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

SPECIFICATIONS FOR

Trent-Severn Waterway
Healey Falls Lock 15
Concrete Refacing

Project No. R.063528.001
Ref. No. COTSW 13-R03
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END

Civil Drawing Number	Title
COTSW 13-R03 - 00	Cover Page and Location Plan
COTSW 13-R03 - 101	Site Plan
COTSW 13-R03 - 102	Existing Plan and Sections
COTSW 13-R03 - 103	Existing Elevations
COTSW 13-R03 - 104	Removals and Demolition I
COTSW 13-R03 - 105	Removals and Demolition II
COTSW 13-R03 - 106	New Construction Plan, East Elevation and Details
COTSW 13-R03 - 107	New Construction West Elevation Section and Detail
COTSW 13-R03 - 108	Plan and Elevation I
COTSW 13-R03 - 109	Plan and Elevation II
COTSW 13-R03 - 110	Breastwall Sections and Detail
COTSW 13-R03 - 111	New Frame and Cover Plates for Valve Shaft Plan, Section and Detail
COTSW 13-R03 - 112	New Hydraulic Trench At Upper Gates Plan, Sections and Detail
COTSW 13-R03 - 113	Concrete Refacing Casting A and B Plans and Sections
COTSW 13-R03 - 114	Concrete Refacing Anchor Type A Detail

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This Specification covers the requirements for the furnishing of all labour, materials, tools, equipment, power plant, systems, transportation and supervision necessary to completely perform the work, as described by the drawings and the specification for the repairs to Lock 15 - Healey Falls lockstation, Trent-Severn Waterway.

.2 Description of Work

.1 The project consists of work as described below, and as detailed on the drawings and these specifications, but is not limited to the following:

.1 Providing access to the site for the conveyance of all materials and equipment. Developing staging areas and facilities in order to undertake the work. Cleaning-up staging area to satisfaction of Departmental Representative.

.2 Installing and maintaining dewatering system for the site.

.3 Designing, supplying, installing, maintaining and dismantling all scaffolding access required to complete the work, including a complete scaffold staircase to the bottom of the lock. Provide scaffolding as required to complete all repairs as indicated on drawings and described in specifications.

.4 Designing, supplying, installing, maintaining and dismantling a temporary security fence around the lock for prevention of accidental fall into the lock in compliance with applicable safety standards.

.5 Surveying and recording existing guardrail around the lock prior to removal.

.6 Removing, salvaging and re-installing existing guardrail around the lock to match prior to construction conditions.

.7 Removing, salvaging and re-installing all existing site fixtures.

.8 Removing by means of close drilling and concrete excavation existing concrete from the chamber walls, sill breast wall, copings, gate monoliths and valve shaft vertical openings as shown on drawings.

1.1 DESCRIPTION (Cont'd)

.2 (Cont'd)
.1 (Cont'd)
.9 Disposing off site all concrete debris, removed steel members and all garbage generated during construction.
.10 Supplying, installing and testing post tensioned rock anchors.
.11 Supplying, installing and testing of concrete refacing anchors.
.12 Excavating and backfilling behind lock wall coping as required to complete work.
.13 Installing concrete refacing on chamber walls, gate monoliths, copings, sill breastwall and valve shaft walls, as shown on drawings.
.14 Preparing and constructing new hydraulic trenches for future mechanization of upper gates.
.15 Removing and re-installing all embedded hardware, electrical and mechanical equipment, hydraulic lines, electrical wiring, etc. as required to complete work.
.16 Removing, and replacing steel checker plates for valve shaft openings, including embedded support frames.
.17 Removing and replacing existing trench checker plate covers as shown on drawings.
.18 Removing and re-installing expansion joint sealant, as shown on drawings.
.19 Restoring landscaping to prior construction state.
.20 Performing general clean-up to the Departmental Representative full satisfaction and approval.

1.2 LOCATION OF WORK

.1 Healey Falls Lock 15 is part of the Trent - Severn Waterway (TSW) and is located 11km north of Campbellford, in Northumberland County, in the municipality of Trent Hills, Ontario.

1.3 ACCESS TO THE SITE

.1 Take Highway 7 and get off at County Road 50 going South. Shortly after crossing Trent River, turn left on 11 Line West which leads to the lockstation at Lock 15.

1.3 ACCESS TO THE SITE (Cont'd)

.2 Existing road provide access to the lock west side only. Access to the east side is available through the existing swing bridge own by the local hydro plant. It is the Contractor's responsibility to obtain permission and negotiate terms of use if required. Existing swing bridge has been rehabilitated in accordance to CHBDC CAN/CSA-S6-00 in 2007. The Contractor shall restrict vehicular traffic over the swing bridge that exceeds loading parametres in relation to CHBDC CAN/CSA S6-00. Any damages to bridge due to work or failure to obey load restrictions shall be rectified by the Contractor at the Contractor's own expense.

.3 Within the Canal and PCA lands, access to the work, and limits of the work and staging areas, to be as shown on the plans or as directed by the Departmental Representative.
.1 Ascertain limitations and controls on movement around the site and access to the work.
.2 Maintain, and improve if required, the authorized access on the Canal lands as necessary to carry out the work.
.3 Remove any and all temporary access structures and restore the access and work areas, including site access roads, signage, barriers, posts, and displays to the original condition upon completion of the work, at the Contractor's expense, except where noted otherwise as per written documentation from the Departmental Representative.

.4 For the portion of the access by public roads, make all arrangements, obtain any required permits if applicable and confine activities to such routes and load limits of the authorities having jurisdiction.

.5 Secure the work area in an approved manner. This includes minimum 1.8m high welded wire construction fencing around the designated work site to prevent public access to any areas where construction activities occur and construction materials are stored.

.6 Provide secure coverings to all openings to prevent public access to the work areas at all times during construction.

1.4 EXISTING LOCK CONDITIONS

.1 Approximately two thirds (2/3) of the existing lock chamber has been resurfaced with approximately 200 mm thick layer of wire mesh reinforced shotcrete. Shotcrete thickness varies and extends from the top coping downwards, along the full length of the chamber walls.

.2 All lock gates shall remain in place during the length of the work unless requested by the Contractor to have them removed to facilitate the work. Note that any and all costs to remove, re-install and align the gates shall be incurred by the Contractor.

1.5 FIRE SAFETY REQUIREMENTS

.1 Comply with the National Building Code of Canada 2010(NBCC) for fire safety in construction and the National Fire Code of Canada 2010 (NFC) for fire prevention, fire fighting and life safety in building in use. Standards are to be the most recent and updated versions.

.2 Comply with Human Resources Development Canada (HRDC), Fire Commissioner of Canada (FCC) standards:
.1 No. 301: Standard for Construction Operations
.2 No. 302: Standard for Welding and Cutting
.3 No. 374: Fire Protection Standard for General Storage (Indoor and Outdoor)
.4 Retain all fire safety documents and standards on site.

.3 Welding and cutting:
.1 A fire watcher as described in FC 302 shall be assigned when welding or cutting operations are carried out in areas where combustible materials within ten (10) meters may be iginited by conduction or radiation.

1.6 STANDARDS

.1 Reference is made to OPSS, CGSB, ASTM, CSA and other national and international standards. These standards when quoted, form an integral part of and are to be read in conjunction with the specification as if reproduced herein. The latest edition is applicable, unless a dated edition is specified. In the case of conflict or

1.6 STANDARDS (Cont'd)

.1 (Cont'd) discrepency the most stringent requirements shall apply.

.2 Materials shall be new and work shall conform to the minimum applicable standards of the Canadian General Standards Board, the Canadian Standards Association, the National Building Code of Canada (NBC), ASTM, Applicable Provincial and Municipal codes, and all other national and international standards.

1.7 ABBREVIATIONS

.1 Abbreviations used are:
.1 ASTM - American Society for Testing and Materials.
.2 ACI - American Concrete Institute.
.3 ANSI - American National Standards Institute.
.4 CSA - Canadian Standards Association.
.5 CWB - Canadian Welding Bureau.
.6 JIC - Joint Industrial Conference, Hydraulic Standards for Industrial Equipment.
.7 NBC - National Building Code of Canada.
.8 CPM - Critical Path Method.
.9 CGSB - Canadian General Standards Board.
.10 CAN2, CAN3 - National Standards of Canada published by CGSB.
.11 GC - General Conditions.
.12 MNR - Ministry of Natural Resources.
.13 MOE - Ministry of the Environment
.14 OPSS - Ontario Provincial Standard Specification.
.15 TSW - Trent-Severn Waterway.
.16 PWGSC - Public Works and Government Services Canada
.17 PCA - Parks Canada Agency (Client)

1.8 DEFINITIONS

.1 Unless the context clearly indicates otherwise, the following definitions apply:
.1 Canal - the Trent-Severn Waterway.
.2 Lock - Lock 15.
.3 Plans and/or Specifications:
.1 Plans - the drawings listed in the "List of Drawings".
.2 Specification - the subject matter listed in the "List of Contents", addenda to the specification, and all relative written communications sent by the Departmental Representative to the Contractor in connection with the work.

1.8 DEFINITIONS (Cont'd)

.1 (Cont'd)
.4 Department - Public Works and Government Services Canada.
.5 Departmental Representative - PWGSC will appoint or designate a Departmental Representative for this Contract. The Contractor will be informed in writing of the designated individual(s). Should the Departmental Representative change, the Contractor will be notified in writing.

1.9 CONCRETE BOREHOLE LOGS

.1 Borings and sub-surface information, when given, is for general information and is not guaranteed.

.2 Copies of the concrete investigation reports are available upon request at:
.1 PWGSC, Heritage Canals and Engineering Works Group, Professional and Technical Services, Ontario Region, Sir Charles Tupper Building, Tower A, Floor 0, 2720 Riverside Drive, Ottawa, Ontario,K1A 0S5
.1 "Healey Falls Locks 15,16 & 17 Concrete Condition Assessment and Geotechnical Investigation Report, 2011"

.3 In the event of disagreement between the plans and specifications and recommendations made in the reports, the plans and specifications will govern.

1.10 WATER LEVELS

.1 Information on the control of water levels may be obtained from the Departmental Representative.

.2 During the non-navigation season the acceptable operating ranges are:
.1 Upstream of Lock 15: Turn basin is drawn down and dewatered during winter.
.2 Downstream of Lock 15: 160.70m to 160.85m.

.3 After October 14, which is the end of the 2013 navigation season, Canal personnel will start the draw down of the turn basin located between Lock 16 & 15. It will be the responsibility of the Contractor to install stoplogs in the lower/downstream gains of lock 15.

1.10 WATER LEVELS (Cont'd)

.4 Leakage through the stoplogs will contribute to some small flow in the lock system. The Contractor may improve the watertightness of the stoplogs with weighted plastic sheeting, burlap bags, etc, which must be removed by April 30, 2014 at the latest. The dewatering stop logs shall be removed prior to the 2014 navigation season start on May 16th or the completion date of the contract.

.5 If required, PCA may operate and maintain the bypass control gate at the lower reach of the turning basing upstream of Lock 15.

.6 Operations to start lowering the water level in the above turning basin can commence as soon as October 14th, 2013 and under normal circumstances, the complete draw down is obtained within two (2) days. This level is maintained until the end of the winter operational down time. The water level is raised in the turning basin to navigation levels starting on April 30th, 2014.

.7 A dewatering system is required to facilitate the work. Refer to Section 35 20 22 for dewatering.

.8 The Contractor is solely responsible for making his own interpretation of the data included herein.

.9 The Contractor is cautioned that, while the Crown endeavors to control the water levels within the indicated ranges it cannot be held responsible for events, or the results of events, that are not under its control.

1.11 PROTECTION OF THE WORK

.1 Protect the work from damage caused by adverse climatic conditions during the time of contract.

.2 Protect adjacent work against the spread of dust and dirt beyond the work areas.

.3 Protect operatives and other users of the site from all hazards.

1.12 MEASUREMENT FOR PAYMENT

.1 There will be no measurement of work for this section. Refer to Section 01 22 01 MEASUREMENT AND PAYMENT for details.

.2 Payment will be included in the Lump Sum Price.

PART 2 - PRODUCTS

2.1 ACCEPTANCE OF MATERIALS

.1 Where materials and equipment are specified to CSA, CGSB, ASTM, or similar standards, submit a written request to the Departmental Representative for approval of the relevant items. Include all relevant items. Do not use listed items until written approval has been provided by the Departmental Representative.

.2 Use new, unused material only, except as noted or approved by the Departmental Representative in writing.

.3 Include with each request relevant material data sheets from the manufacturer with full item details, and any other relevant documentation which will substantiate its quality, conformance and cost.

.4 Materials and equipment specified by a manufacturer's name, catalogue number or trade name with in the specifications or drawing package are intended to establish a standard of quality. Materials or equipment at least equivalent thereto may be submitted to the Departmental Representative for approval along with proof of equivalence.

.5 Cost of additional work and modifications if any to the design due to use of alternative materials shall be borne by the Contractor.

.6 Alternatives will not be considered during the tender period. Base the tender on the exact material and equipment specified, and on the design concepts shown on the drawings.

2.2 SAMPLES

.1 Be responsible for test specimens, samples and sampling. The Departmental Representative will be responsible for testing.

2.3 RECTIFICATION OF EXISTING SURFACES AND MATERIALS

.1 Repair, replace and/or refinish, to the Departmental Representative's approval, existing surfaces and items damaged or altered in connection with the work.

.2 The repaired, replaced and/or refinished items to be at least equal to those that existed immediately before damage occurred.

.3 Restore topsoil and seed at the Contractor's expense in areas which have been disturbed by the Contractor's operations under this contract and which are not covered by other items of the contract. Where disturbance is to gravelled or timber lined areas, completely restore using like materials and to the satisfaction of the Departmental Representative.

.4 Sodded and seeded areas: Refer to Section 32 94 00.

.5 Restoration of the site must occur as soon as possible after construction is completed.

2.4 GUARANTEE

.1 Guarantee the satisfactory operation of all work and apparatus installed under the Contract. Replace immediately any part which may fail or prove defective as per GC 32 without cost to the Departmental Representative, provided such failure is not due to improper usage. Guarantee to be extended where applicable when stated elsewhere in this specification.

.2 Do not construe as acceptance of defective work or of improper materials, any certificate given, payment made or partial or entire use of the equipment by the Departmental Representative. Make good at once all such defective work or materials, and the consequences therefrom, within twelve months of the date of the final certificate of completion.

.3 Do not consider this general guarantee as a waiver of any specified guarantee for any other greater length of time normally extended by manufacturers of equipment.

.4 Remain responsible for and provide all guarantees required under this specification. All guarantees including guarantees in writing

2.4 GUARANTEE (Cont'd)

.4 (Cont'd) required for specific portions of this contract must be provided by the Contractor prior to final acceptance of the work by the Departmental Representative.

.5 Before completion of work collect "All" manufacturer's guarantees and warranties and deposit with Departmental Representative.

PART 3 - EXECUTION

3.1 REQUIREMENTS OF REGULATORY AGENCIES

.1 Adhere to National, Provincial and Municipal requirements relating to the safety, health and protection of workers and the environment.

.2 Be entirely responsible for the design and adequacy of all scaffold, supports, set forms, bracing, blocking, ties, shoring, handrails, guardrails, fencing, conveyance systems, etc. used in the construction and comply with applicable Federal, Provincial and Municipal ordinances and regulations.

.3 Adhere to noise bylaws of the authority having jurisdiction.

.4 Dispose of all unwanted materials at a location off Canal lands approved by the Ontario Ministry of the Environment.

3.2 WHMIS REQUIREMENTS

.1 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage and disposal of materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada, and Health and Welfare Canada.

.2 Provide copies of all WHMIS data sheets to the Departmental Representative upon delivery of any and all materials to the site.

3.3 SCHEDULING

.1 The Contract must be completed on or by the date specified in the instruction to tenderers portion of these documents.

3.3 SCHEDULING (Cont'd)

.2 Submit the Construction Progress Schedule, (in CPM form) within five (5) days of award of Contract. Progress schedule must include the quantity of work to be accomplished within each 2 week timeframe. No progress payments will be made until an up-to-date Construction Progress Schedule is approved. Submit together with the progress schedule a cost breakdown for each lump sum payment item - the breakdown to be sufficient in detail as to permit the calculation and processing of the first and future progress payment claim amounts. Upon receipt of notice from the Departmental Representative, in writing, that the progress schedule is not approved or no longer valid, submit a revised Construction Progress Schedule within five (5) days. Submit together also with the Progress Schedule, an equipment and manpower loading schedule.

.3 After approval by the Departmental Representative, cost breakdown will be used as the basis for all progress payments. Progress payments will not be made without an approved detailed breakdown of the individual Lump Sum itemizations.

.4 When requested by the Departmental Representative, resubmit the schedule with all revisions made to show the progress of the work and to show any changes which are required to meet the approved completion dates.

.5 Take all necessary measures to complete the work within the scheduled times approved by the Departmental Representative.

.6 Do not make changes to the approved schedule, without the Departmental Representative's approval.

.7 The requirements of Section 01 33 00 apply to the Construction Progress Schedule.

