in accordance with Section 31 23 10 - Excavating, Trenching and Backfilling.

.2 Protect existing items designated to remain and items designated for salvage. In event of damage to such items, immediately replace or make repairs to approval of Departmental Representative and at no cost to Departmental Representative.

.3 Remove and store materials to be salvaged, in manner to prevent damage.

.4 Store and protect in accordance with requirements for maximum preservation of material.

.5 Handle salvaged materials as new materials.

.3 Waste Management and Disposal.

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

.2 Divert excess materials from landfill to site approved by Departmental Representative.

.3 Separate for reuse and recycling and place in designated containers steel, metal, and plastic waste.

.4 Place materials defined as hazardous or toxic in designated containers.

.5 Handle and dispose of hazardous materials in accordance with CEPA, TDGA, and Regional and Municipal regulations.

.6 Label location of salvaged material's storage areas and provide barriers and security devices.

.7 Ensure emptied containers are sealed and stored safely.

.8 Source separate for recycling materials that cannot be salvaged for reuse including wood, metal, concrete and asphalt, and gypsum.

.9 Remove materials that cannot be salvaged for reuse or recycling and dispose of in accordance with applicable codes at licensed facilities.

1.6 SITE CONDITIONS

.1 Site Environmental Requirements.

.1 Perform work in accordance with Section 01 35 43 - Environmental Procedures.

.2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.

.3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

.1 Ensure proper disposal procedures are maintained throughout the project.

.4 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers or onto adjacent properties.

.5 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authorities.

.6 Protect trees, plants and foliage on site and adjacent properties where indicated.

.2 Existing Conditions.

.1 Remove contaminated or hazardous materials as defined by authorities having jurisdiction from site, prior to start of demolition Work, and dispose of in safe manner in accordance with TDGA and other applicable regulatory requirements and Section 02 81 01 - Hazardous Materials.

1.7 SCHEDULING

.1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion.

.1 Notify Departmental Representative in writing when unforeseen delays occur.

Part 2 Products

2.1 EQUIPMENT

.1 Leave machinery running only while in use, except where extreme temperatures prohibit shutting machinery down.

Part 3 Execution

3.1 PREPARATION

.1 Inspect site 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 Notify and obtain approval of utility companies before starting demolition.

.4 Disconnect and Cap Designated Mechanical Services as required.

.1 Natural Gas Supply Lines: contact utility company to arrange for removal as directed by Departmental Representative.

.2 Sewer and Water Lines: remove in accordance with authority having jurisdiction as directed by Departmental Representative and securely plug to form watertight seal.

.3 Other Underground Services: remove and dispose of as directed by Departmental Representative.Underground Storage Tanks: remove and dispose of in accordance with CCME PN1326 and directions of Departmental Representative.

3.2 REMOVAL OF HAZARDOUS WASTES

.1 Remove contaminated or dangerous materials defined by authorities having jurisdiction, relating to environmental protection, from site and dispose of in safe manner to minimize danger at site or during disposal.

3.3 REMOVAL OPERATIONS

.1 Remove items as indicated.

.2 Do not disturb items designated to remain in place.

.3 Removal of Pavements, Curbs and Gutters:

.1 Square up adjacent surfaces to remain in place by saw cutting or other method approved by Departmental Representative.

.2 Protect adjacent joints and load transfer devices.

.3 Protect underlying and adjacent granular materials.

.4 Prevent contamination with base course aggregates, when removing asphalt pavement for subsequent incorporation into hot mix asphalt concrete paving,

.5 Excavate at least 300 mm below pipe invert, when removing pipes under existing or future pavement area.

.6 Stockpile topsoil for final grading and landscaping.

.1 Provide erosion control and seeding if not immediately used.

.7 Disposal of Material.

.1 Dispose of materials not designated for salvage or reuse on site in accordance with governing regulations.

.8 Backfill.

.1 Backfill in areas in accordance with Section 31 23 33 01 - Excavating, Trenching and Backfilling.

3.4 STOCKPILING

.1 Label stockpiles, indicating material type and quantity.

.2 Designate appropriate security resources/measures to prevent vandalism, damage and theft.

.3 Locate stockpiled materials convenient for use in new construction to eliminate double handling wherever possible.

.4 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end markets, and which does not impede disassembly, processing, or hauling procedures.

3.5 REMOVAL FROM SITE

.1 Remove stockpiled material as directed by Departmental Representative, when it interferes with operations of project.

.2 Remove stockpiles of like materials by alternate disposal option once collection of materials is complete.

.3 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.

3.6 RESTORATION

.1 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work.

.2 Use soil treatments and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

3.7 CLEANING

.1 Remove debris, trim surfaces and leave work site clean, upon completion of Work

.2 Use cleaning solutions and procedures which are not harmful to health, are not injurious to plants, and do not endanger wildlife, adjacent water courses or ground water.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 CAN/CSA-A23.1-09/A23.2-09 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-04 (R2010) - Design of Concrete Structures.

.3 CAN/CSA-G30.18-09 – Carbon Steel Bars for Concrete Reinforcement.

.4 CAN/CSA-W186-M1990 (R2012) - Welding of Reinforcing Bars in Reinforced Concrete Construction.

.5 American Concrete Institute (ACI) Detailing Manual 2004-(SP-66).

.6 Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice, 28th Edition.

1.2 SUBMITTALS

.1 Prepare and submit shop drawings, consisting of bending, cutting and placing drawings for all reinforcing steel.

.1 Generally, placing to be in accordance with the ACI Manual of Standard Practice for Detailing Reinforcing Concrete Structures and the CRSI Manual of Standard Practice for Placing of Reinforcing Bars.

.2 Structural drawings take precedence over placement drawings and bar schedules.

1.3 INSPECTION

.1 The consultant's general review are undertaken to inform the Owner of the Contractor's performance, and in no way shall augment the Contractor's quality control procedures or relieve him of his contractual responsibilities.

.2 Advise the Consultant a minimum of 24 hours prior to placement of concrete. Failure to give adequate notice may cause Consultant to classify the work as defective.

.3 Concrete shall not be placed until the reinforcement and its placement has been reviewed by the Consultant.