.8 Carry out the work during "regular hours" Monday to Friday from 07:00 to 18:00 hours unless otherwise noted and approved in writing by the Departmental Representative.

.9 Give the Departmental Representative forty-eight (48) hours notice for any work to be carried out during "off hours".

3.4 LAYOUT OF THE WORK

.1 The Departmental Representative will locate the project, establish a bench mark, and set the initial line. The Contractor will be responsible for all other layout and control survey work, and checking plan dimensions against field measurements.

.2 Lay out the work according to the elevations and dimensions shown on the plans and verified in the field.

.3 Notify the Departmental Representative immediately of any discrepancies between field measurements and dimensions shown on the plans or reference drawings.

.4 Be responsible for rectification of errors resulting from failure to verify dimensions, elevations and other pertinent data shown on the plans and reference drawings, and from improper layout.

3.5 TEMPORARY SERVICES

.1 The Contractor will be allowed access to the power services at the Lock Station building located on the west side as approved by the Departmental Representative and within the capacity of the existing power supply at no charge to the Contractor.Contractor to verify and confirm site supply capacity during site visit. Any power requirements in excess of that which may be provided by the lock supply will be provided for by the Contractor.

.2 Make all required arrangements with utility providers in order to provide temporary light, telephone, power and water to fulfill the requirements of construction.

.3 Temporary sanitary services to be provided by the Contractor. Public washrooms shall not be used by the Contractor.

.4 Contractor to be responsible for snow removal on site for full duration of the contract to allow for proper access and limit any delays in the completion of the work starting from the intersection of 11 Line West road and Canal Road and to site. Contractor to confirm with municipal authorities regarding winter road maintenance on county road 11 Line West.

3.6 TEMPORARY FACILITIES

.1 Provide and maintain suitable storage facilities, of type and location approved by the Departmental Representative.

.2 Provide and maintain laydown/ site trailer/storage areas at a location approved by the Departmental Representative.

.3 Observe and enforce all construction safety measures required by authorities having jurisdiction.

.4 Provide and maintain necessary scaffolding, ladders and platforms to Canadian Construction Safety Code, NRCC 15562.

.5 Provide and maintain all necessary enclosures, guards, guardrails, hoardings, barricades, warning signs, flashing warning lights (for night) and similar items.

.6 Provide sufficient chemical toilet conveniences in a sanitary condition for use of all persons at the site in a location approved by the Departmental Representative.

.7 Photograph staging and work areas prior to starting work and have Departmental Representative verify. Upon completion of work return work and staging areas to a condition which existed prior to starting work.

3.7 EXAMINATION OF WORK SITE

.1 One Site visit scheduled during the tender period shall be as indicated in the instructions to tenderers. Confirmation of attendance is to be made through the Departmental Representative. No other visits will be scheduled by the Owner and, should the tenderer wish to visit the site at other times, it will be his responsibility to make the appropriate arrangements.

.2 Investigate and be fully informed as to the character and extent of the work to be performed and the difficulties involved, the facilities available for delivering, placing and operating the necessary plant and delivering and handling of materials.

.3 Examine site and conditions likely to affect work and be familiar and conversant with existing conditions.

3.7 EXAMINATION OF WORK SITE (Cont'd)

.4 Provide photographs of surrounding properties, objects and structures liable to be damaged or be the subject of subsequent claims prior to start of work.

3.8 SIGNS

.1 Provide common-use signs related to traffic control, information, instruction, use of equipment, public safety devices, etcetera, in both official languages or by the use of commonly-understood graphic symbols to the Departmental Representative's approval.

.2 No advertising will be permitted on this project.

3.9 PROTECTION OF EXISTING UNDERGROUND FACILITIES

.1 Prior to excavating, locate and expose existing underground utilities. Shore and protect (including winter protection) exposed utilities until such time that these protective devices are ordered removed by the Departmental Representative.

.2 Repair, restore and/or replace to the Departmental Representative's approval any and all utilities damaged due to the work, or activities in connection with the work.

3.10 DEPARTMENTAL REPRESENTATIVE'S SITE OFFICE

.1 Provide and maintain a secure construction site trailer/office for the use of the Departmental Representative complete with:
.1 Equipped with electric power, adequate lighting, 4 electrical outlets, adequate heating, cooling and ventilation, desk, 900 mm x 3000 mm reference table, 4 chairs, 1 drafting stool, 2 lockable 4-drawer filing cabinets, and active telephone land line and fax machine; not less than 25 square metres in floor area.

.2 Office to be of sound, lockable, insulated, weather-proof construction.

.3 Pay all costs, including heating, lighting and installation.

.4 The office is to remain the property of the Contractor.

3.11 CONTRACTOR'S OFFICE

.1 Provide an office at the site location, open during regular working hours and large enough to accommodate site meetings for up to ten (10) people.

.2 Site office can be a shared unit for both the Contractor and Departmental Representative if allotted space requirements are met for both.

3.12 EXPLOSIVES

.1 Do not use explosives.

3.13 CLEAN-UP

.1 Clean and tidy the work area on a daily basis and permit no undue amounts of debris, trash and/or garbage to accumulate.

.2 Rubbish, debris and garbage from all construction activities is to be removed off site on a weekly basis.

.3 At the completion of the work, remove all surplus materials, tools, plant, rubbish and debris and dispose of them in an approved manner off Parks Canada property.

.4 Clean areas under Contract to a condition at least equal to that previously existing and to the approval of the Departmental Representative.

3.14 TAXES

.1 Pay all taxes properly levied by Law (including Federal, Provincial, and Municipal).

3.15 FEES, PERMITS CERTIFICATES

.1 Pay all fees and obtain all permits. Provide authorities with plans and information for acceptance certificates. Provide inspection certificates as evidence that work conforms with requirements of authority having jurisdiction.

3.16 TESTING SERVICES

.1 The Departmental Representative will appoint and pay for costs of inspection and testing services, unless indicated otherwise.

3.16 TESTING SERVICES (Cont'd)

.2 Provide safe working areas and assist with testing procedures, including provisions for materials or services and co-ordination, as required by testing agency and as authorized by the Departmental Representative.

.3 Where tests indicate non-compliance with specifications, Contractor to pay for initial test and all subsequent testing of work to verify acceptability of corrected work.

PART 4 - DOCUMENTS

4.1 CONTRACT DOCUMENTS

.1 Drawings and Specifications are complementary, items shown or mentioned in one and not the other are deemed to be included in the Contract work.

.2 The Contractor will be responsible for printing/duplicating any required drawings or specifications for:
.1 Suppliers;
.2 Sub-contractors;
.3 On-site drawings & specifications;
.4 Project record drawings.

4.2 DOCUMENTS REQUIREMENTS

.1 Maintain at the job Site, one copy of the following:
.1 Contract Drawings,
.2 Specifications,
.3 Addenda,
.4 Change orders,
.5 Other modification documents,
.6 Field test reports,
.7 Copy of approved work schedule (to be keep up to date),
.8 Manufacturer's' installation and application instructions,
.9 Notice of Project issued by the Ministry of Labour,
.10 All items required to be maintained on site as per Section 01 35 29,
.11 Site Specific Safety Plan,
.12 Environmental Protection Plan,
.13 Waste Management Plan.

PART 5 - ENVIRONMENTAL CONSIDERATIONS

5.1 FIRES

.1 Fires and burning of rubbish or any material on site is not permitted.

5.2 WASTE DISPOSAL

.1 Do not bury rubbish and waste materials on site.

.2 Do not dispose of waste or volatile materials, such as mineral spirits, oils or paint thinner on site.

.3 All waste described as subject to Regulation 309, Environmental Act, must be transported with a valid "Certificate of Approval for a Waste Management System" to a site approved to accept the waste.

.4 Do not allow any materials to enter the waterway. Provide, as necessary, silt traps or confinement/sedimentation areas where siltation can be controlled.

.5 Confirm wash-out area location with the Departmental Representative.

5.3 ENVIRONMENTAL PROTECTION PLAN

.1 Submit Site Specific Environmental Protection Plan within seven (7) days after date of Notice to Proceed and prior to commencement of work. Environmental Plan must include outline of how mitigation measures will be satisfied.

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 This section covers the measurement of work for payment purposes, and the scope of work included in the pay items in the Unit Price Table.

1.2 APPLICATIONS FOR PROGRESS PAYMENT

.1 Make applications for payment on account as provided in Agreement as work progresses.

.2 Date applications for payment last day of payment period and ensure amount claimed is for value, proportional to amount of Contract, of Work performed and products delivered to place of work at that date.

.3 Submit to Departmental Representative, at least fourteen (14) days before first application for payment. Schedule of values for parts of Work, aggregating total amount of Contract Amount, so as to facilitate evaluation of applications for payment.

1.3 SCHEDULE OF VALUES

.1 Make schedule of values out in such form and supported by such evidence as Departmental Representative may reasonably direct and when accepted by Departmental Representative, be used as basis for applications for payment.

.2 Include statement based on schedule of values with each application for payment.

.3 Support claims for products delivered to place of work but not yet incorporated into work by such evidence as Departmental Representative may reasonably require to establish value and delivery of products.

1.4 PREPARING SCHEDULE OF UNIT PRICE TABLE ITEMS

.1 Submit separate schedule of unit price items of work requested in Bid and Acceptance Form.

.2 Make form of submittal parallel to Schedule of Values, with each line item identified same

1.4 PREPARING SCHEDULE OF UNIT PRICE TABLE ITEMS (Cont'd)

.2 (Cont'd)
as line item in Schedule of Values. Include in unit prices only:
.1 Cost of material.
.2 Delivery and unloading at site.
.3 Sales taxes.
.4 Installation, overhead and profit.

.3 Ensure unit prices multiplied by quantities given equal material cost of that item in Schedule of Values.

1.5 MEASUREMENT AND PAYMENT PROCEDURES

.1 Lump Sum Price - For all work that is not specifically designated in the Unit Price Table but is indicated in the tender package in order to complete the Work in full, shall be paid at the Contract Lump Sum Price. This item includes all costs associated to perform the work including but not limited to material, equipment, personnel, overhead, etc. Items included in the Lump Sum Price are:
.1 Mobilization
.2 Demobilization
.3 Connecting to existing services.
.4 Design, install and maintaining all temporary access routes required to access the work areas.
.5 Providing construction fence and perimeter security measures around work and staging areas.
.6 Supplying, installing and maintaining luminated/non luminated signals.
.7 Maintaining the work/storage area for the duration of the work.
.8 Removal of the temporary access routes.
.9 Environmental Procedures, including control work to provide effective environmental, waterbody, and fish habitat protection.
.10 Temporary utilities.
.11 Temporary service connections and maintenance.
.12 Progressive and final site cleaning including snow removal.
.13 Dewatering system.
.14 Landscaping

.2 The following Item titles, units and their respective associated sections list work included in each item. Further description of the work can be found in the sections referenced.

1.5 MEASUREMENT AND PAYMENT PROCEDURES (Cont'd)

.3 Item No.1 - Close Drilling.
.1 Item No.1 shall be paid at the contract unit price by the unit square metre, of clean cut face. This item shall include all the work described in Section 02 41 23.

.4 Item No.2 - Concrete Demolition.
.1 Item No.2 shall be paid at the contract unit price by the unit cubic metre. This item shall include all the work described in Section 02 41 23.

.5 Item No.3 - Concrete Excavation.
.1 Item No.3 shall be paid at the contract unit price by the unit cubic metre. This item shall include all the work described in Section 02 41 23.

.6 Item No.4 - Reinforcing Steel.
.1 Item No.4 shall be paid at the contract unit price by the unit kilogram (kg). This item shall include all the work described in Section 03 20 00. Mass of reinforcing steel shall be computed from the theoretical unit mass specified in CAN/CSA- G30.18 for lengths and sizes of bars as indicated on drawings or authorized in writing by Departmental Representative.

.7 Item No.5 - Class 1 Concrete.
.1 Item No.5 shall be paid at the contract unit price by the unit CUBIC metre. This item shall include all the work described in Section 03 30 00; to supply and placement of concrete in the construction of the new lock chamber walls, breastwall and monoliths.

.8 Item No.6 - Class 2 Concrete.
.1 Item No.6 shall be paid at the contract unit price by the unit CUBIC metre. This item shall include all the work described in Section 03 30 00; to supply and place concrete for the lock coping surfaces upto 300mm below top coping elevation.

.9 Item No.7 - Class 3 Concrete.
.1 Item No.7 shall be paid at the contract unit price by the unit CUBIC metre. This item shall include all the work described in Section 03 30 00; to supply and place concrete for the lock Valve shaft openings.

.10 Cast-in-place concrete will be measured in CUBIC metres calculated from neat dimensions indicated on drawings or authorized in writing

1.5 MEASUREMENT AND PAYMENT PROCEDURES (Cont'd)

.10 (Cont'd)
by Departmental Representative. Concrete placed beyond dimensions indicated will not be measured.
.1 No deductions will be made for volume of concrete displaced by reinforcing steel.
.2 Include in the prices of concrete the bonding agent.
.3 Include in the prices of concrete the installation of all items embedded therein.
.4 Include in the prices of concrete the work described in Section 03 10 00.
.5 Include in the prices of concrete the heating, cooling, hot and cold weather protection, curing, and finishing.
.6 Include in the prices of concrete the supply and installation of joint filler, bond breaker and joint sealer.

.11 Item No.8 - Anchors Type A.
.1 Item No.8 shall be paid at the contract unit price by the LINEAR metre of anchor rod in place. This item shall include all the work described in Section 05 05 20 related to supplying and installation of post tensioned Type A anchors (rock anchors).

.12 Item No.9 - Anchors Type B.
.1 Item No.9 shall be paid at the contract unit price EACH for each anchor installed. This item shall include all the work described in Section 05 05 20.

.13 Item No.10 - Anchors Type C.
.1 Item No.10 shall be paid at the contract unit price EACH for each anchor installed. This item shall include all the work described in Section 05 05 20.

1.6 PROGRESS PAYMENT

.1 Departmental Representative will issue to Owner, no later than Ten (10) days after receipt of an application for payment, certificate for payment in amount applied for or in such other amount as Departmental Representative determines to be properly due. If Departmental Representative amends application, Departmental Representative will give notification in writing giving reasons for amendment.

1.7 SUBSTANTIAL PERFORMANCE OF WORK

.1 Prepare and submit to Departmental Representative a comprehensive list of items to be completed or corrected and apply for a review by Departmental Representative to establish Substantial Performance of Work or Substantial Performance of designated portion of Work when Work is substantially performed if permitted by lien legislation applicable to Place of Work designated portion thereof which Departmental Representative agrees to accept separately is substantially performed. Failure to include an item on list does not alter responsibility to complete the Contract.

.2 Submit an application for final payment when work is completed.

.3 Departmental Representative will, no later than ten (10) days after receipt of an application for final payment, review work to verify validity of application. Departmental Representative will give notification that application is valid or give reasons why it is not valid, no later than seven (7) days after reviewing work.

.4 Departmental Representative will issue a Certificate of Completion and a Certificate of Measurement when application for final payment is found valid.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

END

PART 1 - GENERAL

1.1 ADMINISTRATIVE .1 This Section specifies general requirements and procedures for Contractor submissions of shop drawings, product data and samples to Departmental Representative for review. Additional specific requirements for submissions are also specified in other individual sections of these specifications.

.2 Do not proceed with work until relevant submissions are reviewed by Departmental Representative.

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

.4 Where items or information is not produced in SI Metric units, converted values are acceptable.

.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 of submissions, unless Departmental Representative gives written acceptance of specific deviations.

.9 Make any and all changes in submissions which Departmental Representative may require consistent with Contract Documents and resubmit as directed by Departmental Representative.

.10 Notify the Departmental Representative, in writing, when resubmitting any revisions other than those requested by the Departmental Representative.

1.1 ADMINISTRATIVE (Cont'd)

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

1.2 SHOP DRAWINGS AND PRODUCT DATA

.1 The term "shop drawing" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of portions of work, which are specific to project requirements.

.2 Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Ontario, Canada.

.3 Maximum sheet size: 850 X 1050 mm.

.4 Submit shop drawings as follows:
.1 Electronic Format in PDF, JPEG or Word, transmitted on either a USB Stick, on CD/DVD disk, or by email.

.5 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, specifications and/or applicable portions of Contract Documents.

.6 Allow five (5) working days for Departmental Representative's review of each submission.

.7 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.

.8 Co-ordinate, each submission, with requirements of work and Contract documents. Individual submissions will not be reviewed until all related and relevant information is available.

.9 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When re-submitting, notify

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.9 (Cont'd)
Departmental Representative in writing of revisions other than those requested.

.10 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.

.11 Submissions shall 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. Note: submissions without a signed Contractor's stamp will not be reviewed and will be returned to the Contractor for re-submission with the required signed stamp.
.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 Relationship to adjacent work.

.12 After Departmental Representative's review, distribute copies to appropriate parties.

.13 Delete information not applicable to project.

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

.15 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of work may proceed. If shop drawings are rejected, noted copies will be

1.2 SHOP DRAWINGS AND PRODUCT DATA (Cont'd)

.15 (Cont'd) returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of work may proceed.

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

.17 Submit shop drawings for the following work:
.1 Reinforcing steel.
.2 Formwork.
.3 Metal fabrication.
.4 Anchors type A and B.

1.3 SAMPLES

.1 Sample: examples of materials, equipment, quality, finishes, workmanship.

.2 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.

.3 Where colour, pattern or texture is criterion, submit full range of samples.

.4 Reviewed and accepted samples will become standard of workmanship and material against which installed work will be verified.

1.4 PRODUCT DATA

.1 Product data: manufacturers catalogue sheets, brochures, literature, performance charts and diagrams used to illustrate standard manufactured products.

.2 Submit product data in electronic PDF format.

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

.4 Cross-reference product data information to applicable sections of Contract Documents.

.5 Submit product data for the following items:
.1 Concrete mix.
.2 Anchor grout.
.3 Formwork liner.
.4 Waterstops.

1.5 CERTIFICATES AND TRANSCRIPTS

.1 Immediately after award of Contract, submit Workers' Safety and Insurance Board Experience Report.

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

1.6 FEES, PERMITS AND CERTIFICATES

.1 Provide authorities having jurisdiction with information requested.

.2 Pay fees and obtain certificates and permits required.

.3 Furnish certificates and permits.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 GENERAL REQUIREMENT

.1 Comply with Ontario Occupational Health and Safety Act, Canada Labour Code part II, and Canada Occupational Safety and Health Regulations.

.2 Develop written Site Specific Health and Safety Plan based on hazard assessment prior to commencing any site work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.

.3 Relief from or substitution from any portion or provision of minimum Health and Safety Guidelines specified herein or reviewed site-specific Health and Safety Plan must be submitted to the Departmental Representative in writing. Departmental Representative will respond in writing, either accepting or requesting improvements.

1.2 REFERENCES

.1 Canadian Standards Association (CSA): Canada
.1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

.2 National Building Code 2010 (NBC):
.1 NBC 2010, Division B, Part 8 Safety Measures at Construction and Demolition Sites.

.3 National Fire Code 2010 (NFC):
.1 NFC 2010, Division B, Part 2 Emergency Planning, subsection 2.8.2 Fire Safety Plan.

.4 Canada Labour Code, Part 2, Canada Occupational Health and Safety regulations.

.5 Workplace Hazardous Materials Information System (WHMIS).

.6 Province of Ontario:
.1 Occupational Health and Safety Act Revised Statutes of Ontario 1990 (updated 2005), Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended, Reg.490/09.
.2 Ministry of Labour publication "Silica on Construction Sites", 2004.

1.2 REFERENCES (Cont'd)

.6 Province of Ontario:(Cont'd)
.3 Workplace Safety and Insurance Act, 1997.
.4 Municipal statutes and authorities.

.7 Fire Commissioner of Canada (FCC):
.1 FC-301 Standard for Construction Operations, June 1982.
.2 FC-302 Standard for Welding and Cutting, June 1982.

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
4900 Yonge Street 8th Floor
North York, Ontario M2N 6A8

and copies may be obtained from:

Human Resources and Social Development Canada
Labour Program
Fire Protection Engineering Services
Ottawa, Ontario K1A 0J2

1.3 SUBMITTALS

.1 Make submittals in accordance with Section 01 33 00.

.2 Submit Site Specific Health and Safety Plan: Within five (5) 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 operations found in work plan.
.3 Measures and controls to be implemented to address identified safety hazards and risks.
.4 Contractor's and Sub-contractors' Safety Communication Plan.
.5 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations. Coordinate plan with existing Emergency Response requirements and procedures provided by Departmental Representative.

.3 Departmental Representative will review Contractor's Site Specific Health and Safety Plan and provide comments to Contractor within five (5) days after receipt of plan. Revise

1.3 SUBMITTALS (Cont'd)

.3 (Cont'd) plan as appropriate and resubmit plan to Departmental Representative within five (5) days after receipt of comments from Departmental Representative.

.4 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.

.5 Submit names of personnel and alternates responsible for site safety and health present on site, and use of personal protective equipment.

.6 Submit records of Contractor's Health and Safety meetings when requested.

.7 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.

.8 Submit copies of incident and accident reports.

.9 Submit Material Safety Data Sheets (MSDS)for all products and items use on site to Departmental Representative.

.10 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report for Province of Ontario.

1.4 FILING OF NOTICE

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

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

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

1.7 REGULATORY REQUIREMENTS

.1 Comply with the Federal Acts and regulations as well as those of the Province of Ontario.

.2 Comply with specified standards and regulations to ensure safe operations at site.

.3 In event of conflict between any provisions of specified standards and regulations, the most stringent provision governs.

1.8 PROJECT/SITE CONDITIONS

.1 Work at site will involve contact with:
.1 Silica/silica dust in concrete.
.2 Benzene in fuel oil and adhesives.
.3 Arsenic and acrylonitrile in adhesives.
.4 Fresh concrete, concrete admixtures and bonding agents.

.2 Confined spaces in crawl space, feed tunnels, valve chambers.

.3 Work near water, in trench and in a confined space.

.4 Working during cold and adverse weather conditions.

.5 Working at heights in some locations on site near dewatered lock chamber.

.6 Working near excavations and heavy machinery.

1.9 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.

.3 Where applicable the Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act for the Province of Ontario.

1.10 UNFORESEEN HAZARDS

.1 Should any unforeseen or peculiar safety related factor, hazard, or condition become evident during performance of work, immediately stop work and advise Departmental Representative verbally and in writing.

.2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.11 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 site related working experience specific to activities associated with heavy machinery demolition.
.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 site supervisor.

1.12 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 Province of Ontario, and in consultation with Departmental Representative.
.1 Contractor's Safety Policy.
.2 Constructor's Name.
.3 Notice of Project.
.4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
.5 Ministry of Labour Orders and reports.
.6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
.7 Material Safety Data Sheets.
.8 Written emergency Response Plan.
.9 Site Specific Safety Plan.

1.12 POSTING OF DOCUMENTS (Cont'd)

.1 (Cont'd)
.10 Valid certificate of first aid personnel on duty.
.11 WSIB "In Case of Injury At Work" poster.
.12 Location of toilet and cleanup facilities.

1.13 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.

1.14 BLASTING

.1 Blasting or other use of explosives is not permitted without prior receipt of written permission from Departmental Representative.

1.15 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.

.2 Assign responsibility and obligation to Health and Safety Coordinator to stop or start work when, at Health and Safety Coordinator's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop work for health and safety considerations.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not used.

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This Section describes requirements for the protection of the environment that apply to the Work. These requirements apply to all Sections of this Specification, without limiting the conditions and approvals imposed by statute.

.2 Control Work to Provide effective environmental, waterbody, and fish habitat protection. Departmental Representative will monitor environmental protection measures and will identify whenever such protection is found to be ineffective. Change protective measures or work procedures as directed by the Departmental Representative to ensure environmental, waterbody and fish habitat protection.

1.2 DEFINITIONS

.1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavourably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.

.2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

.3 "Deleterious Material" - any substance that, if added to a waterbody, could degrade water quality or impact fish, fish habitat and aquatic wildlife. This includes, but is not limited to:

.1 Masonry and concrete dust.
.2 Soils (clay, silt, sand).
.3 Oil, diesel, or gasoline.
.4 Chipped or fresh mortar, concrete and admixtures.

1.2 DEFINITIONS (Cont'd)

.3 (Cont'd)
.5 Alkali water resulting from fresh mortar, concrete or cementitious grout.
.6 Salt.
.7 Solvents.

.4 "Dripline" - means the location on the ground surface directly beneath a theoretical line described by the tips of the outermost branches of the trees.

.5 "Barrier" - means fence consisting of approved material, supported by steel posts and being a minimum of 1.8m high, without breaks or unsupported sections.

.6 "Designated Substances" - hazardous materials as defined and listed in Ontario Regulation 490/09.

1.3 MEASUREMENT AND PAYMENT

.1 There will be no measurement of Environmental Procedures.

.2 Payment will be included in the Lump Sum Price.

1.4 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00.

.2 Prior to commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative. Environmental Protection Plan is to present comprehensive overview of known or potential environmental issues which must be addressed during construction.

.3 Address topics at level of detail commensurate with environmental issue and required construction tasks.

.4 Environmental protection plan: include:
.1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
.2 Names and qualifications of persons responsible for training site personnel.
.3 Erosion and sediment control plan which identifies type and location of erosion and sediment controls to be provided including

1.4 SUBMITTALS (Cont'd)

.4 Environmental protection plan:(Cont'd)

.3 (Cont'd)
monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.4 Drawings showing locations of proposed temporary excavations or embankments for haul roads, channel crossings, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials including methods to control runoff and to contain materials on site.

.5 Traffic control plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather. Plans include measures to minimize amount of mud transported onto paved public roads by vehicles or runoff.

.6 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use. Plan to include measures for marking limits of use areas including methods for protection of features to be preserved within authorized work areas.

.7 Spill Control Plan: including procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.

.8 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.

.9 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, do not become air borne and travel off project site.

.10 Contaminants prevention plan that: identifies potentially hazardous substances to be used on job site; identifies intended actions to prevent introduction of such materials into air, water, or ground; and details provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.

.11 Waste water management plan that identifies methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of ground water.

.12 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying

1.4 SUBMITTALS (Cont'd)

.4 Environmental protection plan:(Cont'd)
.12 (Cont'd)
and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.5 FIRES

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

1.6 DISPOSAL OF WASTES

.1 Do not bury rubbish and waste materials on site.

1.7 TURBIDITY CONTROL AND DRAINAGE

.1 Provide erosion and sediment control plan that identifies type and location of erosion and sediment controls to be provided. Plan to include but not limited to; monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations.

.2 Obtain a "Permit to Take Water" from the Ontario Ministry of the Environment if more than 50,000 Litres of water per day is taken from the waterway, or if the waterway is restricted during construction.

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

.4 Do not pump water containing suspended materials into waterways, sewer or drainage systems. Send all discharge to a settling pond or filtration area before removal from site.
.1 If required upon site observations, provide a marine grade turbidity curtain across all areas where sediments can enter the watercourse. Turbidity curtain to be anchored or weighted down along its length to form a continuous seal on the lake bed with adequate flotation at water surface to prevent over spills of turbid water.
.2 In the event of significant silting or debris caused by construction activities, contractor must take appropriate measures to confine work and install additional turbidity curtains.

1.7 TURBIDITY CONTROL AND DRAINAGE (Cont'd)

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

.6 If the sediment, debris or erosion control measures are not functioning properly, no further work will be permitted until the sediment/erosion problem has been rectified

.7 Sediment, debris and erosion control measures shall be left in place until all disturbed areas within the work area has been stabilized and any sediments in the water have settled. Removal will be permitted only after written approval from the Departmental Representative.

1.8 PLANT PROTECTION

.1 Protect trees and plants on site and adjacent properties where indicated.

.2 Wrap in burlap, trees and shrubs adjacent to construction work, storage areas and trucking lanes, and encase with protective wood framework from grade level to height of two (2)meters.

.3 Protect roots of designated trees to dripline during excavation and site grading to prevent disturbance or damage. Avoid unnecessary traffic, dumping and storage of materials over root zones.

.4 Minimize stripping of topsoil and vegetation.

.5 Restrict tree removal to areas indicated or designated by Departmental Representative.

1.9 WORK ADJACENT TO WATERWAYS

.1 Do not operate construction equipment in waterways.

.2 Do not use waterway beds for borrow material.

.3 Do not dump excavated fill, waste material or debris in waterways.

.4 Design and construct temporary crossings to minimize erosion to waterways.

1.9 WORK ADJACENT TO WATERWAYS (Cont'd)

.5 Do not use salt as a deicer near canal. In areas where ice is a safety concern, the use of sand will be permitted, but it must not be allowed to enter the watercourse.

.6 Stockpile excavated or fill materials must be stored and stabilized away from water. Runoff from the excavated or fill material must be contained from entering the watercourse.

1.10 POLLUTION CONTROL

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

.2 Spills of deleterious substances:
.1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
.2 Report immediately to Ontario Spills Action Centre: 1-800-268-6060.
.3 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.
.4 Using appropriate safety precautions, collect liquid or solidify liquid with an inert, noncombustible material and remove for disposal.
.5 Be responsible for all costs of cleaning up any spills to the satisfaction of the Departmental Representative.
.6 Have an environmental emergency response plan in place and a spill kit readily available.

1.11 SEDIMENT,DUST AND EROSION PROTECTION

.1 Before starting work that will create dust or debris, (such as wood sawing, excavation, backfilling, etc.), install effective mitigation techniques for sediment, dust, debris and erosion control to the satisfaction of Departmental Representative. Maintain these protective measures at all times, including shut down periods.

.2 Provide a 1 metre high silt fence barrier in all areas where, due to construction activities, silt or debris may enter the lake. Install silt curtain minimum 3 m from shoreline.

1.11 SEDIMENT,DUST AND EROSION PROTECTION (Cont'd)

.3 Maintain a standby supply of pre-fabricated silt fence barrier, or an equivalent ready-to-install sediment control device.

.4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.

1.12 OPERATION AND MAINTENANCE OF EQUIPMENT

.1 Provide drip trays to prevent the discharge oil, grease, antifreeze, or any other materials into the ground.

.2 Equipment and heavy machinery used shall meet or exceed all applicable emission requirements.

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

.4 Conduct all vehicle/equipment maintenance and refueling over impermeable/absorptive material situated at a designated site that is located at least 15 m away from the waterway and basin.

1.13 CLEANING OF EQUIPMENT

.1 Use trigger operated spray nozzles for water hoses.

.2 Departmental Representative will designate a cleaning area for equipment and tools to limit water use and runoff. The cleaning area shall be sufficiently far away from the watercourse to prevent contamination. Where no safe cleaning area is available, Contractor shall be required to provide a settling pond where the equipment can be cleaned. All alkali water is to be disposed of in accordance with federal, provincial, and local authority requirements.

1.14 REMOVED MATERIALS

.1 Unless otherwise specified, materials designated for removal become the Contractor's property. Remove these from site.

1.15 CLEAN UP

.1 Clean up work area as work progresses. At the end of each work period, and more often if ordered by the Departmental Representative, remove debris from site, neatly stack material for use, and clean up generally.

.2 Permit no undue amounts of debris, trash or garbage to accumulate.

.3 Separate and recycle all materials that can be recycled.

.4 Dispose of hazardous materials and designated substances in accordance with Ontario Regulation 347/90.

.5 Dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner by taking them to a special designated waste facility. Do not dump these into lake, storm or sanitary sewers.

.6 Ensure all emptied containers are sealed and stored safely for disposal away from children and / or the Public.

.7 Remove all scaffolding, temporary protection, surplus materials, tools, plant, rubbish and debris and dispose of them in an approved manner off Crown property by the completion date of the Work.

.8 Clean areas under contract to a condition at least equal to that previously existing and to approval of Departmental Representative.

1.16 TRANSPORTING WASTE MATERIALS

.1 All waste subject to Regulation 347/90 of the Ontario Environmental Protection Act must be transported with a valid "Certificate of Approval for a Waste Management System" to a site approved by the Ontario Ministry of the Environment to accept that waste.

.2 Be responsible for obtaining all Waste Generator Numbers, permits, manifests, and all other paperwork necessary to comply.

1.17 NOISE CONTROL .1 Minimize the noise levels from construction activities by using proper muffling devices, in addition to appropriate timing and location of these activities to reduce or minimize the effect of noise on nearby residents, recreational users, and wildlife.

.2 Comply with any local or municipal Noise By-Laws.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 INDEPENDENT INSPECTION AGENCIES

.1 Departmental Representative will engage, as required, independent Inspection/Testing Agencies for purpose of Quality Assurance only, that is, verifying Contractor's Quality Control processes for concrete, environmental protection, waste disposal, etc.

.2 Contractor is responsible for all Quality Control. Employment of inspection/testing agencies does not relax responsibility to perform work in accordance with Contract Documents.

1.2 ACCESS TO WORK

.1 Allow Departmental Representative access to work whenever and wherever it is in progress. Provide equipment required for access and executing inspection and testing by appointed agencies such as (but not limited to) ladders, lights.

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

1.3 PROCEDURES

.1 Notify Departmental Representative in advance of requirement for tests as specified in individual Sections of the tender package.

.2 Submit samples and/or materials required for testing as listed 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.

1.4 TESTING BY DEPARTMENTAL REPRESENTATIVE

.1 Departmental Representative will perform inspection/testing on a random basis for auditing purposes. Correct defect and irregularities as advised by Departmental Representative at no cost. Pay costs for retesting and reinspection.

1.4 TESTING BY DEPARTMENTAL REPRESENTATIVE (Cont'd)

.2 If Contractor covers or permits to be covered work that has been designated for inspections before these are made, uncover such work, have inspections or tests satisfactorily completed and make good such work.

.3 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 will authorize payment of the cost of examination and replacement.

1.5 REJECTED WORK

.1 Remove defective work whenever this is found, either through Contractor Quality Control procedures or through Departmental Representative's Quality Assurance. Replace or re-execute in accordance with Contract Documents.