.4 Correct defects and irregularities to the satisfaction of the Consultant, at no cost to the Owner.

1.4 DELIVERY, STORAGE AND CLEANING

.1 Reinforcing steel, welded wire fabric, and accessories shall be delivered, handled and stored as required to prevent contamination and damage.

.2 All steel reinforcement, before being placed, shall be cleaned of loose scaly rust, dirt, oil, paint and other coatings that may be detrimental.

Part 2 Products

2.1 MATERIALS

.1 Reinforcing bars: billet steel deformed bars, Grade 400R 400MPa (60 ksi) yield strength, conforming to CAN/CSA-G30.18-M92 (R2007).

.2 Weldable reinforcing bars: weldable low alloy steel deformed bars, Grade 400W 400MPa (60 ksi) yield strength, conforming to CAN/CSA-G30.18-M92 (R2007).

.3 Welded steel wire fabric: sizes and gauges are to be as shown on the structural drawings, flat sheets only.

.4 Supports: wire chairs, bolsters, hanger bars, spirals, stirrups and plastic spacers of size and strength to adequately support reinforcing in required position.

.5 Tie wire: annealed wire, 1.5mm (16ga) or heavier.

2.2 FABRICATION

.1 Fabricate reinforcing to CAN/CSA-A23.1/A23.2-04.

.2 Reinforcing bars shall be cold bent. Reinforcing bars shall not be straightened or re-bent without written approval of the Consultant.

.3 The location of reinforcement splices not shown on the drawings shall be approved by the Consultant and shall, for beams and slabs, be away from points of maximum stress in the steel.

2.3 DETAILING

.1 Conform to CAN/CSA-A23.1-04 and CAN/CSA-A23.3-04 for all hooks, bends, laps and similar details not specifically noted.

.2 Lap bottom bars at support locations and top bars at mid-spans, unless noted otherwise on drawings.

.3 Provide (24") long (each leg) corner bars to match all horizontal bars at all wall and grade beam corners and intersections.

.4 Provide 4 extra 15M diagonal corner bars around holes larger than 100 mm (4") in floor slabs and walls. Corner bars shall be 1.5 times length of shortest side of hole or minimum 750 mm (30") long.

.5 Provide 15M bar each face for holes larger than 1000 mm (40") in walls.

.6 Cover electrical conduit, ductwork or piping buried in slabs with 600 mm (24") wide strip of 152 x 152 x MW13.3 x MW13.3 (6x6x8/8) welded wire fabric. If principal slab reinforcement is placed above conduit then place 600 mm (24") strip under conduit. Position of reinforcing steel takes precedence over conduit, ductwork or piping.

Part 3 Execution

3.1 PLACING

.1 Place reinforcement within a tolerance of 6 mm (1/4") for slab steel and 12 mm (1/2") for other steel. Locate bends and end of bars within 50 mm (2”) of specified location.

.2 Provide minimum concrete cover to reinforcing steel in accordance with CAN/CSA-A23.1-04 and as indicated herein or on drawings:

.1 Cast against and permanently exposed to earth 76mm (3").

.2 Interior faces 40 mm (1 ½").

.3 Where a structural concrete member is required to have a fire resistance rating, provide minimum concrete cover to reinforcing steel in accordance with Appendix D of the Alberta Building Code, except where indicated otherwise on drawings.

.4 Provide 10M "U" spacers at 3 m (10'-0") on centre horizontally and 1.5 m (5'-0") on centre vertically to hold wall reinforcing mats in position.

.5 Provide non-corrosive and non-staining reinforcing steel supports at surfaces where concrete will be exposed.

.6 Set all wall and column dowels prior to placing concrete so that each dowel is maintained in its correct position. Do not insert dowels in freshly placed concrete unless approved by the Consultant.

3.2 WELDING

.1 Any welding of reinforcing steel shall be in accordance with CAN/CSA-W186-M1990 (R2007).

.2 No welding of reinforcing steel shall occur without approval of the Consultant.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 CAN/CSA-A23.1-09/A23.2-09 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.

.2 CAN/CSA-A23.3-04 (R2010) - Design of Concrete Structures.

.3 CAN/CSA-A3000-08 (Consolidation) - Cementitious Materials Compendium.

.4 ASTM D1751-04 (2008) - Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

.5 CAN/CGSB-51.33-M89 - Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.

1.2 TESTING

.1 Testing of concrete and concrete materials will be carried out by testing agency as approved by the Consultant. Provide access for such testing.

.2 It is the Contractor's responsibility to call for the specified number of tests at the appropriate time. Provide and maintain facilities for the temporary storage of concrete test cylinders.

.3 Any additional testing, or retesting, required as a result of materials not meeting the specifications is to be paid for by the Contractor.

.4 Perform a complete test set for each 50 cubic meters (65 cubic yards) of concrete, or fraction thereof, and in any event, not less than one test set for each type of concrete each day it is used.

.5 Each test set, conforming to CAN/CSA-A23.2, is to consist of:

.1 Slump test;
.2 Air content test;
.3 Temperature measurement and
.4 Not less than three (3) moulded specimens for compression testing. Test one (1) at seven (7) days and two (2) at 28 days.

.6 Provide the Consultant with copies of all concrete test results at regular intervals. Reports are to include the following:

.1 Project name;
.2 Date of sampling;
.3 Air temperature at time of sampling;
.4 Concrete temperature;
.5 Concrete supplier;
.6 Exact location on the structure at which the concrete test set is taken;
.7 Slump;
.8 Air content;
.9 Method of curing;
.10 Cylinder strength.

.7 When air temperature is below 0°C (32°F) during placement, or is likely to fall below 0°C (32°F) within 24 hours after placement, make two (2) additional specimens for compression testing. Field cure those two (2) cylinders in a manner which simulates as closely as possible the curing of the placed concrete.

Part 2 Products

2.1 CONCRETE MATERIALS

.1 Portland Cement: conforming to CAN/CSA-A3000-03 (Consolidation), type as per Concrete Mix Schedule.

.2 Water: conforming to CAN/CSA-A23.1.

.3 Aggregates: conforming to CAN/CSA-A23.1, containing no shale, sizes as per Concrete Mix Schedule.