.2 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.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 01 52 00 - Construction Facilities.

.2 Section 01 56 00 - Temporary Barriers and Enclosures.

1.2 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

1.3 INSTALLATION AND REMOVAL

.1 Provide temporary utilities controls in order to execute work expeditiously.

.2 Remove from site all such work after use.

1.4 DEWATERING

.1 Provide temporary drainage and pumping facilities to keep lock chamber floor, excavations and site free from standing water.

1.5 TEMPORARY HEATING AND VENTILATION

.1 Provide temporary heating required during construction period, including attendance, maintenance and fuel.

.2 Construction heaters used inside enclosures must be vented to outside or be non-flameless type. Solid fuel salamanders are not permitted.

.3 Provide temporary heat and ventilation in enclosed areas as required to:
.1 Facilitate progress of work.
.2 Protect work and products against dampness and cold.
.3 Prevent moisture condensation on surfaces.
.4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
.5 Provide adequate ventilation to meet health regulations for safe working environment.

.4 Ventilation:

1.5 TEMPORARY HEATING AND VENTILATION (Cont'd)

.4 Ventilation:(Cont'd)

.1 Prevent accumulations of dust, fumes, mists, vapours or gases in enclosed areas during construction.

.2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.

.3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.

.4 Ventilate storage spaces containing hazardous or volatile materials.

.5 Ventilate temporary sanitary facilities.

.6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

.5 Be responsible for damage to work due to failure in providing adequate heat and protection during construction.

1.6 TEMPORARY POWER AND LIGHT

.1 Departmental Representative will pay for temporary power during construction for temporary lighting and operating of power tools, to a maximum supply of 120 volts 15 amps.

.2 Arrange for connection with appropriate utility company. Pay all costs for installation, maintenance and removal.

.3 Temporary power for electric cranes and other equipment requiring in excess of above is responsibility of Contractor.

.4 Connect to existing power supply in accordance with Canadian Electrical Code and provide meters and switching.

.5 Electrical power and lighting systems installed under this Contract may be used for construction requirements only with prior approval of Departmental Representative provided that guarantees are not affected. Make good damage to electrical system caused by use under this Contract. Replace lamps which have been used for more than 3 months.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 SECTION INCLUDES

.1 Construction aids.

.2 Office and sheds.

.3 Parking.

.4 Project identification.

1.2 REFERENCES

.1 Canadian General Standards Board (CGSB)

.2 Canadian Standards Association (CSA International)
.1 CSA-A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete.
.2 CSA-0121-08, Douglas Fir Plywood.
.3 CAN/CSA-S269.2-M87(R2003), Access Scaffolding for Construction Purposes.
.4 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment.

1.3 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00.

1.4 INSTALLATION AND REMOVAL

.1 Prepare and provide prior to work, site plan indicating proposed location and dimensions of areas to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation including gate locations.

.2 Identify areas which have to be gravelled to prevent tracking of mud.

.3 Indicate use of supplemental or other staging area.

.4 Provide construction facilities in order to execute work expeditiously.

.5 Remove from site all such work after use.

1.5 SCAFFOLDING

.1 Scaffolding in accordance with CAN/CSA-S269.2.

.2 Provide and maintain scaffolding, ramps, ladders, platforms, temporary stairs.

1.6 HOISTING

.1 Provide, operate and maintain hoists/cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.

.2 Hoists/cranes shall be operated by qualified operator.

1.7 SITE STORAGE/LOADING

.1 Confine work and operations of employees to areas defined by Contract Documents. Do not unreasonably encumber premises with products.

.2 Do not load or permit to load any part of work with a weight or force that will endanger the work.

1.8 CONSTRUCTION PARKING

.1 Parking will be permitted on site provided it does not disrupt performance of work.

.2 Provide and maintain adequate access to project site.

.3 Build and maintain temporary roads where indicated or as required and provide snow removal during period of Work.

.4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

.5 Clean construction runways and taxi areas where used by Contractor's equipment.

1.9 SECURITY

.1 Pay for suitable security measures and methods to guard site and contents of site after working hours and during holidays. To be submitted and approved by Departmental Representative.

1.10 SANITARY FACILITIES

.1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.

.2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.11 CONSTRUCTION SIGNS

.1 Provide and erect, within three (3) weeks of signing Contract, a project sign, dimensions and location as indicated by Departmental Representative.

.2 Indicate on sign, name of Owner,and Contractor, of a design style established by Departmental Representative.

.3 No other signs or advertisements, other than warning signs, are permitted on site.

.4 Provide project identification site sign comprising foundation, framing, and one 1200 x 2400 mm signboard as detailed and as described below.
.1 Foundations: 20 MPa concrete to CAN/CSA-A23.1/A23.2 minimum 200 mm x 900 mm deep.
.2 Framework and battens: SPF, pressure treated minimum 89 x 89 mm.
.3 Signboard: 19 mm Medium Density Overlaid Douglas Fir Plywood to CSA O121.
.4 Paint: alkyd enamel to CAN/CGSB-1.59 over exterior alkyd primer to CGSB 1-GP-189.
.5 Fasteners: hot-dip galvanized steel nails and carriage bolts.
.6 Vinyl sign face: printed project identification, self adhesive, vinyl film overlay, supplied by Departmental Representative.

.5 Locate project identification sign as directed by Departmental Representative and construct as follows:
.1 Build concrete foundation, erect framework, and attach signboard to framing.
.2 Paint all surfaces of signboard and framing with one coat primer and two coats enamel. Colour white on signboard face, black on other surfaces.
.3 Apply vinyl sign face overlay to painted signboard face in accordance with installation instructions supplied.

1.11 CONSTRUCTION SIGNS (Cont'd)

.6 Signs and notices for safety and instruction shall be in both official languages Graphic symbols shall conform to CAN/CSA-Z321.

.7 Maintain approved signs and notices in good condition for duration of project, and dispose of off site on completion of project or earlier if directed by Departmental Representative.

1.12 PROTECTION AND MAINTENANCE OF TRAFFIC

.1 Provide access and temporary relocated roads as necessary to maintain traffic.

.2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.

.3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs

.4 Protect travelling public from damage to person and property.

.5 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.

.6 Construct access and haul roads necessary.

.7 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.

.8 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.

.9 Dust control: adequate to ensure safe operation at all times.

.10 Provide snow removal during period of work. Limits as described under Section 01 11 00, paragraph 3.5.4.

.11 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.13 CLEAN-UP

.1 Remove construction debris, waste materials, packaging material from work site daily.

.2 Clean dirt or mud tracked onto paved or surfaced roadways.

.3 Store materials resulting from demolition activities that are salvageable.

.4 Stack stored new or salvaged material.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies requirements for designing, supplying, installing, inspecting, maintaining, and removing:
.1 Cold weather protection, consisting of temporary housing and supplementary heating for the workspaces and the work, as described by the specifications. The requirements of this section apply to all sections of specifications that call for cold weather protection.
.2 Housing and containment systems.
.3 Lighting and ventilating workspaces.

.2 Work not included in this Section:
.1 Provision of separate air supply for workers which is part of Contractor's responsibility under Health & Safety regulations for construction.

.3 Intent: housing, heating and ventilating must be sufficient to:
.1 ensure safe working environment.
.2 facilitate progress of work in an efficient manner.
.3 protect areas adjacent to work during procedures which may damage surrounding areas.
.4 protect work and products against dampness and cold.
.5 provide ambient temperatures and humidity levels for storage, installation and curing of materials.

.4 Access to permit work to be carried out to the walls shall be by means of standard scaffolding.

.5 Provide shop drawings and set up methodology for all scaffolding including locations and, heating measures during concrete placement.

1.2 MEASUREMENT AND PAYMENT

.1 There will be no measurement of Temporary Barriers and Enclosures.

.2 Payment will be included in the Lump Sum Price.

1.3 RELATED SECTIONS

.1 Section 01 33 00 -Submittal And Procedures.

.2 Section 01 35 29 - Health and Safety Requirements.

.3 Section 01 35 43 - Environmental Procedures.

.4 Section 01 51 00 - Temporary Utilities

.5 Section 01 52 00 - Construction Facilities.

1.4 REFERENCES

.1 Canadian General Standards Board (CGSB):
.1 CAN/CGSB-S269.2-M1987 (R2003), Access Scaffolding for Construction Purposes.

.2 Canadian Standards Association (CSA):
.1 CSA-O121-08, Douglas Fir Plywood.

.3 Province of Ontario
.1 Occupational Health and Safety Act and Regulations for Construction Projects, R.S.O. 1990 as amended, O. Reg. 213/91 as amended.
.2 Air Pollution - Local Air Quality (O. Reg. 419/05)

1.5 SUBMITTALS

.1 Shop drawings showing: (when applicable to cold weather Work)
.1 Type and construction of housing and enclosures, connections with scaffolding, stability system and method of sealing.
.2 Ventilation fan location and capacity.
.3 Heater numbers, types, locations, and capacities. Size of drip trays provided with all liquid-fueled heaters.
.4 Number and location of fire extinguishers associated with heating equipment.
.5 Number, type, strength, of all lighting provided within enclosure.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Subject to approval by Departmental Representative as to type, materials and detail. Use:
.1 New materials;
.2 Salvaged/recycled materials in good condition; or,
.3 Prefabricated portable components in a good, safe condition.

.2 Heating fuels:
.1 Use electricity, gas, diesel oil or other fuels approved by the Departmental Representative.

PART 3 - EXECUTION

3.1 GENERAL

.1 Carry out all work to:
.1 Ontario Occupational Health and Safety Act and Regulations.
.2 Approved Site-Specific Safety Plan.
.3 Approved Site-Specific Environmental Protection Plan.

3.2 SCAFFOLDING, HOARDING AND BARRIERS

.1 Provide all scaffolding, ladders, access, lifting equipment, etc., as necessary, to carry out the work of all trades and as per the requirements of the work.

.2 Scaffolding shall be erected on wood sills.

.3 Provide suitable ladders to scaffolding at each section of scaffold isolated from other sections, for full height of the scaffold. Access from the ladder(s) to the scaffolding shall be clear of obstructions and cross bracing so workers and materials can easily enter.

.4 Scaffolding shall be designed, drawn and inspected by a registered Professional Engineer experienced in this work. Provide shop drawings for review. All drawings shall be stamped and signed by a registered Professional Engineer. Prior to using the scaffolding for carrying out the work, the designing Professional Engineer of the

3.2 SCAFFOLDING, HOARDING AND BARRIERS (Cont'd)

.4 (Cont'd) scaffolding shall complete an inspection of the installation and shall provide the Departmental Representative with a letter stating that the installation conforms with his/her design and is suitable for Contractor's use.

.5 Make all changes to scaffolding required by Ministry of Labour officials.

.6 Make periodic inspections of scaffolding as work progresses.

.7 Do not load or permit to load any part of work or any temporary access structure with a weight or force that will endanger work or labourers.

.8 Install, maintain all barriers around the site to prevent access by the public to the immediate work areas. All barriers to be in accordance with the Occupational Health and Safety Act. Provide hoarding and other measures to protect the public. Remove all barriers accordingly at the completion of the work and or as indicated by the Departmental Representative.

3.3 HOUSING AND CONTAINMENT

.1 Provide strong and durable enclosures and containment for portions of Work to be protected, heated, and/or ventilated during Work.
.1 Enclosure to be strong enough to withstand rain, wind and snow loads.
.2 Enclosure to be insulated against cold.
.3 Electrical wiring, lights, and other equipment located inside enclosure: explosion-proof type. Illumination shall be sufficient for safe execution of the work.

3.4 HEATING

.1 Provide temporary heating required during construction period, including watch keeping attendance, maintenance, and fuel.

.2 Be responsible for damage to work due to failure in providing adequate heat and protection during construction.

3.4 HEATING (Cont'd)

.3 Fire protection requirements: to Section 01 35 29 - Health and Safety Requirements.

.4 Use only heating equipment types acceptable to Departmental Representative.

.5 Heating fuels: indirect fired heaters. Do not re-fuel inside the lock.

.6 Fuel Storage: to requirements of Fire Commissioner of Canada and Section 01 35 43 - Environmental Protection.

.7 Provide and maintain temporary fire protection equipment during performance of work commensurate with fuel source selected.

.8 Ensure that heating requirements are met by providing, at optimum efficiency of equipment, a capacity of 125% of heat requirement and a sufficient number of standby heaters ready for use at the site.

.9 Vent exhausts of heating equipment outside of housing, well clear of combustible materials and fresh air intake.

3.5 VENTILATING EQUIPMENT

.1 Intent of ventilation:
.1 To ensure required air temperature and quality in all parts of enclosure.
.2 To enhance Health and Safety of workers.

.2 Depending upon configuration of enclosure, it may be necessary to install both a mechanical supply and exhaust ventilation system to effect adequate air changes within confined space. Locate air-moving devices in a manner that assures that airflow is not restricted or short circuited and is supplied in proper direction and does not interfere with work.

.3 Ventilate storage spaces containing hazardous or volatile materials.

.4 Ventilation system must vent to downstream side of the lock or to take advantage of prevailing winds.

3.6 FIELD QUALITY CONTROL & WATCH KEEPING

.1 Provide and post at approved locations within enclosure, one maximum/minimum thermometer per approximately ten (10) square metres of plan area of enclosure.

.2 Ensure continuity of protection by providing a watch keeper to make periodic checks at all times when work is not in progress.

.3 Watch keeper's qualifications, under this section of specification, are to be sufficient to perform such duties as:
.1 Maintain strict supervision of operation of temporary heating and ventilating equipment.
.2 Enforce safe practices.
.3 Prevent abuse of services.
.4 Prevent damage to finishes due to mis-use of heating and ventilating equipment.
.5 Undertake preventive maintenance and re-fueling.
.6 Complete emergency repairs of minor complexity.
.7 Place standby items in service.

.4 Record maximum and minimum temperature at each thermometer on a daily basis, and re-setting thermometers as necessary.
.1 Make temperature records available to Departmental Representative on a daily basis.
.2 Provide certified written records to Departmental Representative on a weekly basis.

END

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

.1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent where possible. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.

.2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
- .1 Provide facilities for collection, handling and storage of source separated wastes.
- .2 Source separate the following waste:
  - .1 Portland cement concrete.
  - .2 Corrugated cardboard.
  - .3 Wood, not including painted or treated wood or laminated wood.
  - .4 Steel.

.3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
- .1 Indicate how material being removed from the site will be reused, recycled, reduced, composted or anaerobically digested.

.4 Submit proof that all waste is being disposed of at a licensed land fill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

1.2 WASTE PROCESSING SITES

.1 Province of: Ontario.
- .1 Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON, M4V 1P5.
- .2 Telephone: 800-565-4923 or 416-323-4321.
- .3 Fax: 416-323-4682.

1.2 WASTE PROCESSING SITES (Cont'd)

.2 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
.1 Telephone: 416-657-2797
.2 Fax: 416-960-8053
.3 Email: rco@rco.on.ca.
.4 Internet: http://www.rco.on.ca/.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

.1 Government Chief Responsibility for the Environment.

Province	Address	General Inquiries	Fax

END

PART 1 - GENERAL

1.1 RECORD DRAWINGS

.1 Maintain project record drawings and record accurately all deviations from the Contract documents. Record information concurrently with construction progress. Do not conceal work until required information is recorded.

.2 Record changes in red ink. Mark ongoing changes on one set of prints. Then, at the completion of the project and before final inspection, neatly transfer notations to the second set. Submit both sets to the Departmental Representative.

1.2 INFORMATION TO BE RECORDED

.1 Record the following information:

.1 New horizontal and vertical final elevations referenced to permanent surface improvement.

.2 Horizontal and vertical locations of new post tensioned rock anchors.

.3 Field changes of dimension and detail.

.4 Changes made by Change Order or Field Order.

.5 Details not on original Contract Drawings.

.6 References to related shop drawings and modifications.

.7 Additional Requirements: as specified in individual specifications sections.

1.3 REVIEW

.1 Be prepared to review As-Built Drawings with Departmental Representative at least weekly, to ensure that level of detail being recorded is acceptable. Be advised that during periods of high activity, Departmental Representative may review As-Built Drawings even more frequently than weekly.

PART 2 - PRODUCTS

2.1 NOT USED .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED .1 Not Used.

END

PART 1 - GENERAL

1.1 MEASUREMENT AND PAYMENT PROCEDURES

.1 There will be no measurement of Removals.

.2 Payment will be included in the Lump Sum Price.

1.2 DESCRIPTION

.1 This section covers the removal and re-installation, after concrete work is completed, of the following items:
.1 The hydraulic driven mechanical systems located in the valve shaft which operate the lower gates;
.2 All components used for the gate mechanization (Steel,hydraulic and electrical), trenches cover plates, including all embedded components;
.3 All electrical cables and hydraulic lines located in the valve shafts, cable trenches, lock chamber, etc, including support brackets, Refer to paragraph 3.3 & 3.4 of this section;
.4 Scramble ladders;
.5 The valve shaft ladders where required;
.6 All railings, including pipe and HSS types;
.7 Lock chamber gate bumpers;
.8 Light standards;
.9 Lock operating control panels;
.10 Lockgate displays panels if required;
.11 Mooring cables including fastening hardware, refer to Section 05 50 00 for details;
.12 Sign boards located on the gates if required;
.13 Life preserver rings;
.14 Site signage if required;
.15 Flag pole;

.2 This section includes the removal of all other items that not listed above but must be removed to complete the work and reinstalled after, as described in the specification and/or as shown on the drawings.

1.3 PROTECTION

.1 Protect existing structures or parts of structures designated to remain. In the event of damage, make repairs and replacements to

1.3 PROTECTION (Cont'd)

.1 (Cont'd) the approval of, and at no additional cost, to the Departmental Representative.

.2 Protect all exposed electrical wiring and conduits during the concrete excavation, forming, heating and placement of concrete.

PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Inspect the site and verify with the Departmental Representative objects designated to be removed and objects to be preserved.

.2 Survey, record and tag all elements of existing railing for ease of future re-installation, including elements location and orientation.

.3 Notify appropriate utility authorities as required before starting any excavation, demolition, clearing and grubbing.

3.2 REMOVALS

.1 Do not disturb adjacent work designated to remain in place.

.2 Items not designated to be salvaged are to be disposed of in a manner approved by the Departmental Representative.

3.3 HYDRAULIC LINES

.1 Disconnect and drain hydraulic lines as required and temporarily relocate as required to perform the work outlined in the specifications and drawings.

.2 All hydraulic tube and pipe to be sealed to prevent foreign matter from contaminating system.

3.3 HYDRAULIC LINES (Cont'd)

.3 Salvage mounting brackets and reinstall. Supply all anchors required for re-installation.

3.4 ELECTRICAL SYSTEM

.1 Disconnect cables and temporarily relocate as required to perform the work outlined in the specifications and drawings.

.2 Salvage mounting brackets and reinstall. Supply all anchors required for re-installation.

3.5 SALVAGE

.1 Carefully dismantle materials designated to be salvaged and safely stockpile at locations designated / approved by the Departmental Representative.

.2 Carefully dismantle components designated to be salvaged, label, and take all measurements required for re-installation. Store in a location approved by the Departmental Representative.

3.6 REINSTALLATION

.1 Reinstall all items which were removed as a result of construction activities to match prior to construction condition and the Departmental Representative's approval.

.2 Reinstall as indicated on the drawings or as per existing details, and to the Departmental Representative's approval all items which were removed as a result of construction activities. Supply and install new anchors and hardware, for all items listed in this section, as required for re-installation.

.3 Take all necessary measurements and surveys to ensure that all hardware can be relocated in accordance to the drawings.
.1 Reinstall horizontal and vertical anchors which were removed as a result of the concrete work.
.2 Make all necessary adjustments to ensure proper fit, closure and operations of all gates to sill.

3.6 REINSTALLATION (Cont'd)

.3 (Cont'd)

.2 (Cont'd)

3.7 DISPOSAL OF MATERIALS

.1 Dispose of materials not designated for salvage or reuse in work off the site.

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies the requirements for demolition to complete work as indicated by the drawings and specification.

.2 Work includes but is not limited to:

.1 Close drilling (Vertical)as indicated on the drawings.

.2 Concrete demolition. This includes:

.1 Removal of existing concrete from the chamber walls,and gate monoliths where close drilling is shown on the drawings.

.2 Included under this work is saw cutting and mechanical chipping of the following areas:

.1 Along the vertical edges of the gate quoins and Casting B as shown in the drawings,

.2 Beyond the neat line of close drilling extending immediately downstream from the gate quoin to Casting B. This section is where the concrete removal depth changes from 150mm to 300mm approximately 1200mm below the top coping,

.3 Around the openings of the cast iron embedded filling culverts.

.3 Preparation of all concrete surfaces against which new concrete is to be cast.

.4 Disposing off site all concrete debris, removed steel reinforcement and all garbage generated during work.

.3 Concrete excavation. This includes:

.1 By means of saw cutting and mechanical chipping, remove existing concrete in locations where method of close drilling is not shown on the drawings: This includes but is not limited to:

.1 Coping surfaces,

.2 New hydraulic trenches at upper gates,

.3 Breast wall,

.4 Valve shaft vertical openings,

.2 Preparation of all concrete surfaces against which new concrete is to be cast.

.3 Disposing off site all concrete debris, removed steel members and all garbage generated during construction.

1.2 RELATED SECTIONS

.1 Section 03 30 00 - Cast in place concrete.

.2 Section 31 23 33 - Excavating, Trenching and Backfilling.

.3 Section 35 20 22 - Dewatering

1.3 REFERENCES

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

.2 National Building Code of Canada (NBCC), including User's Guide, Part 8 - Safety Measures at Construction and Demolition Sites (2005).

.3 Ontario Occupational Health and Safety Act (OSHA).

.4 Ontario Building Code (OBC).

.5 Department of Justice Canada (Jus).
.1 Canadian Environmental Assessment Act (CEAA), 1992, c. 37.
.2 Canadian Environmental Protection Act (CEPA), 1999, c. 33.
.1 SOR/2003-2, On-Road Vehicle and Engine Emission Regulations.
.3 Transportation of Dangerous Goods Act (TDGA), 1992, c. 34.

1.4 MEASUREMENT AND PAYMENT

.1 Measurement Procedures: in accordance with Section 01 22 01 - Measurement and Payment.

.2 The work will be measured and paid for under payment items included in the Unit Price Table:
.1 Item No. 1 - Close Drilling: This item covers the work described in subsection 1.1.2.1.
.2 Item No. 2 - Concrete Demolition: This item covers the work described in section 1.1.2.2.
.3 Item No. 3 - Concrete Excavation: This item covers the work described in subsection 1.1.2.3.

.3 No payment will be made for concrete excavation or demolition beyond the limits shown on the drawings, which has not been

1.4 MEASUREMENT AND PAYMENT (Cont'd)

.3 (Cont'd) authorized by the Departmental Representative. Any overbreak beyond these limits shall be replaced with concrete at the Contractor's expense.

1.5 SUBMITTALS

.1 Submittals in accordance with Section 01 33 00.

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

.3 Waste Reduction Workplan: prior to beginning of work on site submit detailed Waste Reduction Workplan in accordance with Section 01 74 20 and indicate:
.1 Descriptions of and anticipated quantities of materials to be salvaged reused, recycled and landfilled.
.2 Schedule of selective demolition.
.3 Number and location of dumpsters.
.4 Anticipated frequency of tippage.
.5 Name and address of haulers and waste facilities.

.4 Certificates: submit certified weigh bills and or receipts from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.
.1 Written authorization from Departmental Representative is required to deviate from haulers and facilities listed in Waste Reduction Workplan.

1.6 QUALITY ASSURANCE

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

1.7 DELIVERY, STORAGE AND HANDLING

.1 Perform Work in accordance with Section 01 35 43.

.2 Storage and Protection.
.1 Protect in accordance with Section 31 23 33.01.

1.7 DELIVERY, STORAGE AND HANDLING (Cont'd)

.2 (Cont'd)

.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 20.

.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 waste in accordance with Waste Management Plan.

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

.5 Ensure emptied containers are sealed and stored safely.

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

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

1.8 SITE CONDITIONS

.1 Site Environmental Requirements.

.1 Perform work in accordance with Section 01 35 43.

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

.3 Review existing site conditions and take necessary precautions to protect environment and adjacent non-work areas.

1.9 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 Prevent movement, settlement, or damage to remaining segments of lock walls and utilities, to remain in place. Provide bracing and shoring as required.

.2 Keep Noise, dust, and inconveniences to nearby occupants to a minimum.

.3 Provide temporary dust screens, covers, railings, supports and other protection as required.

.4 Sawcut and line drill existing wall to depth indicated on drawings. Use small, hand operated chippers for demolition and excavation components from approximately 1 m away from sawcuts.
.1 Take special care not to damage the structural integrity of the remaining portion of the remaining concrete by using equipment of appropriate weights (maximum 10kg).

3.2 PROTECTION

.1 Support affected structures and, if safety of structure being demolished or remaining component of structure appears to be endangered, take preventative measures, stop Work and immediately notify Departmental Representative.

3.3 SAFETY CODE

.1 Do demolition work in accordance with Section 01 56 00.

.2 Blasting operations not permitted during demolition.

3.4 DEMOLITION

.1 Demolish components of structure as shown on drawings and specified in specifications.

.2 Crush concrete generated due to demolition of chamber wall to size suitable for recycling.
.1 For further information regarding acceptable uses contact Provincial/Territorial aggregate producers associations and or Ministries of Transportation.

.3 Selective demolition of chamber walls to specified depths as indicated on drawings.

.4 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.

3.5 REMOVAL OPERATIONS

.1 Remove items as indicated.

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

.3 Remove designated trees if required, during demolition.
.1 Obtain written approval of Departmental Representative prior to removal of trees not designated on the drawings.

.4 Grind, chip, or shred other vegetation for mulching and composting.

.5 Stockpile topsoil for final grading and landscaping.
.1 Provide erosion control and seeding if not immediately used.

3.6 STOCKPILING

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

.2 Stockpile materials designated for alternate disposal in location which facilitates removal from site and examination by potential end

3.6 STOCKPILING (Cont'd)

.2 (Cont'd) markets, and which does not impede disassembly, processing, or hauling procedures.

3.7 REMOVAL FROM SITE

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

.2 Transport material designated for alternate disposal using approved facilities listed in Waste Reduction Workplan and in accordance with applicable regulations.
.1 Written authorization from Departmental Representative is required to deviate from facilities listed in Waste Reduction Workplan.

.3 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
.1 Disposal Facilities: approved and listed in Waste Reduction Workplan.
.2 Written authorization from Departmental Representative is required to deviate from disposal facilities listed in Waste Reduction Workplan.

3.8 RESTORATION

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

3.9 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

PART 1 - GENERAL

1.1 RELATED SECTIONS

.1 Section 03 20 00 - CONCRETE REINFORCING.

.2 Section 03 30 00 - CAST-IN-PLACE CONCRETE

1.2 MEASUREMENT PROCEDURES

.1 No measurement will be made under this Section. Include costs in items of work for which concrete formwork, falsework and accessories are required.

1.3 REFERENCES

.1 Canadian Standards Association (CSA)
.1 CSA-A23.1-09/A23.2-09, Concrete materials and methods of concrete construction/Test methods and standard practices for concrete.
.2 CAN/CSA-O86.1-01(R2006), Engineering Design in Wood (Limit States Design).
.3 CAN/CSA-O86.1S1-05, Supplement No. 1 to CAN/CSA-O86-01, Engineering Design in Wood (Limit States Design).
.4 CSA O121-08, Douglas Fir Plywood.
.5 CSA O151-09, Canadian Softwood Plywood.
.6 CSA O153-M1980(R2008), Poplar Plywood.
.7 CSA S269.1-1975(R2003), Falsework for Construction Purposes.
.8 CAN/CSA-S269.3-M92(R2008), Concrete Formwork.

.2 Council of Forest Industries of British Columbia (COFI)
.1 COFI Exterior Plywood for Concrete Formwork.

1.4 SHOP DRAWINGS

.1 Submit shop drawings for formwork and falsework in accordance with Section 01 33 00.

.2 Indicate method and schedule of construction, shoring, stripping and re-shoring procedures, materials, arrangement of joints, special architectural exposed finishes, ties, liners, and locations of temporary embedded parts. Comply with CSA S269.1, for falsework drawings. Comply with CAN/CSA-S269.3 for formwork drawings.

1.4 SHOP DRAWINGS (Cont'd)

.3 Indicate formwork design data, such as permissible rate of concrete placement, and temperature of concrete, in forms.

.4 Indicate sequence of erection and removal of formwork/falsework to minimize exposure time to adverse weather conditions.

.5 Each shop drawing submission shall bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada.

1.5 REQUIREMENTS OF REGULATORY AGENCIES

.1 Conform to municipal, provincial and national codes relating to design and construction of formwork and falsework.

1.6 WASTE MANAGEMENT AND DISPOSAL

.1 Separate and recycle waste materials in accordance with Section 01 74 20 and section 01 35 43.

.2 Use sealers, form release and stripping agents that are non-toxic, biodegradable and have zero or low VOC's.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Formwork materials:
.1 For concrete without special architectural features, use wood and wood product formwork materials to CAN/CSA-O86.1 CSA-O153.

.2 Form ties: use removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface.

.3 Form release agent: non-toxic, biodegradable, low VOC.

.4 Form stripping agent: colourless mineral oil, non-toxic, biodegradable, low VOC, free of kerosene, with viscosity between 15 to 24 mm^2/s at 40°C, flashpoint minimum 150°C, open cup.

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

2.1 MATERIALS (Cont'd)

.6 Formwork liner: Reusable Type III controlled permeability formwork (CPF) liner consisting of integrally bonded non-woven fabric and plastic mesh.

.1 The approved Type III CPF liner shall have the following properties:

.1 A maximum compression of less than 10% under pressure of 200 kPa.

.2 A maximum pore size of less than 0.05 mm.

.3 A minimum water retention capacity of 1.3 litres/m^2.

.4 A maximum absorbency of 0.1 litres/m^2.

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

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

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

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

.6 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.

.7 Align form joints and make watertight. Keep form joints to minimum.

.8 Use 25 mm chamfer strips on external corners, unless specified otherwise.

.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. Assure that all anchors and

3.1 FABRICATION AND ERECTION (Cont'd)

.10 (Cont'd) inserts will not protrude beyond surfaces designated to receive applied finishes.

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

.12 If flying forms are used, submit details of equipment and procedures for Departmental Representative's approval.

3.2 FORMWORK LINER

.1 Install controlled permeability formwork self-adhesive liner as per manufacturer's instructions on all formed surfaces.

3.3 FORM RELEASE AGENT

.1 No form release agent is required with CPF formwork liner applied as indicated.

.2 Apply agent where CPF fomwork liner can not be installed, such as but not limited too the corner chamfers. Surface preparation:
.1 Protect adjacent surfaces not designated to receive concrete form release.
.2 Clean and prepare surfaces to receive form release in accordance with manufacturer's instructions.
.3 Clean form surfaces thoroughly prior to application.
.4 Remove all rust, scale and/or previously used form release agents from the forms in accordance with good concrete practices.
.5 When using new wooden forms, form release shall be applied and re-applied until complete saturation has been accomplished prior to first use.

.3 Application:
.1 Apply concrete form release in accordance with manufacturer's instructions.

3.4 REMOVAL AND RESHORING

.1 Leave formwork in place for following minimum periods of time after placing concrete.
.1 Seven days.

.2 Provide all 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.

3.4 REMOVAL AND RESHORING (Cont'd)	.3	Re-use formwork and falsework subject to requirements of CSA-A23.1/A23.2.
3.5 FORMWORK AT CHAMBER CULVERT PIPES	.1	Form circular openings where existing culverts are located within the areas of concrete refacing.

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies the requirements for concrete reinforcement as described by the drawings and the specification.

1.2 RELATED SECTIONS

.1 Section 03 10 00 - Concrete forming and Accessories.

.2 Section 03 30 00 - Cast-in-Place Concrete.

.3 Section 01 33 00 - Submittal Procedures.

1.3 MEASUREMENT AND PAYMENT

.1 Measurement Procedures: in accordance with Section 01 22 01.

.2 Work covered by this section will be paid for under payment items included in the unit price table:

.1 Measure reinforcing steel in kilograms of steel incorporated into work, computed from theoretical unit mass specified in CSA-G30.18 for lengths and sizes of bars as indicated or authorized in writing by Departmental Representative.

.1 Item No. 6 Reinforcing Steel:

.1 For all concrete work as indicated in Contract documents.

.3 The reinforcing steel for all Type C anchors will be paid for under section 05 05 20.

.4 All other work of this section, which is not identified as a unit price item, is to be included in the Lump Sum Price stated in the Tender Form.

1.4 REFERENCES

.1 ASTM International

.1 ASTM A82/A82M-07, Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

1.4 REFERENCES (Cont'd)

.1 (Cont'd)

.2 ASTM A185/A185M-07, Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

.2 CSA International

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

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

.3 CSA G30.3-M1983(R1998), Cold Drawn Steel wire for Concrete Reinforcement.

.4 CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement.

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

.6 CSA W186-M1990(R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.

.3 Reinforcing Steel Institute of Canada (RSIC)

.1 RSIC-2013, Reinforcing Steel Manual of Standard Practice.

1.5 SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Prepare reinforcement drawings in accordance with RSIC Manual of Standard Practice.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada. Indicate placing of reinforcement and:

.1 Bar bending details.

.2 Lists.

.3 Quantities of reinforcement.

.4 Sizes, spacings, locations of reinforcement and mechanical splices if approved by Departmental Representative, with identifying code marks to permit correct placement without reference to structural drawings.

.5 Indicate sizes, spacings and locations of chairs, spacers and hangers.

1.5 SUBMITTALS (Cont'd)

.3 Shop Drawings:(Cont'd)
.2 Detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.
.1 Provide type B tension lap splices unless otherwise indicated.