.4 Air Entraining Admixture: conforming to CAN/CSA-A23.1, percentage as per Concrete Mix Schedule.

.5 Chemical Admixtures: Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.

2.2 ACCESSORY MATERIALS

.1 Concrete Bonding Agent: Approved proprietary material to be applied directly to concrete or mixed with cement and sand before application.

.2 Concrete Curing Agent: conforming to CAN/CSA-A23.1.

.3 Polyethylene Vapour Barrier: 150 micrometre (6mil) polyethylene film, Type 1, conforming to CAN/CGSB-51.33.

.4 PVC Waterstops: extruded polyvinylchloride with ribbed flanges, 150 mm (6") x 5 m (16'-0") unless noted otherwise.

.5 Edge Joint Filler: Bituminous impregnated fibreboard, 12mm (1/2”) thick, conforming to ASTM D1751.

.6 Grout: Non-shrink, non-metallic dry pack or flowable, 35MPa (5 ksi) compressive strength at 28 days.

.7 Control Joint Sealant: Cold-applied rubberized-asphalt sealer, 'W.R. Meadows' #158, or equivalent.

2.3 MIX DESIGN

.1 Use ready-mix concrete conforming to CAN/CSA-A23.1 and these specifications. Site-mix concrete is permitted for placements not exceeding 1 cubic metre (1.5 cubic yards) and for core-filling masonry and bond beams.

.2 Concrete shall be Normal Weight with a unit weight of 23.6 kN/m³ (150 pcf).

.3 No Calcium Chloride, in any form, is permitted in any concrete mix without the written approval of the Engineer.

.4 Cement: Concrete Type and Strength for concrete in contact with soil are to be confirmed with Geotechnical Engineer.

.1 Type GU: General Use.

.5 Curing: Concrete Placing and Curing shall not be carried out in temperatures lower than 5°C (40°F) without protective measures.

.6 The variation of minimum 28 day compressive strength shall be within 15%.

.7 Tolerance in slump shall be 20mm (3/4") for specified slumps less than 75mm (3"), and 30mm (1-1/8") for slumps of 75mm (3") and greater.

2.4 CONCRETE MIX SCHEDULE

Component	Min. Comp. Strength	Type	Maximum Aggregate Size	Water/ Cement Ratio	Slump	Air Content	Curing Type	Exposure Class
Concrete Slab	25 MPa	GU	20mm	0.55	50mm	None	1	-

Part 3 Execution

3.1 EXAMINATION AND PREPARATION

.1 Ensure that compacted fill has been placed to meet specified requirements, and that underground services have been installed, inspected, tested and approved.

.2 Before concrete is placed, all reinforcing steel, accessories and hangers, inserts, conduits, sleeves, outlets, etc. must be securely tied in place and reviewed.

.3 All dirt, clips, sawdust, water, snow, ice and other foreign matter must be removed from forms and reinforcing steel.

.4 When experience or weather records indicate adverse temperatures are probable, plan for protecting all concrete at early ages is to be established and the necessary special equipment and materials are available on site before adverse temperatures occur.

3.2 CONDUITS, PIPES, OPENINGS AND INSERTS

.1 Electrical conduit and other pipes embedded in the concrete are not to be of a material harmful to the concrete and are to be:

.1 Not be a larger outside diameter than one-third (1/3) the thickness of the slab in which they are embedded;

.2 Not be spaced closer than 3 diameters on centre unless otherwise shown on the Drawings;

.3 Have a concrete covering of not less than 25mm (1").

.4 Be so installed that it will not require cutting, bending or displacement of the reinforcement or impair the structural strength of the system.

.2 Provide and cast in all sleeves, frame-outs, inserts, and fastening devices, including reglets and nailing strips, unless otherwise specified.

.3 Anchor bolts, nuts and washers for structural steel and precast concrete shall be supplied and installed by the Contractor. Anchor bolts shall be set before concrete placement in accordance with approved shop drawings. Other anchoring devices for structural steel shall be supplied by the steel trades and installed by the Contractor in accordance with approved shop drawings.

.4 The Contractor shall cooperate will all trades who are placing inserts, bolts, sleeves, hangers, conduits, reglets, nailers, etc.. Contractor shall notify other trades sufficiently in advance to ensure that provision is made for openings, inserts and fastenings.

.5 Costs for cutting, coring and inserts in concrete for installation of sleeves, inserts, bolts, conduits, etc. not installed prior to concrete placement shall be at the cost of the Trade requiring the sleeves, inserts, bolts, conduits, etc..

.6 Contractor shall grout all openings or sleeves in the concrete after the completion of work by other Trades.

3.3 PLACING CONCRETE

.1 Place concrete in conformance with the requirements of CAN/CSA-A23.1.

.2 The time lapse between the introduction of cement into the concrete mixes and final placement of the concrete into the forms shall not exceed 120 minutes (2 hours).

.3 Conveying and placing equipment is to be such that when concreting has started, the depositing of concrete will be at such a rate and of such sequence that the concrete is at all times sufficiently plastic to ensure proper bonding of successive layers or panels.

.4 Equipment and tools are to be kept free from hardened concrete and foreign material and is to be cleaned at frequent intervals.

.5 Concrete is to be placed in the forms as close as it is practical to its final position to avoid segregation due to re-handling or flowing.

.6 To prevent segregation, the vertical height of free fall of concrete is not to exceed 1.5m (5'-0"). For falls of greater than 1.5m (5'-0"), or if segregation occurs, chutes and spouts designed to prevent segregation of concrete are to be used.

.7 While concrete is being placed it is to be consolidated thoroughly and uniformly by means of tamping, hand tools, vibrators or finishing machines to secure a dense, homogeneous structure, close bond with reinforcement and with smooth formed surfaces. Internal vibrators are to be used whenever practical.

.8 Internal vibrators are to be applied at the point of deposit in the areas of freshly placed concrete, allowed to sink by their own weight in the concrete until they penetrate into the previous layer of concrete. They are to be withdrawn immediately at the same speed at which they sank, moved about 300mm (12") to a new location and the process repeated. Extreme care is to be taken to ensure that internal type vibrators do not disturb the reinforcing steel or the forms.

.9 Place concrete as a continuous operation stopping only at construction joints indicated on the drawings or as follows: At centre of span of suspended slabs, beams and joists; in walls and columns immediately above or below floor construction; at centre of steel beam that supports concrete slab. The Consultant must approve all construction joint locations and may, at his discretion, require keys, mortises or extra reinforcing to be provided by the Contractor at construction joints not shown on the drawings.

3.4 SLAB CONSTRUCTION

.1 The tops of all floor slabs, including slabs on grade, are to be brought to an even, level or sloping surface as indicated of the Drawings and steel trowel finished to a tolerance of 12mm (1/2") in 3.0m (10'-0") dimension and ±12mm (1/2") overall.

.2 Maintain topping slab thickness as indicated on Drawings. Thickness of topping are not be modified to facilitate finishing to specified tolerances, or to compensate for cambers in supporting structural members.

3.5 COLD WEATHER PROTECTION REQUIREMENTS

.1 Cold weather protection requirements shall be as per CAN/CSA-A23.1, except that the following minimum requirements must also be met:

.1 Protection Against Early Frost Damage: Effective means is to be provided for maintaining the temperature of the concrete in place above 10°C (50°F) for a minimum period of 3 days or until sufficient hydration has occurred to protect the concrete from frost damage.

.2 Protection for Structural Safety: If, subsequent to the above period of protection, the ambient conditions are not likely to be favourable for continuous strength development, the protection period is to be extended until the concrete has achieved sufficient strength for structural safety.

.3 Protection for Strength and Durability: When subsequent ambient conditions are not conductive to continue during and strength development, the protection period is to be extended until a total period of 7 days at temperatures above 10°C (50°F) has been attained.

.4 Concrete Temperature: When the air temperature is at or below 5°C (40°F) or when there is a probability of its falling to that limit within 24 hours of placing, the temperature of the concrete as placed is to be between 10°C (50°F) and 30°C (85°F).

.5 Placing: Concrete is not to be placed against any surface that is at a temperature of less than 5°C (40°F) or will lower the temperature of the concrete once placed to below 10°C (50°F).

.6 Cold Weather Protection: Protection is to be provided for newly placed concrete by means of suitable enclosures, coverings and/or adequate insulation as follows:

.1 For temperatures from 0°C (32°F) to 5°C (40°F), suitable covering plus adequate insulation.

.2 For temperatures below 0°C (32°F), suitable enclosure plus supplementary heat or adequate insulation.

.7 Heating of Enclosures: At the time of placing and during placing, concrete surfaces are to be protected by formwork or an impermeable membrane from direct exposure to the combustion gasses of heaters.

.8 Protection by Insulation: The amount of insulation required to properly cure concrete in cold weather is to be determined on the basis of the expected air temperatures and wind velocity (wind chill), the size and shape of the concrete structure and the amount of cement in the mix.

.9 Cooling After Protection: To avoid cracking of the concrete due to sudden temperature change near the end of the curing period, the protection is not to be completely removed until the concrete has cooled to the temperature differential of 15°C (60°F).

3.6 HOT WEATHER PROTECTION REQUIREMENTS

.1 Hot weather protection requirements shall be as per CAN/CSA-A23.1, except that the following minimum requirements must also be met:

.1 Job Preparation: Facilities are to be provided for protection of the concrete in place from the effects of hot and/or drying weather conditions. In extremely hot weather, the formwork, reinforcement and concreting equipment is to be protected from the direct rays of the sun, or cooled by fogging or evaporation.

.2 Concrete Temperature: When the air temperature is at or above 25°C (75°F) or when there is a probability of it rising to this temperature during the placing, special effort is to be made to maintain the temperature of the concrete as low as practical, and in no case more than 30°C (85°F).

.3 Protection From Drying: When the rate of surface moisture evaporation exceeds 0.75 kg/m²/hr, concrete shall be protected according to one or more of the following measures:

.1 dampening the subgrade prior to placing the concrete;
.2 erecting sunshades over the concrete during finishing operations;
.3 lowering the concrete temperature;
.4 covering the concrete surface with white polyethylene sheeting between the various finishing operations;
.5 beginning the concrete curing immediately after trowelling; or
.6 placing and finishing at night.

3.7 CURING

.1 Curing of concrete shall be as per CAN/CSA-A23.1, except that the following minimum requirements must also be met:

.1 All equipment needed for curing and protection of the concrete is to be on hand and ready for use before actual placing is started.

.2 The water used for curing is to be clean and free from any materials that will stain or discolour the concrete.

.3 A liquid, membrane forming curing compound may be used under circumstances where application of such compounds will not jeopardize the appearance of the concrete or the bonding of floor finishes.

.4 Wheeling, handling, piling or storing of any material over or on slabs is prohibited during the first 7 days after placing concrete.

.5 Initial Curing: Keep concrete surface continuously moist for minimum 24 hours after placement.

.6 Final Curing:

.1 Type 1 (Basic): Immediately following Initial Curing and before the concrete has dried; All exposed, non-formed surfaces are to be cured for a period of at least 3 consecutive days, at which time the temperature of the air in contact with the concrete is to be above 10°C (50°F) or for a time necessary to attain 40% of the specified strength.

.2 Type 2 (Additional): Immediately following Initial Curing and before the concrete has dried; All exposed, non-formed surfaces are to be cured for a period of at least 7 consecutive days, at which time the temperature of the air in contact with the concrete is to be above 10°C (50°F) or for a time necessary to attain 70% of the specified strength.

.3 Type 3 (Extended): Immediately following Initial Curing and before the concrete has dried; All exposed, non-formed surfaces are to be wet cured for a period of at least 7 consecutive days. The Acceptable Wet Curing Methods Are:

.1 Ponding or continuous sprinkling.

.2 Absorptive mat or fabric kept continuously wet.

.3 Continuous steam vapour mist bath not exceeding 65°C (150°F).

.4 Polyethylene sheet covering, min. 300mm (12") lapped and edges weighted.