1.6 QUALITY ASSURANCE

.1 Submit in accordance with Section 01 33 00.
.1 Mill Test Report: upon request, provide Departmental Representative with certified copy of mill test report of reinforcing steel, minimum three (3) weeks prior to beginning reinforcing work.
.2 Upon request submit in writing to Departmental Representative proposed source of reinforcement material to be supplied.

1.7 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 off in dry location and in accordance with manufacturer's recommendations in clean, dry, area.
.2 Replace defective or damaged materials with new.

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

2.1 MATERIALS (Cont'd)

.5 Mechanical splices: subject to approval of Departmental Representative.

2.2 FABRICATION

.1 Fabricate reinforcing steel in accordance with CSA A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by the Reinforcing Steel Institute of Ontario, Canada.

.2 Obtain Departmental Representative's written approval for locations of reinforcement splices other than those shown on placing drawings.

.3 Upon approval of Departmental Representative, weld reinforcement in accordance with CSA W186.

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

PART 3 - EXECUTION

3.1 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.

3.2 PLACING REINFORCEMENT

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

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

.3 Minimum cover for reinforcement: 75 mm unless indicated otherwise.

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

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specified the requirements for cast-in-place concrete placed as described by the drawings and the specifications.

.2 Three classes of concrete are used as described under paragraph 1.3.2.1 to 1.3.2.3.

1.2 RELATED SECTIONS

.1 Section 03 10 00 - Concrete Forming and Accessories.

.2 Section 03 20 00 - Concrete Reinforcing.

.3 Section 05 05 20 - Anchors.

.4 Section 31 23 35 - Excavating.

1.3 MEASUREMENT AND PAYMENT PROCEDURES

.1 Measurement Procedures: in accordance with Section 01 22 01.

.2 Work covered by this section will be paid for under payment items included in the Unit Price Table:

.1 Item No.5 - Class 1 Concrete:
  .1 Concrete in the construction of the new lock vertical refacing of chamber walls, breastwalls and monoliths starting 300mm below coping elevation.

.2 Item No. 6 - Class 2 Concrete:
  .1 Concrete in the construction of the coping refacing starting at elevation 167.64 to 150mm below top of coping over coping surfaces and 300mm below top of coping at locations overlapping vertical refacing.

.3 Item No. 7 - Class 3 Concrete:
  .1 Concrete in the existing valve shafts vertical wall refacing starting at 300mm below top of coping.

.3 Cast-in-place concrete will be measured in cubic metres calculated from field measured dimensions authorized in writing by the Departmental Representative.

.4 No deductions will be made for volume of concrete displaced by reinforcing steel.

1.3 MEASUREMENT AND PAYMENT PROCEDURES (Cont'd)

.5 Include in the prices of concrete the installation of all items embedded therein.

.6 Include in the prices of concrete the work described in Section 03 10 00.

.7 Include in the prices of concrete the supply and installations of waterstops.

.8 Include in the prices of concrete the supply and installation of joint filler, bond breaker and joint sealer.

.9 Include in the prices of concrete the heating, cooling, hot and cold weather protection, curing, and finishing.

.10 All other work, necessary to the completion of the work of this section, will not be measured separately for payment, but will be considered incidental to the work.

1.4 REFERENCES

.1 Reference Standards:

.1 ASTM International

.1 ASTM C260-/C260M-10a, Standard Specification for Air-Entraining Admixtures for Concrete.

.2 ASTM C309-11, Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

.3 ASTM C494/C494M-13, Standard Specification for Chemical Admixtures for Concrete.

.4 ASTM C1017/C1017M-07, Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.

.5 ASTM D412-06a(2013), Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.

.6 ASTM D570 -98(2010)e1, Standard test Method for Water Absorption of Plastics.

.7 ASTM D624-00(2012), Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer.

.8 ASTM D1751-04(2008), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

1.4 REFERENCES (Cont'd)

.1 (Cont'd)
.1 (Cont'd)
.9 ASTM D1752-04a(2008), Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.
.2 CSA International
.1 CSA A23.1-09/A23.2-09, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
.2 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.
.3 CAN/CSA-A3000-08, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
.4 CAN/CSA-A3001-08, Cementitious Materials for Use in Concrete.

1.5 SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00.

.2 Submit warranty performance parameters of concrete for review, including supporting back-up data and manufacturer's data sheets.

.3 At least four (4) weeks prior to beginning work, submit to Departmental Representative concrete mix design and product data of the following materials proposed for use: aggregate source, curing compound, joint filler, joint sealant, and waterstops.

.4 Concrete pours: provide accurate records of poured concrete items indicating date and location of pour, quality, air temperature and test samples taken.

.5 Concrete hauling time: provide for review by Departmental Representative deviations exceeding maximum allowable time of 90 minutes for concrete to be delivered to site of work and discharged after batching.

1.6 QUALITY ASSURANCE

.1 Provide Departmental Representative, minimum four (4) weeks prior to starting concrete work, with valid and recognized certificate from plant delivering concrete.
.1 Provide test data and certification by qualified independent inspection and testing

1.6 QUALITY ASSURANCE (Cont'd)

.1 (Cont'd)

.1 (Cont'd)

laboratory that materials and mix designs used in concrete mixture will meet specified requirements.

.2 Minimum four (4) weeks prior to starting concrete work, provide proposed quality control procedures for review by Departmental Representative on following items:

.1 Hot weather concrete.
.2 Cold weather concrete.
.3 Curing.
.4 Finishes.
.5 Formwork removal.
.6 Joints.

.3 Ensure that the mix design is adjusted suitably to prevent alkali aggregate reactivity problems.

1.7 DELIVERY, STORAGE AND HANDLING

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

.2 Modifications to maximum time limit must be agreed by the Departmental Representative and concrete producer as described in CSA A23.1/A23.2.

1.8 REQUIREMENTS OF REGULATORY AGENCIES

.1 Conform to municipal, provincial and national codes relating to design and construction of formwork.

PART 2 - PRODUCTS

2.1 APPROVALS

.1 All materials to be new and approved by the Departmental Representative.

.2 All concrete mixes to be approved by the Departmental Representative.

2.2 DESIGN CRITERIA

.1 To CSA A23.1/A23.2, and as described in CONCRETE MIX of PART 2 - PRODUCTS.

2.3 MATERIALS

.1 General:
.1 Do not use calcium chloride or compounds, or admixtures containing calcium chloride.
.2 Use consistent concrete ingredients, uniformly proportioned from batch to batch.

.2 Cement: to CAN/CSA-A3001, Normal Type GU.

.3 Supplementary cementing materials: with 20% to 30% hydraulic slag, by mass of total cementitious materials to CAN/CSA-A3001.

.4 Cementitious hydraulic slag: to CAN/CSA-A3000-08.

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

.6 Aggregates: to CSA A23.1/A23.2.
.1 hard, dense, well graded aggregates of normal mass-density, approved by the Departmental Representative both as to quality and source:
.2 Aggregates to be free from materials identified as having deleterious reactions with certain constituents of cements. Minimal amounts of these reactive materials will be given consideration for inclusion - the basis of consideration will be:
.1 Conformance to the requirement of CAN/CSA-A23.1/A23.2; and/or
.2 The performance criteria as given in Clause 5.9 of CAN/CSA-A23.1/A23.2.

.7 Admixtures:
.1 Air entraining admixture: to ASTM C260.
.2 Chemical admixture: to ASTM C494/C494M. Departmental Representative to approve accelerating or set retarding admixtures during cold and hot weather placing.
.3 Superplasticizers: to ASTM C1017.

.8 Curing compound: to CSA A23.1/A23.2 white and to ASTM C309, Type 1-chlorinated rubber.

.9 Waterstops:
.1 PVC waterstop:
.1 To be a flexible PVC (Polyvinyl chloride) extruded from an elastomeric plastic material of which the basic resin is prime virgin polyvinyl chloride. The PVC compound shall not contain any scrapped or reclaimed material or pigment whatsoever.

2.3 MATERIALS (Cont'd)

.9 Waterstops:(Cont'd)

.1 PVC waterstop:(Cont'd)

.2 For all expansion joints: ribbed with centerbulb type having the following dimensions: 225 mm wide by 9.5 mm thick.

.3 Performance Requirements to meet:

.1 Tensile strength: to ASTM D638 - 13.8 MPa(2000 psi).

.2 Tear resistance: 43.78N/mm or 102 kg/25.4 mm (225 lb/in) to ASTM D624.

.3 Ultimate elongation: minimum 300% to ASTM D638.

.4 Water absorption: 0.005 to 0.02% to ASTM D570.

.5 Low temperature brittleness: to ASTM D746, passed @ -37.2°C/-38.3 (-35°F/-37).

.6 Cold bend test at -45°C for 2 hours - no cracking.

.7 Stiffness in flexure: 4.8 kPa 700 psi) to ASTM D747.

.8 Specific Gravity (ASTM D792) - 1.4.

.2 Hydrophilic waterstop:

.1 For all construction joints.

.2 Rectangular profile measuring 7 mm thick x 25 mm wide and incorporating hollow longitudinal compression openings.

.3 Comprised of non-bentonite synthetic chloroprene rubber.

.4 Co-extruded hydrophilic and non-hydrophilic composition.

.5 Hardness exceeding 50 (ASTM-D2240).

.6 Tensile strength exceeding 30 kg/cm^2.

.7 Elongation of synthetic chloroprene rubber exceeding 600% (ASTM-D412).

.8 Elongation of chloroprene rubber only exceeding 400% (ASTM-D412).

.9 Volume expansion capability exceeding 3.0 times original size.

.10 Adhesive and sealant as recommended by waterstop manufacturer.

.10 Premoulded joint fillers:

.1 ASTM D175-05 (2011) - Standard Specification for preformed Closed Cell polyolefin Expansion Joint Fillers for Concrete Paving and Structural Construction.

.11 Joint Sealer: to Can/CGSB-19.12 Sealing Compound, Two part component, elastormeric, chemical curing. Type I for Horizontal joints, Type II for vertical joints.

2.3 MATERIALS (Cont'd)

.12 Bonding agent:To ASTM c1059/c1059M-99 (2008).

.13 Polyethylene foam: use as a bond breaker between joint filler and sealer as shown on drawings.

2.4 CONCRETE MIX

.1 Proportion concrete mix in accordance with CSA A23.1/A23.2 to meet following requirements - All classes of concrete:

.1 Cement: Mix of Type GU Portland cement and a cementitious hydraulic slag cement ranging between 20% and 30%.

.2 Minimum compressive strength at 28 days: 35 MPa.

.3 Maximum water/cementing materials ratio: 0.45.

.4 Class of exposure: F-1.

.5 Nominal size of coarse aggregate: 20 mm.

.6 Slump at time and point of discharge: 50 to 110 mm.

.7 Air content: 5 to 8%.

.8 Admixtures, Water reducing agents:quantity to manufacturer's recommendation.

.1 Do not use calcium chloride or materials containing calcium chloride.

.9 Weigh aggregates, cement, water and admixture separately when batching. No alternative method of measuring will be permitted.

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

.11 Concrete supplier's certification: both batch plant and materials meet CSA A23.1/A23.2 requirements.

PART 3 - EXECUTION

3.1 PREPARATION

.1 Obtain Departmental Representative's written approval before placing concrete.

.1 Provide 48 hours minimum notice prior to placing of concrete.

.2 Place concrete reinforcing in accordance with Section 03 20 00. Ensure that reinforcing steel, and other necessary items are in-place, clean and undamaged.

3.1 PREPARATION (Cont'd)

.3 Use proper and timely placing, finishing and curing practices.

.4 During concreting operations:
.1 Development of cold joints not allowed.
.2 Ensure concrete delivery and handling facilitates placing with minimum of re-handling, and without damage to existing structure or Work.

.5 Pumping of concrete is permitted only after approval of equipment and mix.

.6 Ensure reinforcement and inserts are not disturbed during concrete placement.

.7 Prior to placing of concrete obtain Departmental Representative's approval of proposed method for protection of concrete during placing and curing in adverse weather.

.8 Protect previous work from staining.

.9 Clean and remove stains prior to application for concrete finishes.

.10 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

.11 Do not place load upon new concrete until authorized by Departmental Representative.

3.2 FORMWORK

.1 Construct mortar-tight formwork in accordance with reviewed formwork drawings, maintain tolerances of finished concrete work as specified in CAN/CSA-A23.1/A23.2.

.2 Where forms appear to be unsatisfactory stop work until defects corrected.

.3 Strip forms to CAN/CSA-A23.1/A23.2.

3.3 INSTALLATION/ APPLICATION

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

.2 Place concrete continuously from start to finish:
.1 At such rates as to permit satisfactory placing and compaction - plan the work and use

3.3 INSTALLATION/ APPLICATION (Cont'd)

.2 (Cont'd)
.1 (Cont'd)
such methods and performance rates as to allow no cold joints and/or honeycomb;
.2 During clement weather or with protection;
.3 During daylight hours;
.4 Without unscheduled construction joints.

.3 When applicable - pumping concrete:
.1 Arrange equipment so that no vibrations result which might damage freshly placed concrete. Use reversible pumps.
.2 Operate pump so that a continuous stream of concrete without air pockets is produced.
.3 When pumping is discontinued and concrete remaining in pipe line is to be used, void pipe line in a manner that prevents contamination of concrete or separation of ingredients.

.4 Embedded parts:
.1 Set other embedded parts and openings as indicated or specified elsewhere.
.2 Check locations and sizes of embedded parts and openings shown on drawings.

.5 Anchor bolts:
.1 Set anchor bolts to templates in co-ordination with appropriate trade prior to placing concrete.
.2 Grout anchor bolts in preformed holes or holes drilled after concrete has set only after receipt of written approval from Departmental Representative.
.1 Drilled holes: 25 mm minimum diameter larger than bolts used to manufacturers' recommendations.
.3 Protect anchor bolt holes from water accumulations, snow and ice build-ups.
.4 Set bolts and fill holes with shrinkage compensating grout.

.6 Do not commence placing concrete until the Departmental Representative has inspected and approved forms, falsework, reinforcing steel, conveying, spreading consolidation and finishing equipment, and curing and protective methods.

.7 Joint fillers:
.1 Furnish filler for each joint in single piece for depth and width required for joint,

3.3 INSTALLATION/ APPLICATION (Cont'd)

.7 Joint fillers:(Cont'd)
.1 (Cont'd)
unless otherwise authorized by Departmental Representative. When more than one piece is required for a joint, fasten abutting ends and hold securely to shape by stapling or other positive fastening.
.2 Locate and form construction and expansion joints as indicated. Install joint filler, bond breaker and sealer.

.8 Joint Sealant:
.1 Install to manufacturer's recommendations.

.9 Waterstops (PVC and hydrophilic):
.1 Install waterstops at locations shown on the drawings and to CAN/CSA-A23.1/A23.2-09. Follow manufacturer's recommendations.
.2 Install waterstops to provide continuous water seal.
.3 Do not distort or pierce waterstop in way as to hamper performance.
.4 Do not displace reinforcement when installing waterstops.
.5 Use equipment to manufacturer's requirements to field splice waterstops.
.6 Tie waterstops rigidly in place.
.7 Use only straight heat sealed butt joints in field.
.8 Use factory welded corners and intersections unless otherwise approved by Departmental Representative.
.9 Use adhesive and sealant as recommended by waterstop manufacturer.

.10 Finishing and curing:
.1 Finish concrete in accordance with CAN/CSA-A23.1/A23.2.
.2 Unformed surface concrete tolerance to conventional classification in accordance with straight edge method.
.3 Use wood float finish for unformed surfaces.
.4 Fill all holes due to formwork installation with concrete and smooth with steel trowel.

3.4 BONDING AGENT

.1 Apply two coats of bonding agent on all sawcut and other stone faces in contact with new concrete.

3.4 BONDING AGENT (Cont'd)

.2 Follow the manufacturer's instructions for application.

3.5 CURING

.1 If formwork is left in place for 7 days or more, no additional curing will be required. If formwork is removed in less than 7 days, cure with double-layer of wet burlap. Maintain burlap in place and keep thoroughly wet for 7 days after day of placing.

.2 Unformed surfaces: cure with burlap and water. Carefully place two layers of damp burlap on the surface of the concrete. Overlap each strip by at least 75 mm and secure against displacement by wind. Maintain burlap in place and keep thoroughly wet for 7 days after day of placing.

.3 During curing period uncover only such areas that are immediately needed for finish treatment. Recover and continue curing.

3.6 COLD WEATHER PROTECTION

.1 For concrete and grout placed when air temperature is at or below 5 degrees Celsius, in addition to cold weather requirements of CAN/CSA-A23.1/A23.2:
.1 Protect concrete by a windproof shelter of canvas or other material to allow free circulation of inside air around fresh concrete. At no point let walls of shelter touch formwork. Provide sufficient space for removal of formwork for finishing. Supply approved heating equipment. Vent the products of combustion outside the protective shelter. Equipment shall be capable of keeping inside air at a constant temperature sufficiently high to maintain concrete at following curing temperatures:
.2 Ensure that a minimum substrate temperature of 5 degrees Celsius shall be achieved and maintained, prior to concrete pour.
.3 For an initial 3 days, at a temperature of not less than 15 degrees Celsius nor more than 27 degrees Celsius at concrete surfaces.
.4 Cure at not less than 10 degrees Celsius for an extra 4 days.
.5 Keep concrete surfaces moist continuously while protected.