3.8 ACCEPTANCE

.1 Where material or workmanship fails to meet the requirements of the specifications and tests, the work may be rejected by the Consultant. Rejected work shall be replaced or repaired to the Consultant's approval at no cost to the Owner.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

.1 CAN/CSA-S16-09 - Design of Steel Structures.

.2 CSA-S136-07 - North American Specification for the Design of Cold-Formed Steel Structural Members.

.3 CAN/CSA-G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.

.4 CSA-W47.1-09 - Certification of Companies for Fusion Welding of Steel.

.5 CSA-W55.3-08 - Certification of companies for resistance welding of steel and aluminum.

.6 CSA-W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding).

.7 CAN/CSA-W117.2-06 (R2011) - Safety in Welding, Cutting and Allied Processes.

.8 ASTM A325-10 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

.9 ASTM A108-07 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.

1.2 SUBMITTALS

.1 Comply with the requirements of Section 01 33 00 - Submittal Procedures.

.2 Submit shop drawings and product data prior to commencement of fabrication.

.3 Shop Drawings shall include, though not limited to, shop details and erection diagrams and shall indicate framing and grid lines, bearing and anchorage details, framed openings, accessories, schedule of materials, camber and loadings, fasteners, method of torqueing bolts, and welds using American Welding Society basic weld symbols. Shop Drawings shall be prepared under the supervision of, signed and sealed by a Professional Engineer registered in Alberta.

.4 All steel connections and splices not shown on structural drawings shall be designed, signed and sealed by a Professional Engineer currently registered in Alberta and clearly shown on shop drawings for review by the Consultant.

.5 The submission is required for the Consultant's review for compliance with the general design concept only, and shall in no way relieve the Contractor of his responsibility for the correct design, details, dimensions and site conditions.

1.3 FABRICATOR AND ERECTOR QUALIFICATIONS

.1 The fabricator will be fully qualified to meet all requirements of CAN/CSA-S16, CSA-S136 and shall be certified to all conditions of CSA-W47.1 and CSA-W55.3. Fabricator shall be certified by the Canadian Welding Bureau and shall submit verification of same at time of bid.

.2 Field and shop welding Work shall be performed throughout by certified welders.

1.4 INSPECTION AND TESTING

.1 Allow the Consultant free access to the fabrication shop and to all parts of the work at all times.

.2 Welds will be examined by a non-destructive testing method where, in the opinion of the Consultant, visual inspection is inadequate and/or inconclusive.

.3 The Consultant may reject at any time during the progress of the work a piece of material or member which he may find defective regardless of previous inspection. Components so rejected will be removed and replaced by the Contractor, at no expense to the Owner, and shall also be responsible for all delays caused by the rejection.

.4 Structural inspections as specified in Section 01 45 00 – Quality Control Procedures are to be performed at the following stages:

.1 Overall structural steel framing prior to installation of any finishes.

.2 For larger or multiple storey buildings, separate inspections will be required at different stages as laid out in contract documents.

1.5 COORDINATION

.1 Where structural steel is scheduled to be finish painted, ensure that shop paint primer is compatible with painting coats specified in Section 09 90 23 - Interior Painting and Finishing.

.2 Give to the other Sections all necessary cooperation, directions and information regarding items supplied under this Section and in particular, but not limited to, the following:

.1 Details regarding the setting of anchor bolts, strap anchors, bearing plates and other members built into the work of other Sections.

.2 Provision of holes for mechanical services where shown on the drawings, reinforced as required.

.3 General provision for holes from 9mm (3/8") to 25mm (1") diameter for bolts, etc. where shown, called for or required for the connection of the work of other Sections.

.4 Exchange shop drawings with regard to the details noted above with relevant Sections to ensure coordination of same. Locate holes so as to avoid any appreciable reduction in the strength of the members. Do not cut holes through steel members in the field for any reason until their location has been individually approved by the Consultant. All approved field cutting shall be done as part of the work of this Section.

1.6 PROTECTION

.1 Take all necessary precautions to protect sections of the structure existing or previously erected structures at the time erection commences.

.2 Protect architecturally exposed steel during fabrication, handling, shipping, storage and erection to prevent damage to surfaces by marking, bending, denting and soiling with grease, oil, weld, flux and other foreign materials.

Part 2 Products

2.1 MATERIALS

.1 Provide structural steel to CAN/CSA-G40.20/G40.21 with the following grades:

.1 Rolled Structural Steel 'W-Sections': Grade 350W.

.2 Hollow Structural Steel Sections: Grade 350W, Class C.

.3 Structural Bars and Plates: Grade 300W.

.2 Bolts: to ASTM A325 high-strength bolts including suitable nuts and plain hardened washers.

.3 Shear Stud Connectors: to ASTM A108, minimum tensile strength of 400MPa (58 ksi).

.4 Shop Paint Primer: to CAN/CGSB-1.105-M91.

2.2 FABRICATION

.1 Fabricate structural steel in accordance with CAN/CSA-S16 and CSA-S136.

.2 All fabricated units shall be straight and true, and without sharps kinks or bends. Camber steel members as indicated on drawings.

.3 Shop or field connections are to be bolted with high strength bolts or welded, with due regard for location and appearance.

.4 Prepare steel work for attachment of other work including, but not limited to, bolt holes, anchor holes, anchor rods or brackets, clips and/or similar attachments. Cut and cope members to provide clearances for adjacent work incorporated in construction and to retain lines of finishes.

.5 All hollow structural sections are to be closed airtight with welded endplates and/or cap and base plates.

.6 Do not splice any structural members without written consent of the Consultant.

.7 All steel shall be thoroughly cleaned of all loose mill scale, loose rust, oil or dirt.

.8 Remove all marks and surface imperfections from architectural finish surfaces exposed to view and refinish to match surrounding surfaces.

.9 Chip and grind all welds where weld is visible in completed structure.

.10 The Consultant may reject the work if the work is visually obtrusive due to poor welding, misalignment, lack of fit, surface blemishes or damage where the work is visible in the completed structure.

2.3 SURFACE PREPARATION AND SHOP PRIMING

.1 Where structural steel is scheduled to be shop primed, clean surfaces of dirt and other foreign matter in accordance with SSPC-SP3 – Power Tool Cleaning.