3.6 COLD WEATHER PROTECTION (Cont'd)

.1 (Cont'd)
.6 Reduce temperature at a rate not exceeding 10 degrees Celsius per day until outside temperature has been reached.

3.7 HOT WEATHER REQUIREMENTS

.1 When applicable, during hot weather place concrete to hot weather requirements of CAN/CSA-A23.1/A23.2, clause 21.2. Ensure concrete temperatures at placing meet the requirements of Table 15: take suitable control measures when mixing ingredients.

3.8 FIELD QUALITY CONTROL

.1 Inspection and testing of concrete and concrete materials will be carried out by testing laboratory designated by Departmental Representative for review to CSA A23.1/A23.2.
.1 Ensure testing laboratory is certified to CSA A283.

.2 Departmental Representative will pay for costs of tests.

.3 Departmental Representative will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.

.4 If tests do not meet requirements of the Departmental representative, take such measures as indicated in CAN/CSA-A23.1/A23.2, after confirmed approval by the Departmental Representative.

.5 Non-Destructive Methods for Testing Concrete: to CSA A23.1/A23.2.

.6 Inspection or testing by Consultant will not augment or replace Contractor quality control nor relieve Contractor of his contractual responsibility.

3.9 CLEANING

.1 Cleaning of concrete equipment to be done in accordance with Section 01 35 43.

.2 Divert unused concrete materials from landfill to local quarry or facility after receipt of written approval from Departmental Representative.

3.9 CLEANING (Cont'd)

.3 Provide appropriate area on job site where concrete trucks and be safely washed.

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies requirements for drilling anchor holes, and supply and installation of anchors, including grouting, as described by the drawings and the specification.

.2 The lock site lies in an area of Paleozoic limestone bedrock with relative compressive strength of

1.2 SHOP DRAWINGS

.1 Submit shop drawings in accordance with Section 01 33 00.

1.3 QUALIFICATIONS

.1 The installation of the anchors Type A (rock anchors) is to be performed by a contractor with at least five (5) years experience in this type of work.

.2 The Contractor is obligated to provide examples of relevant experience to the Departmental Representative, if requested. Proof of the crew experience providing the work may also be requested.

1.4 MEASUREMENT AND PAYMENT

.1 The work of the anchor installation will be paid for under payment item included in the Unit Price Table:
.1 Item No. 8 - Anchors Type A - per linear metre of anchor in place.
.2 Item No. 9 - Anchors Type B - per each anchor.
.3 Item No. 10 - Anchors Type C - per each anchor.

.2 The price for Type A anchors includes:
.1 Drilling including casing when required; setting and stressing; supplying and placing all attached hardware; excavating for anchor heads; supplying and placing the grout pad for anchor plates; supplying and placing the anchor grout; and performance testing of total of 4 anchors (2 per lock side) selected by Departmental Representative. Proof testing of all other anchors.

1.4 MEASUREMENT AND PAYMENT (Cont'd)

.3 The price for Type B anchors includes:
.1 Drilling hole in concrete base material; supplying and placing all attached hardware; supplying and placing anchor grout; and proof testing a total of 20 anchors (10 per lock side) selected by Departmental Representative.

.4 The price for Type C anchors includes:
.1 Drilling hole in concrete base material; supplying and grouting rebars of size, length and shape shown on drawings.

.5 Housing and heating are included in the unit price for each anchor.

.6 All other work, necessary for the completion of the work of this section, will not be measured separately for payment, but will be considered as incidental to the work of this section.

1.5 SEQUENCE OF WORK

.1 Anchors Type A shall be installed, including post-tensioning, after the excavation of the face 300 mm depth, but before placing the new concrete.

PART 2 - PRODUCTS

2.1 MATERIALS-GENERAL

.1 Use materials approved by the Departmental Representative.

.2 Epoxy resin anchors shall not be considered equivalent for Type B anchors. Use only mechanical anchors.

.3 Supply anchors in one piece, up to maximum continuous length produced by manufacturer. Strength of couplings to be equal to bar.

.4 Anchors to be complete with all accessory parts as specified by the manufacturer, and additional accessories indicated on the drawings or described in the specification.

.5 Adhesive type anchors to be anchored with epoxy acrylate resin.Polyester resins will not be accpeted.

2.1 MATERIALS-GENERAL (Cont'd)

.6 All steel components of the anchor to be hot dipped galvanized.

.7 Clean steel surfaces of all deleterious matter. Remove grease or oils thoroughly. Bars showing pitting will be rejected.

.8 Store bars straight, and protect threads.

.9 Deliver cementitious materials in clearly marked, sealed bags.

.10 Store materials in dry, heated enclosure maintained between 2 and 40 degrees C.

2.2 TYPE A ANCHORS

.1 Grouted anchors, to CSA Standard G279-M1982(R1998), Grade 835/1030 MPa proof stressed prestressing bars. All-thread bar conforming to ASTM A615/A615M-12.

.2 Steel bearing plates to ASTM A36/A36M-12.

.3 Nuts to be hexagonal, heavy duty type with round head, conforming to ASTM A325M-13 or the bar manufacturer's specifications.

.4 Nominal diameter: 32 mm.

.5 Minimum ultimate tensile strength: 834 kN.

.6 Double corrosion protected to the following:
.1 Deformed prestressing bar centred in corrugated plastic sheathing, with the annular space between the bar and sheathing filled with grout.
.2 Sleeve of smooth sheathing fitting snugly over the corrugated sheathing in the free stressing length to guarantee unobstructed elongation during stressing.
.3 Plastic end cap filled with mastic corrosion inhibitor.
.4 The anchor to be pre-assembled and pre-grouted at the factory prior to shipping to the job site.
.5 Sleeve and corrugated sheathing to be plastic with minimum compressive strength of 100 MPa and minimum tensile strength of 45 MPa.
.6 Sleeve and sheathing to be non-reactive with concrete and its ingredients, gas and water tight, resistant to chemical attack and aging.

2.2 TYPE A ANCHORS (Cont'd)

.6 (Cont'd)
.7 Deformations in corrugated plastic sheathing to develop a minimum bond of 5 MPa with grout having a minimum compressive strength of 25 MPa.

.7 Anchor length: free length = 5 m, bonded length = 6 m, tail length =0.5 m, for a total anchor length of 11.5 m.

.8 Locations:
.1 Type A - anchors in the chamber walls of Lock 15.

2.3 TYPE B ANCHORS

.1 Solid rock and concrete anchor.

.2 Pre-stressable mechanical expansion anchor and steel bar, threaded as required.

.3 Steel plates to ASTM A36/A36M-12.
.1 plate size (millimetres) : 10 x 152 x 152.

.4 Location, capacity, diameter and length:
.1 General refacing of Lock 15; guaranteed ultimate tensile strength 160 kN; nominal diameter 19 mm; maximum 1220 mm long or as shown on drawings.

2.4 TYPE C ANCHORS

.1 Deformed bars to CAN/CSA-G30.18-09, Carbon Steel Bars for Concrete Reinforcement, grade 400.

.2 20M dowels in the refacing of lock chamber walls, monoliths walls and breastwall as shown on drawings.

.3 15M dowels in varies locations as shown on drawings.

2.5 TYPE A ANCHOR GROUT

.1 Proportion grout mix to comply with the following requirements:
.1 28 day compressive strength: 35 MPa;
.2 Maximum water/cement ratio 0.4;
.3 Portland cement type GU;
.4 Do not use expanding or shrinkage compensating agents, unless otherwise approved by Departmental Representative.

2.5 TYPE A ANCHOR GROUT (Cont'd)

.1 (Cont'd)
.5 Use admixtures, including superplasticizers and anti-washout agents as required.
.6 Alternatively, a cable grout approved by the manufacturer of the anchors can be used.

2.6 TYPE B ANCHOR GROUT

.1 Same as 2.5.1 with the exception of anti-washout agents.

2.7 TYPE C ANCHOR GROUT

.1 Same as 2.5.1 with the exception of anti-washout agents.

.2 For Type C anchors in areas of underwater application, acrylic epoxy grout to be used. Drill hole size as recommended by manufacturer. Embedment depths, to remain as shown on the drawings.

PART 3 - EXECUTION

3.1 GENERAL

.1 Except as specified in this section, install to the manufacturer's recommendations.

.2 For all anchors: provide housing and heating for anchors and grouting and stressing equipment, when the temperature is under 5° Celsius. Maintain housing above 10° Celsius for 3 days after grouting.

.3 Minimum substrate temperature shall be maintained at 5° Celsius minimum, prior to grouting.

.4 The Contractor is to provide to the Departmental Representative a complete list of equipment which will be used for work, prior to starting any work.

3.2 STRESSING EQUIPMENT

.1 Supply tensioning equipment specially adapted to the anchor system used.

.2 Design equipment to impose a controlled force gradually, inducing no dangerous secondary

3.2 STRESSING EQUIPMENT (Cont'd)

.2 (Cont'd) stresses in the bar, anchor head or supported structure.

.3 Tension anchor in one operation.

.4 Provide load cells which are robust and appropriately protected for site work; capable of accurate centering on the jack to ensure co-axiality with the bar. Provide calibration certificates.

.5 Calibrate load recording instruments with the actual tendon to be used on site.

.6 Provide calibration certificates for pressure gauges. Mount duplicate gauges adjacent to the jack, when the pump is more than 5 m from the jack. Provide gauge capacity within 80% to 160% of the bar strength; accuracy within 2% of actual tensioning force.

.7 Assemble stressing head and bearing plate concentrically with anchor bar within plus or minus 10 mm, and not more than 5 degrees from the bar axis.

.8 Ensure that the free anchor length is ice free before stressing.

.9 During stressing, take adequate precautions to protect personnel and property from injury and damage due to failure of the bar or the stressing equipment. Post notices stating "DANGER - Tensioning in Progress".

3.3 GROUT MIXING

.1 Provide water free of deleterious materials.

.2 Add water to mixer before cement.

.3 Mix for 3 minutes minimum, with high speed mixer (1000 rpm minimum), or paddle mixer (150 rpm minimum).

.4 Provide holding tank with paddle mixer.

.5 Inject grout within initial setting time.

3.4 INSTALLATION

.1 Type A anchors:

.1 During drilling, record all changes in bedrock characteristics.

.2 Drill hole entry point to be within 75 mm of plan.

.3 Drill hole alignment to be within 3 degrees of the angle shown on the drawings. Straightness of drill hole to be such that deviation from a straight line in any 3 meters is less than 25 mm.

.4 Drill hole using casing where required, continuously cleaning out with water.

.5 Before installation of anchor, clean out with water jet and high pressure air.

.6 Probe hole to ensure absence of obstruction.

.7 Depth of holes shown on the drawings is the minimum required.

.8 Install anchor in accordance with manufacturer's specifications.

.9 Use centering devices at 3 m centers.

.10 Inject grout at the lowest point of drill hole, and fill completely, in one continuous operation.

.11 Place grout pad for anchor plate bearing.

.12 When grout has cured, do performance test to clause 3.6.1 for the first two anchors on each side of lock.

.13 Do proof test to clause 3.6.2 for all other anchors.

.14 Lock off anchor at 550 kN.

.15 Install accessory plates and nuts as shown on the drawings.

.2 The Contractor shall provide to Departmental Representative all details describing method that will be used to lower/install the anchor into the drilled hole.

.3 Type B anchors:

.1 Type B anchors are not prestressed.

.2 Drill holes, using manufacturer's recommended drill size, to extend 150 mm beyond the length of the rock bolt.

.3 Clean the hole thoroughly of dust and debris.

.4 Place nut, washer and plate on rock bolt, attach grout tube, and lower bolt into drill hole with thrust-ring and malleable shell cone set in position on the inner threaded portion of the bolt.

.5 Set the expansion anchor by torquing the rod to the torque required by the manufacturer's specifications.

3.4 INSTALLATION (Cont'd)

.3 Type B anchors:(Cont'd)

.6 Place de-air tube at the highest point of the hole.

.7 At the appropriate stage, grout with anchor grout through grout tube until a continuous flow of grout starts coming out of the de-air tube.

.8 Install extensions, couplings and accessory plates and nuts as shown on the drawings.

.9 Do proof test on 20 anchors at locations selected by the Departmental Representative, using a design load, P = 80 kN. Test anchor as per Type A anchor proof test (sub-paragraph 3.6.2)

.4 Type C anchors:

.1 Cementitious Grout:

.1 Drill holes at least 25mm larger than the bar diameter. Clean thoroughly by air or water jet.

.2 Install bars with grout and de-air tubes securely attached.

.3 Mortar the drill hole opening.

.4 Pump grout through grout tube until continuous flow of grout is coming out of the de-air tube.

.2 Acrylic epoxy grout:

.1 Drill holes to diameter recommended by manufacturer. clean thoroughly by air or water jet.

.2 Install bars as directed by manufacturer instructions.

3.5 GROUT TESTING

.1 Test compressive strength of grout using 50 mm cube specimens in accordance with CAN/CSA-A23.2-6B-09 (See A23.2-09).

.2 Obtain samples for testing from each different batch of grout, from the grout tube.

3.6 ROCK ANCHOR TESTING

.1 Performance Test - Type A:

.1 Incrementally load and unload the anchor in accordance with the following schedule. At each increment, record the movement of the

anchor head to an accuracy of 0.025 mm with respect to an independent fixed reference point. Monitor the jack load with a pressure gauge or a load cell. P = design load = 500 kN. kN. AL = alignment load = 2 to 10 % of P.

Performance test:
AL
0.25 P
AL
0.25 P
0.50 P
AL
0.25 P
0.50 P
0.75 P
AL
0.25 P
0.50 P
0.75 P
1.00 P
AL
0.25 P
0.50 P
1.00 P
1.20 P
AL
0.25 P
0.50 P
1.00 P
1.20 P
1.33 P (Hold for creep test)

.2 Hold creep test load for 10 minutes. Record total movements at 1,2,3,4,5,6,10 minutes. If the total movement between 1 minute and 10 minutes exceeds 1 mm, hold test load for an additional 50 minutes. Record total movement at 15,20,25,30,45,60 minutes

.2 Proof test:

.1 Incremental load the anchor in accordance with the following schedule. Record movement at each increment to an accuracy of 0.025 mm with respect to an independent fixed reference point. Monitor jack load with a pressure gauge or load cell. P = design load.

Proof Test
0.25 P
0.50 P
0.75 P
1.00 P
1.20 P

3.6 ROCK ANCHOR TESTING (Cont'd)

.3 Acceptance Criteria: an anchor will be acceptable if:

.1 The total elastic movement obtained from the performance test exceeds 80 % of the theoretical elastic elongation of the stressing length and is less than the theoretical elastic elongation of the stressing length plus 50 % of the bond length.

.2 The creep movement does not exceed 2 mm during the final time increment of the performance test.

.3 The proof test results do not vary significantly from the performance test results.

.4 Lift-off tests show an anchor load within 10% of the specified lock-off load.

.4 Reports: provide copies of all data to the Departmental Representative.

3.7 MANUFACTURERS' SPECIFICATIONS

.1 Keep a manual of manufacturers' specifications and installation procedures at the work site.

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies requirements for the supply and installation of all parts embedded in cast-in-place concrete including anchors unless specifically noted otherwise; other metal fabrications as described by the drawings and specification;

.2 The work includes but is not necessarily limited to the supply and installation of:
- .1 electrical/hydraulic trench frames and covers;
- .2 frames and covers for valve shaft openings in the lock coping.
- .3 Supply and installation of new mooring lines and anchorage.

1.2 RELATED SECTION

.1 Section 03 30 00 - Cast In Place Concrete.

1.3 REFERENCES

.1 ASTM International
- .1 ASTM A123/A123M-12, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A307-12, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
- .3 ASTM A780-09, Standard Practice for Repair of Damaged and uncoated Areas of Hot-Dip Galvanized Coatings.
- .4 ASTM A603-98(2009)e1, Standard Specification for Zinc-Coated steel Structural wire rope.
- .5 ASTM A492-95(2009), Standard Specification for stainless steel rope wire.

.2 Canadian General Standards Board (CGSB) CGSB 1-GP-181M-99 Coating, Zinc-Rich, Organic, Ready Mixed.

.3 CSA International
- .1 CSA G40.20-04(R2009)/G40.21-04(R2009), General Requirements for Rolled or Welded

1.3 REFERENCES (Cont'd)

.3 (Cont'd)
.1 (Cont'd)
Structural Quality Steel/Structural Quality Steel.
.2 CSA S16-09, Design of Steel Structures.
.3 CSA W48-06 (R2011), Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
.4 CSA W59-03(R2008), Welded Steel Construction (Metal Arc Welding) Metric.
.5 CSA G4.00(R2006), Steel Wire Rope for General Purpose and for Mine Hoisting And Mine Haulage.

.4 Health Canada / Workplace Hazardous Materials Information System (WHMIS)
.1 Material Safety Data Sheets (MSDS).