.2 Where structural steel is scheduled to be shop primed and finish painted, clean surfaces of dirt and other foreign matter in accordance with SSPC-SP6 – Commercial Blast Cleaning.

.3 Where structural steel is scheduled to be site fireproofed, clean surfaces of dirt and other foreign matter in accordance with SSPC-SP3 – Power Tool Cleaning and cleaned of oil and grease with solvents cleaners. Do not prime.

.4 Clean welds by wire brushing and wash down with clean water to remove the chemical residues left by the electrodes.

.5 Apply shop paint primer in accordance with CAN/CSA-S16 to a dry film thickness of 50 to 75 micrometers, grey colour. Ensure compatibility of primer with architectural finishes for exposed structural steel.

.1 Shop primer shall be applied to:

.1 Members exposed to outside conditions,
.2 Members inside building shell,
.3 Members penetrating slabs-on-grade,
.4 Members to receive finish painting.

.2 Do not prime paint the following surfaces:

.1 Surfaces and edges to be field welded,
.2 The contact surfaces of friction type connections assembled by high strength bolts,
.3 Structural steel to receive fireproofing.

.6 After erection and connections are complete, provide a field touch-up coat of paint to all surfaces that have been scraped, chipped, cut or welded.

Part 3 Execution

3.1 ERECTION

.1 Erect structural steel in accordance with CAN/CSA-S16 and CSA-S136.

.2 Obtain Engineer's approval prior to field cutting or altering of members. Where approval is granted, such alteration shall only be performed by this sub-contractor.

.3 Field touch up shop paint primer at bolts, welds and burned or scratched surfaces. Use same primer as applied in shop.

.4 Provide necessary erection equipment, and temporary flooring as required for work of erection to ensure that it is maintained in alignment under construction and other loading, and until all other construction elements contributing to stability are in place.

.5 Report any failure of material to fit together to the Engineer before proceeding. No members shall be field modified without prior notice and approval of Engineer.

.6 Structural steel work shall be carefully located at the proper elevation and rigidly secured in place, using steel shims. All spaces under the steel shall then be filled with non-shrink pre-mix grout by the concrete contractor.

.7 The structural steel contractor shall be responsible for the design of all hooks, erection connections and handling gear.

.8 Provide welding and spatter protection to the work of other sections.

3.2 ARCHITECTURALLY EXPOSED STEEL

.1 Continuously weld field connection joints where exposed to view, and grind them smooth and flush with adjacent surface.

.2 Where bolted connections are indicated, take special care with the bolting of connections. Ensure that the connections are tightly joined.

.3 Clean field welded connections, field bolted connections, scratches and damaged shop primer in accordance with SSPC-SP3 – Power Tool Cleaning. Wash down field welded connections with clean water. Ensure removal of chemical residues left by electrodes of field-welded connections, prior to the application of touch-up primer.

.4 Within 3 hours of field surface preparation, apply 1 coat of field touch-up primer, minimum 0.05mm (2.0 mil) thick to field welded connections, field bolted connections, scratches and damaged shop primer.

.5 Do not use marking paint, crayons or other marking materials on architecturally exposed surfaces.

3.3 ERECTION TOLERANCES

.1 Comply with the tolerances specified in CAN/CSA-S16, and to the tolerances indicated:

.1 Columns from plumb: 1:1000

.2 Columns true location: ±5mm (0.20")

.3 Beam level: ±5mm (0.20")

.4 All other members:

.1 10mm (3/8") from specified location,

.2 6mm (1/4") of true level.

END OF SECTION

Part 1 General

1.1 REFERENCES

.1 American Society for Testing and Materials (ASTM)

.1 ASTM D4791-99, Standard Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.2 SAMPLES

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

.2 Allow continual sampling by Departmental Representative during production.

.3 Provide Departmental Representative with access to source and processed material for sampling.

.4 Install sampling facilities at discharge end of production conveyor, to allow Departmental Representative to obtain representative samples of items being produced. Stop conveyor belt when requested by Departmental Representative to permit full cross section sampling.

.5 Pay cost of sampling and testing of aggregates which fail to meet specified requirements.

.6 Provide water, electric power and propane to Departmental Representative laboratory trailer at production site.

1.3 WASTE MANAGEMENT AND DISPOSAL

.1 Divert unused granular materials from landfill to local facility as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Aggregate quality: sound, hard, durable material free from soft, thin, elongated or laminated particles, organic material, clay lumps or minerals, or other substances that would act in deleterious manner for use intended.

.2 Flat and elongated particles of coarse aggregate: to ASTM D4791.

.1 Greatest dimension to exceed five times least dimension.

.3 Fine aggregates satisfying requirements of applicable section to be one, or blend of following:

.1 Natural sand.

.2 Manufactured sand.

.3 Screenings produced in crushing of quarried rock, boulders, gravel or slag.

.4 Coarse aggregates satisfying requirements of applicable section to be one of or blend of following:

.1 Crushed rock.

.2 Gravel and crushed gravel composed of naturally formed particles of stone.

.3 Light weight aggregate, including slag and expanded shale.

2.2 SOURCE QUALITY CONTROL

.1 Inform Departmental Representative of proposed source of aggregates and provide access for sampling at least 4 weeks prior to commencing production.

.2 If, in opinion of Departmental Representative, materials from proposed source do not meet, or cannot reasonably be processed to meet, specified requirements, locate an alternative source or demonstrate that material from source in question can be processed to meet specified requirements.

.3 Advise Departmental Representative four (4) weeks in advance of proposed change of material source.

.4 Acceptance of material at source does not preclude future rejection if it fails to conform to requirements specified, lacks uniformity, or if its field performance is found to be unsatisfactory.

Part 3 Execution

3.1 PREPARATION

.1 Processing

.1 Process aggregate uniformly using methods that prevent contamination, segregation and degradation.

.2 Blend aggregates, if required, to obtain gradation requirements, percentage of crushed particles, or particle shapes, as specified. Use methods and equipment approved by Departmental Representative.

.3 Wash aggregates, if required to meet specifications. Use only equipment approved by Departmental Representative.

.4 When operating in stratified deposits use excavation equipment and methods that produce uniform, homogeneous aggregate.

.2 Handling

.1 Handle and transport aggregates to avoid segregation, contamination and degradation.

.3 Stockpiling

.1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Departmental Representative. Do not stockpile on completed pavement surfaces.

.2 Stockpile aggregates in sufficient quantities to meet Project schedules.

.3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.

.4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

.5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.

.6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Departmental Representative within 48 h of rejection.

.7 Stockpile materials in uniform layers of thickness as follows:

.1 Max 1.5 m for coarse aggregate and base course materials.

.2 Max 1.5 m for fine aggregate and sub-base materials.

.3 Max 1.5 m for other materials.

.8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

.9 Do not cone piles or spill material over edges of piles.

.10 Do not use conveying stackers.

.11 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

3.2 CLEANING

.1 Leave aggregate stockpile site in tidy, well drained condition, free of standing surface water.

.2 Remove any unused aggregates from site.

END OF SECTION

Part 1 General

1.1 REFERENCES

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

.1 ASTM C117-04, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing.

.2 ASTM C136-05, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

.3 ASTM D422-63(2007), Standard Test Method for Particle-Size Analysis of Soils.

.4 ASTM D698-00ae1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft ;) (600 kN-m/m ;).

.5 ASTM D4318-05, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

.2 Canadian General Standards Board (CGSB)

.1 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric.

.3 Canadian Standards Association (CSA International)

.1 CAN/CSA-A3000-03, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).

.1 CSA-A3001-03, Cementitious Materials for Use in Concrete.

.2 CSA-A23.1/A23.2-04, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.

1.2 DEFINITIONS

.1 Excavation classes: two classes of excavation will be recognized; common excavation and rock excavation.

.1 Rock: any solid material in excess of 0.25 m^3 and which cannot be removed by means of heavy duty mechanical excavating equipment with 0.95 to 1.15 m^3 bucket. Frozen material not classified as rock.

.2 Common excavation: excavation of materials of whatever nature, which are not included under definitions of rock excavation.

.2 Topsoil: material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

.3 Waste material: excavated material unsuitable for use in Work or surplus to requirements.

.4 Borrow material: material obtained from locations outside area to be graded, and required for construction of fill areas or for other portions of Work.

.5 Unsuitable materials:

.1 Weak and compressible materials under excavated areas.

.2 Frost susceptible materials under excavated areas.

.3 Frost susceptible materials:

.1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.2.

.2 Table

Sieve Designation	% Passing
2.00 mm	100
0.10 mm	45 - 100
0.02 mm	10 - 80
0.005 mm	0 - 45

.3 Coarse grained soils containing more than 20 % by mass passing 0.075 mm sieve.

.6 Un-shrinkable fill: very weak mixture of Portland cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.3 SUBMITTALS

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

.2 Samples:

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

.2 Inform Departmental Representative at least 4 weeks prior to commencing Work, of proposed source of fill materials and provide access for sampling.

.3 Submit 70 kg samples of type of fill specified including representative samples of excavated material.

.4 Ship samples prepaid to Departmental Representative in tightly closed containers to prevent contamination.

1.4 QUALITY ASSURANCE

.1 Qualification Statement: submit proof of insurance coverage for professional liability.

.2 Submit design and supporting data at least 2 weeks prior to commencing Work.

.3 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Saskatchewan, Canada.

.4 Keep design and supporting data on site.

.5 Engage services of qualified professional Engineer who is registered or licensed in Province of Saskatchewan, Canadian in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.

1.5 WASTE MANAGEMENT AND DISPOSAL

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

.2 Divert excess aggregate materials from landfill to local quarry or recycling facility for reuse as directed by Departmental Representative.

1.6 EXISTING CONDITIONS

.1 Buried services:

.1 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.

.2 Prior to commencing excavation Work, notify Departmental Representative or authorities having jurisdiction, establish location and state of use of buried utilities and structures. Departmental Representative or authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.

.3 Confirm locations of buried utilities by careful test excavations.

.4 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered.

.5 Where utility lines or structures exist in area of excavation, obtain direction of Departmental Representative before removing or re-routing. Costs for such Work to be paid by Departmental Representative.

.6 Record location of maintained, re-routed and abandoned underground lines.

.7 Confirm locations of 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 to approval of Departmental Representative.

.3 Where required for excavation, cut roots or branches as approved by Departmental Representative.

Part 2 Products

2.1 MATERIALS

.1 Type 1 and Type 2 fill: properties to Section 31 05 16 - Aggregate Materials and the following requirements:

.1 Crushed, pit run or screened stone, gravel or sand.

.2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.

.3 Table:

Sieve Designation	% Passing	
	Type 1	Type 2
75 mm	-	100
50 mm	-	-
37.5 mm	-	-
25 mm	100	-
19 mm	75-100	-
12.5 mm	-	-
9.5 mm	50-100	-
4.75 mm	30-70	22-85

Sieve Designation	% Passing	
	Type 1	Type 2
2.00 mm	20-45	-
0.425 mm	10-25	5-30
0.180 mm	-	-
0.075 mm	3-8	0-10

.2 Type 3 fill: selected material from excavation or other sources, approved by Departmental Representative for use intended, unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse or other deleterious materials.

.3 Unshrinkable fill: proportioned and mixed to provide:

.1 Maximum compressive strength of 0.4 MPa at 28 days.

.2 Maximum Portland cement content of 25 kg/m ^{3} with 40% fly ash replacement: to CAN/CSA-A3000-A5, Type 10.

.3 Minimum strength of 0.07 MPa at 24 h.

.4 Concrete aggregates: to CAN/CSA-A23.1.

.5 Portland cement: Type 10.

.6 Slump: 160 to 200 mm.

Part 3 Execution

3.1 SITE PREPARATION

.1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.

.2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13 - Selective Site Demolition.

3.2 PREPARATION/PROTECTION

.1 Protect existing features in accordance with Section 01 56 00 - Temporary Barriers and Enclosures and applicable local regulations.

3.3 STRIPPING OF TOPSOIL

.1 Begin topsoil stripping of areas as directed by Departmental Representative after area has been cleared of brush, weeds, grasses and removed from site.

.2 Strip topsoil to depths as directed by Departmental Representative.