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit in accordance with Section 01 33 00.

.2 Shop Drawings:
.1 Submit drawings in accordance with Section 01 33 00.
.2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

1.5 MEASUREMENT AND PAYMENT

.1 There will be no measurement of work included in this Section.

.2 Payment shall be included in the Lump Sum Price.

1.6 DELIVERY, STORAGE AND HANDLING

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

.2 Storage and Handling Requirements:
.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations.
.2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 Steel sections and plates: to CSA G40.20/G40.21, Grade 300W,unless noted otherwise.

.2 Welding materials: to CSA W59.

.3 Welding electrodes: to CSA W48 Series.

.4 Bolts and anchor bolts: to ASTM A307.

.5 Frames and covers for the valve shaft openings and electrical/hydraulic trenches:
.1 Steel, galvanized finish, fabricate from 7.9 mm thick raised pattern plate set in galvanized angle frame.
.2 Supply trench covers in dimensions and lengths as indicated on the drawings.

.6 Zinc primer: zinc rich, ready mix to CGSB 1-GP-181M.

.7 PVC coated wire strand rope: to ASTM A603-98.

2.2 FABRICATION

.1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.

.2 Use self-tapping shake-proof flat headed screws on items requiring assembly by screws or as indicated.

.3 Where possible, fit and shop assemble work, ready for erection.

.4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

2.3 FINISHES

.1 Galvanizing: hot dipped galvanizing with zinc coating 600 g/m^2, Coating Grade 85, to ASTM A123/A123M.
.1 Touch-up primer for galvanized coating SPCC 20 Type I inorganic zinc rich.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for metal fabrications 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 ERECTION

.1 Do welding work in accordance with CSA W59 unless specified otherwise.

.2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.

.3 Exposed fastening devices to match finish and be compatible with material through which they pass.

.4 Supply components for work by other trades in accordance with shop drawings and schedule.

.5 Deliver items over for casting into concrete together with setting templates to appropriate location and construction personnel.

.6 Touch-up scratched galvanized surfaces with zinc primer where damaged.

3.3 TRENCH COVERS

.1 Install trench covers in locations as indicated.

3.4 MOORING CABLES

.1 Reinstall new mooring cables in original locations as indicated on the drawings or as per existing details from initial contractor survey. Supply new anchors, as required for re-installation.

3.4 MOORING CABLES (Cont'd)

.2 Cable: PVC coated wire strand rope - 3/8" diameter, 1 x 7 strand galvanized wire rope - black PVC coated to outside diameter 1" with galvanized closed spelter sockets. Compare and match existing if discrepancies are found.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by metal fabrications installation.

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies the requirements for reinstating damaged landscaped areas within the work and staging areas, access route and areas disturbed by the work and consists of:
.1 Restoring concrete curbs placement.
.2 Restoring existing access route and parking area to its original state.
.3 Supplying, placing, and finish grading of a topsoil bed.
.4 Supplying and placing nursery sod
.5 Restoring lawn by seeding grass.
.6 Maintaining sodded and seeded areas until acceptance.

.2 All disturbed sodded areas, within the limits of excavation zone, to be covered with topsoil, smoothed to the finish grade, and re-sodded at Contractor's expense.

.3 All disturbed sodded areas, outside the limits of excavation zone, as shown on the drawings, to be covered with topsoil, smoothed to the finish grade, and restored by seeding at Contractor's expense.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 There will be no measurement of General Landscaping.

.2 Payment of General Landscaping shall be included in the Lump Sum Price.

1.3 RELATED SECTIONS

.1 Section 01 11 00 - General Instructions.

.2 Section 01 35 43 - Environmental Procedures.

1.4 PRELIMINARY INSPECTION

.1 Establish the condition of sodded areas in conjunction with Departmental Representative before starting work.

1.5 SOURCE QUALITY CONTROL

.1 At least 2 weeks before starting final topsoil work, advise Departmental Representative of proposed sources of topsoil and grass seeds. Provide Departmental Representative with access to the sources for inspection, sampling and testing.

.2 When proposed sources are approved, use no other sources without written authorization from Departmental Representative.

1.6 DELIVERY AND STORAGE

.1 Schedule deliveries in order to keep storage at the job site to a minimum without causing delays.

.2 Deliver, unload and store rolled sod on pallets only.

.3 Deliver sod to site within 24 hours of being lifted and lay sod within 36 hours of being lifted.

.4 Do not deliver small, irregular, or broken pieces of sod. Departmental Representative will reject these.

.5 During wet weather, allow sod to dry sufficiently to prevent tearing during lifting and handling.

.6 During dry weather, protect sod and from drying. Water sod as necessary to ensure its vitality and prevent dropping soil in handling. The Departmental Representative will reject dried-out sod.

1.7 SCHEDULING OF SODDING AND SEEDING WORK

.1 Schedule sod laying and seeding to coincide with final topsoil operations.

.2 Obtain Departmental Representative's approval of the schedule for seeding before proceeding.

PART 2 - PRODUCTS

2.1 TOPSOIL

.1 New topsoil to be a friable sandy-clayish loam of good humus content, suitable for supporting sod growth, free from:
.1 Debris and stones over 50 mm diameter.
.2 Coarse vegetative material, 10 mm diameter and 100 mm length, occupying more than 2% of soil volume.

.2 Approval of topsoil material subject to soil testing and analysis. Testing of topsoil will be carried out by testing laboratory designated by Departmental Representative. Departmental Representative will pay for cost of tests.

2.2 SOD

.1 Nursery sod: Quality and source to comply with standards outlined in "Guide Specification for Nursery Stock", Section 17, 1978 edition, published by Canadian Nursery Trades Association.
.1 Number 1 Kentucky Bluegrass/Fescue sod" sod grown from minimum 40% Kentucky Bluegrass, 30% Creeping Red Fescue.

2.3 SEEDS

.1 Number 1 Kentucky Bluegrass/Fescue seeds to produce sod with minimum 40% Kentucky Bluegrass, 30% Creeping Red Fescue.

PART 3 - EXECUTION

3.1 PREPARATION OF TOPSOIL SUB-GRADE

.1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and do not start other landscape work in that area until instructed to do so in writing by Departmental Representative.

.2 Grade soil, eliminating uneven areas and low spots, ensuring that new sodded surface will be faired-off to the existing sodded areas with no sharp transition.

.3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious

3.1 PREPARATION OF TOPSOIL SUB-GRADE (Cont'd)

.3 (Cont'd) materials. Remove debris which protrudes more than 75 mm above surface. Dispose of removed material off site.

.4 Coarse cultivate entire area which is to receive topsoil to depth of 100 mm. Coarse cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.2 PLACING AND SPREADING OF TOPSOIL

.1 Place topsoil after Departmental Representative has accepted sub-grade.

.2 Spread topsoil to 150 mm minimum depth after settlement and 80% compaction. Keep final elevation 15 mm below finished grade to allow room for sod.

.3 Manually spread topsoil around trees, shrubs and obstacles.

.4 Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.

.5 Consolidate topsoil to required bulk density using equipment approved by Departmental Representative. Leave surfaces smooth, uniform and firm enough to resist deep footprints.

3.3 ACCEPTANCE OF TOPSOIL GRADING

.1 Departmental Representative will inspect topsoil in place and determine acceptance of depth of topsoil and finish grading.

3.4 SURPLUS TOPSOIL MATERIAL

.1 Dispose of materials not required off site.

3.5 SODDING AND SEEDING

.1 Obtain Departmental Representative's approval of topsoil grade and depth before starting sodding and seeding lawn.

.2 Loosen surface of topsoil where it has become compacted.

.3 Protect all sodded and seeded areas against any damage until sod has been fully

3.5 SODDING AND SEEDING (Cont'd)

.3 (Cont'd) established. Supply and install required protective apparatus.

3.6 SOD PLACEMENT

.1 Lay sod within 18 hours of being lifted if air temperature exceeds 20 degrees C.

.2 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.

.3 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.

3.7 MAINTENANCE OF SODDED AND SEEDED AREAS

.1 Maintain sodded and seeded areas until accepted by Departmental Representative.

.2 Apply water to ensure establishment and continuous growth of grass. Apply sufficient water to ensure moisture penetration of 200 mm into soil below sod.

.3 Cut grass when it reaches a height of 80 mm. Cut grass thereafter frequently enough to be kept at a height of 80 to 100 mm. Allow clippings to remain.

3.8 ACCEPTANCE OF SODDED AND SEEDED AREAS

.1 Approval of material at its source does not prevent subsequent rejection on job site.

.2 Sodded and seeded lawn will be approved when:
.1 Growth of sodded and seeded areas has been properly established;
.2 Turf is free of bare and dead spots;
.3 No surface soil is visible when grass has been mowed to a height of 80 mm; and,
.4 Grass has been cut a minimum of 2 times.

3.9 SODDING ON SLOPES GREATER THAN THREE TO ONE	.1	Lay sod sections perpendicular to slopes greater than 3:1 (run/rise) and secure with stakes. Place 3 stakes per m^2, 100 mm below top edge to prevent shifting of sod and drive stakes flush with top of sod soil.

END

PART 1 - GENERAL

1.1 DESCRIPTION

.1 This section specifies requirements for dewatering work described by drawings and specifications.

.2 The work includes but is not limited to:

.1 The design, construction, maintenance and operation methods to improve the water tighness of the downstream dewatering structure (Service stoplogs), and of the systems used to remove water from the work spaces.

.1 Service stoplogs to be provided by PCA. Contractor is responsible for loading, unloading, transportation and installation of stoplogs at the beginning and completion of the project.

.2 PCA does not have a certified crane in the yard.

.3 Stoplogs are located at the Parks Canada Agency service yard located at: TSW Shops Building Yard, 2155 Ashburnham Drive, Peterborough, Ontario, K9L 1P8

.2 Provision and maintenance of a dewatering systems for removal of water from the work spaces.

.3 Removal of water from the work spaces and the continued maintenance of these spaces in the dry state for the duration of the work to meet work requirements and environmental regulations.

.4 Supply of standby equipment to replace dewatering equipment which malfunctions.

.5 The removal of the materials used to improve the dewatering structure, no later than April 30th, 2014.

1.2 MEASUREMENT AND PAYMENT PROCEDURES

.1 There will be no measurement of Dewatering.

.2 Payment of Dewatering work shall be included in the Lump Sum Price.

1.3 RELATED WORK

.1 Section 01 35 43 - ENVIRONMENTAL PROCEDURES.

1.4 REGULATORY REQUIREMENTS

.1 Adhere to local, provincial and federal requirements relating to:
.1 Protection of environment;
.2 Safety of construction; and
.3 Protection of workers.

.2 Pumping water out of dewatering enclosure: to Section 01 35 43.

.3 Obtain and pay costs of, all required permits.

1.5 SUBMITTALS

.1 Shop drawings presenting methodology of water-tight dewatering systems and additional components.

.2 Submit detail drawings to Regulatory Agencies, as required to satisfy conditions for granting of permits.

1.6 DESIGN CRITERIA

.1 Ensure maintenance of work spaces in a dry state for duration of work.

.2 Plan dewatering systems considering:
.1 Access to dewatering systems and access to reach any portion of Work.
.2 Space required for crews to work in dewatered areas.
.3 Sequence of Work.
.4 Water levels.
.5 Environmental regulations and requirements.

.3 At all times, maintain environmental quality of water to Section 01 35 43 - ENVIRONMENTAL PROCEDURES.

.4 Ensure that no phase of Work threatens safe performance of stoplogs and additional dewatering systems.

.5 Provide a minimum of 300 mm freeboard above the normal navigation levels.

1.7 WATER LEVELS

.1 Refer to Section 01 11 00 - GENERAL INSTRUCTIONS.

.2 There may be considerable ponding in low areas, particularly in the lock.

1.7 WATER LEVELS (Cont'd)

.3 The work spaces are to be dewatered and maintained in the dewatered condition as part of the work of this section.

1.8 ENVIRONMENTAL REQUIREMENTS

.1 Dispose of water so that it does not create a safety or health hazard; or cause damage to environment, to adjacent property or to any portion of Work.

.2 Refer to Section 01 35 43 - ENVIRONMENTAL PROCEDURES.

.3 Do not release any silt or other materials into watercourse during construction or removal of cofferdams.

.4 A "Permit to Take Water" will be required if the dewatering system discharges more than 50,000 litres per day. The permit must be obtained from the Ontario Ministry of the Environment by the contractor.

.5 Provide settling facilities to remove suspended solids before discharging water into storm sewers, water courses or drainage areas.

.6 The total suspended solids concentration in water discharged into surface water bodies must not exceed 80 mg/L.

.7 Remove all debris from the worksite upon completion of construction.

.8 Protect the water quality and minimize the undesirable impacts of the construction upon the environment.

1.9 PROTECTION

.1 Protect dewatered work spaces from damage due to floods, rain, ice, snow or other adverse climatic conditions.

PART 2 - PRODUCTS

2.1 MATERIALS

.1 In good condition, approved by Departmental Representative and suitable for their use in Work.

.2 Do not use materials which may cause environmental damage to waterway or to land at or near site.

.3 Materials and methods proposed for use in the dewatering structure improvements, and the dewatering systems, must be approved by the Department of Fisheries and Oceans.

.4 If using sandbags, sand must be washed of fines before placing in water.

.5 Earth or granular materials are not acceptable for improving the water-tightness of the existing stoplog dewatering structures.

.6 Note that Fisheries & Oceans prefers gravel/rock fill with rubber membrane, caissons, rubber dams, sheet piling, bolted pre-engineered frame-type structures, or other types of cofferdams which do not generate turbidity.

PART 3 - EXECUTION

3.1 GENERAL

.1 Evaluate, plan and execute work in an expert and prudent manner giving due consideration to:
.1 Climatic conditions which may occur at work location during period of doing work in its entirety.
.2 Safety of personnel and of general public.
.3 Safety of work and of adjacent property.
.4 Safety of removals.
.5 Environmental requirements.
.6 Clearance requirements for work.
.7 Changes in water levels

.2 Parks Canada to supply Service Logs for dewatering.

3.2 DEWATERING

.1 Stoplogs to be installed to coping elevation.

.2 When existing structures are incorporated into the dewatering system, the Departmental Representative does not guarantee the water-tightness of the structures.

.3 Design, supply and install any additional methods and materials required to maintain the site in dry condition.

.4 The contractor may improve the water-tightness of the stoplogs in the dewatering structure with plastic sheeting, burlap bags or similar material.

.5 Dewater work spaces and maintain them in a fully dewatered state until work is finished.

.6 Continue dewatering operations, to enable work to proceed in the dry, for duration of work.

.7 Ensure that any drawdown of the water surface due to pumping does not affect:
.1 The safety or quality of the work.
.2 Neighbouring property in an adverse manner.
.3 The stability of soils.

.8 Intersect water draining from adjacent soil and bedrock due to lowering of the water table. Remove it from the work spaces. Prevent the loss of fines from adjacent soil. The dewatering systems must prevent seepage pressure on foundation soils which would disturb the soil and reduce the bearing capacity.

.9 Repeat entire dewatering procedure as often as may be necessary if flooding or other damage occurs before completion of work.

3.3 WATCHKEEPER

.1 Ensure continuity of dewatering by designating a watchkeeper to make periodic checks at times when work is not in progress. Watchkeeper's qualifications under this Section are to be sufficient to perform, on dewatering equipment, such duties as:
.1 Preventive maintenance and refuelling of generators normally performed during any shift.
.2 Emergency repairs of minor complexity.

3.3 WATCHKEEPER (Cont'd)

.1 (Cont'd)
.3 Placing standby items in service.

3.4 EQUIPMENT

.1 General:
.1 Provide equipment in safe operating condition and maintain it in a safe operating condition for entire period of use and/or standby for use on work.
.2 Provide skilled operators for equipment.

.2 Standards and Performance:
.1 Provide equipment of such quality and in such quantity as to provide sufficient capability to perform essential functions of work.
.2 Provide standby replacement for pumps and other essential dewatering equipment which may break down during work.
.3 Keep this replacement equipment available on site for immediate use.

3.5 DEWATERING REMOVAL

.1 At approved stages in work remove all materials, temporary structures, and dewatering systems used to improve the water tighness of the stoplogs in the dewatering structure; any additional temporary structures; and dewatering systems.

.2 The Contractor will be responsible for the removal of stoplogs in the dewatering structures and to return service stoplogs to the same location where they were picked-up. TSW Shops Building Yard, 2155 Ashburnham Drive, Peterborough, Ontario, K9L 1P8

3.6 CLEAN-UP AND RECTIFICATION

.1 Clean the lock chambers of accumulated silt, debris and other materials deposited as a result of the contract activities.

.2 Dispose of all unwanted materials in an approved manner off TSW property.

.3 Do not dispose of any materials in the turning basing and or lock chambers.

.4 All waste described as subject to Regulation 347, Environmental Protection Act, must be transported with a valid "Certificate of Approval for a Waste Management System" to a

3.6 CLEAN-UP AND RECTIFICATION (Cont'd)

.4 (Cont'd)
site approved by the Ontario M.O.E. to accept the waste.

END