.1 Avoid mixing topsoil with subsoil where textural quality will be moved outside acceptable range of intended application.

.3 Stockpile in locations as directed by Departmental Representative.

.1 Stockpile height not to exceed 2 m.

.4 Disposal of unused topsoil is to be in an environmentally responsible manner but not used as landfill as directed by Departmental Representative.

.5 Protect stockpiles from contamination and compaction.

3.4 STOCKPILING

.1 Stockpile fill materials in areas designated by Departmental Representative. Stockpile granular materials in manner to prevent segregation.

.2 Protect fill materials from contamination.

3.5 SHORING, BRACING AND UNDERPINNING

.1 Construct temporary Works to depths, heights and locations as approved by Departmental Representative.

.2 During backfill operation:

.1 Unless otherwise as indicated or as directed by Departmental Representative, remove sheeting and shoring from excavations.

.2 Do not remove bracing until backfilling has reached respective levels of such bracing.

.3 Pull sheeting in increments that will ensure compacted backfill is maintained at an elevation at least 500 mm above toe of sheeting.

.3 When sheeting is required to remain in place, cut off tops at elevations as indicated.

.4 Upon completion of substructure construction:

.1 Remove cofferdams, shoring and bracing.

3.6 DEWATERING AND HEAVE PREVENTION

.1 Keep excavations free of water while Work is in progress.

.2 Submit for Departmental Representative's review details of proposed dewatering or heave prevention methods, such as dikes, well points, and sheet pile cut-offs.

.3 Avoid excavation below groundwater table if quick condition or heave is likely to occur. Prevent piping or bottom heave of excavations by groundwater lowering, sheet pile cut-offs, or other means.

.4 Protect open excavations against flooding and damage due to surface run-off.

.5 Dispose of water in accordance with Section 01 35 43 - Environmental Procedures and in manner not detrimental to public and private property, or any portion of Work completed or under construction.

.6 Provide flocculation tanks, settling basins, or other treatment facilities to remove suspended solids or other materials before discharging to storm sewers, water courses or drainage areas.

3.7 EXCAVATION

.1 Excavate to lines, grades, elevations and dimensions as indicated.

.2 Remove concrete, asphalt paving, walks and other obstructions encountered during excavation in accordance with Section 02 41 13 - Selective Site Demolition.

.3 Excavation must not interfere with bearing capacity of adjacent foundations.

.4 Do not disturb soil within branch spread of trees or shrubs that are to remain. If excavating through roots, excavate by hand and cut roots with sharp axe or saw.

.5 For trench excavation, unless otherwise authorized by Departmental Representative in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open more than 15 m at end of day's operation.

.6 Keep excavated and stockpiled materials a safe distance away from edge of trench as directed by Departmental Representative.

.7 Restrict vehicle operations directly adjacent to open trenches.

.8 Dispose of surplus and unsuitable excavated material off site.

.9 Do not obstruct flow of surface drainage or natural watercourses.

.10 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.

.11 Notify Departmental Representative when bottom of excavation is reached.

.12 Obtain Departmental Representative approval of completed excavation.

.13 Remove unsuitable material from trench bottom to extent and depth as directed by Departmental Representative.

.14 Correct unauthorized over-excavation as follows:

.1 Fill under bearing surfaces and footings with concrete specified for footings.

.2 Fill under other areas with Type 2 fill compacted to not less than 95 % of corrected maximum dry density.

.15 Hand trim, make firm and remove loose material and debris from excavations. Where material at bottom of excavation is disturbed, compact foundation soil to density at least equal to undisturbed soil. Clean out rock seams and fill with concrete mortar or grout to approval of Departmental Representative.

3.8 FILL TYPES AND COMPACTION

.1 Use fill of types as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D698.

.1 Exterior side of perimeter walls: use Type 3 fill to subgrade level. Compact to 95% of corrected maximum dry density.

.2 Within building area: use Type 2 to underside of base course for floor slabs. Compact to 100 % of corrected maximum dry density.

.3 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill to underside of slab. Compact base course to 100 %.

.4 Place un-shrinkable fill in areas as indicated.

3.9 BEDDING AND SURROUND OF UNDERGROUND SERVICES

.1 Place and compact granular material for bedding and surround of underground services as indicated and as specified in the appropriate Sections.

.2 Place bedding and surround material in unfrozen condition.

3.10 BACKFILLING

.1 Do not proceed with backfilling operations until Departmental Representative has inspected and approved installations.

.2 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.

.3 Do not use backfill material which is frozen or contains ice, snow or debris.

.4 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.

.5 Backfilling around installations.

.1 Place bedding and surround material as specified elsewhere.

.2 Do not backfill around or over cast-in-place concrete within 24 hours after placing of concrete.

.3 Place layers simultaneously on both sides of installed Work to equalize loading.

.4 Where temporary unbalanced earth pressures are liable to develop on walls or other structures:

.1 Permit concrete to cure for minimum 14 days or until it has sufficient strength to withstand earth and compaction pressure and approval obtained from Departmental Representative or:

.2 If approved by Departmental Representative, erect bracing or shoring to counteract unbalance, and leave in place until removal is approved by Departmental Representative.

.6 Place un-shrinkable fill in areas as indicated.

.7 Consolidate and level un-shrinkable fill with internal vibrators.

3.11 RESTORATION

.1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 74 21 - Construction/Demolition Waste Management And Disposal, trim slopes, and correct defects as directed by Departmental Representative.

.2 Replace topsoil as indicated.

.3 Reinstate lawns to elevation which existed before excavation.

.4 Clean and reinstate areas affected by Work as directed by Departmental Representative.

.5 Use temporary plating to support traffic loads over un-shrinkable fill for initial 24 hours.

END OF SECTION

DIVISION 01 GENERAL REQUIREMENTS

DIVISION 02 EXISTING CONDITIONS

DIVISION 03 CONCRETE

DIVISION 05 METALS

DIVISION 07 THERMAL AND MOISTURE PROTECTION

DIVISION 09 FINISHES

DIVISION 23 HEATING, VENTILATION AND AIR CONDITIONING (HVAC)

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DRAWING LIST

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